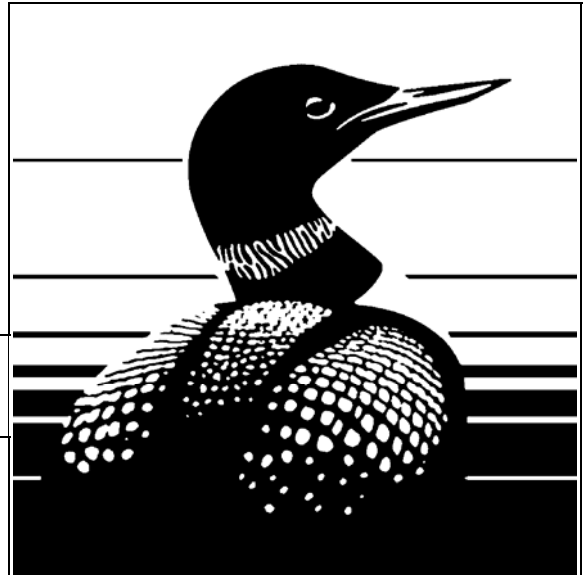

The 2005 International Trumpeter Swan Survey in Alberta, Saskatchewan, Manitoba and the Northwest Territories

Gerard W. Beyersbergen, Regional Coordinator / Editor

Prairie and Northern Region 2007

Technical Report Series Number 485



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Gerard W. Beyersbergen, Regional Coordinator / Editor¹

**Technical Report Series Number 485
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Summary

The survey of Trumpeter Swan (*Cygnus buccinator*) breeding and summering habitat in Alberta, Saskatchewan, Manitoba and the Northwest Territories was completed in August and September 2005. Aerial survey flights totaled over 136 hours across the region. This is the first international survey where swans were recorded in Manitoba with a total of 35 birds including 25 adults and 10 cygnets. Total swan numbers increased in all areas surveyed in 2005 from the counts in 2000: Alberta 1724 birds (73.3% increase); Saskatchewan 78 birds (59.2% increase); and the Northwest Territories 415 birds (41.2% increase). The greatest increase in adult numbers occurred in Alberta 1175 birds (+75.9%), followed by Saskatchewan 53 birds (+65.6%) and the Northwest Territories 327 birds (+60.3%). Cygnets accounted for 31.8%, 32.1% and 21.2% of the swans counted in Alberta, Saskatchewan and the Northwest Territories, respectively. Cygnet numbers were higher than in the 2000 census in all areas except the Northwest Territories while mean brood size was lower except in Alberta which increased slightly. Trumpeter Swan numbers continue to increase across their current range with higher densities in some regions and expansion into new areas of suitable habitat in others. The Trumpeter Swans surveyed in this region are part of the Rocky Mountain and Interior Populations and currently rely on limited wintering ranges in the Greater Yellowstone and LaCreek National Wildlife Refuge areas, respectively. Restriction on expansion of the wintering areas will more likely limit population growth than will the availability of summer habitat for Trumpeter Swans in this region.

Résumé

Le relevé du Cygne trompette (*Cygnus buccinator*) à l'échelle de son aire de nidification et d'estivage en Alberta, en Saskatchewan, au Manitoba et dans les Territoires du Nord-Ouest a été effectué en août et septembre 2005. Les dénombrements aériens se sont échelonnés sur plus de 136 heures. C'est la première fois que ce relevé international révèle la présence de cygnes trompettes au Manitoba. Au total, 35 individus, soit 25 adultes et 10 jeunes, y ont été recensés. Dans toutes les régions étudiées, le nombre total de cygnes était plus élevé en 2005 qu'en 2000 : Alberta, 1 724 individus (hausse de 73,3 %); Saskatchewan, 78 individus (hausse de 59,2 %); Territoires du Nord-Ouest, 415 individus (hausse de 41,2 %). La plus forte augmentation relative a été notée en Alberta (1 175 individus, + 75,9 %), puis en Saskatchewan (53 individus, + 65,6 %) et, finalement, aux Territoires du Nord-Ouest (327 individus, + 60,3 %). Les jeunes représentaient 31,8 %, 32,1 %, 28,6 % et 21,2 % des effectifs recensés en Alberta, en Saskatchewan, au Manitoba et dans les Territoires du Nord-Ouest, respectivement. Ils étaient plus nombreux qu'en 2000 dans chaque région, à l'exception des Territoires du Nord-Ouest. La taille moyenne des couvées était plus faible qu'en 2000 dans toutes les régions sauf l'Alberta, où elle a légèrement augmenté. Les effectifs du Cygne trompette continuent de croître à l'échelle de l'aire actuelle, l'espèce atteignant des densités plus fortes dans certaines régions et occupant de nouvelles étendues d'habitat favorable dans d'autres. Les cygnes trompettes recensés dans cette région font partie des populations

des Rocheuses et de l'Intérieur et dépendent d'un nombre limité d'aires d'hivernage dans les régions du Greater Yellowstone et du LaCreek National Wildlife Refuge, respectivement. Dans l'avenir, la croissance des populations de cygnes trompettes dans cette région sera davantage limitée par l'incapacité d'étendre les aires d'hivernage que par la disponibilité des aires d'estivage.

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1.0 INTRODUCTION

The first extensive breeding range survey of Trumpeter Swans (*Cygnus buccinator*) was conducted in 1968, next in 1975, then every five years up to the present (Caithamer 1996, Caithamer 2001). Our survey area, in the Prairie and Northern Region of Environment Canada, covers two geographically distinct populations of Trumpeter Swans. There is the Rocky Mountain Population in Alberta, the Deh Cho Region of the Northwest Territories and western Saskatchewan, and the Interior Population in eastern Saskatchewan and Manitoba.

This report summarizes the results of surveys conducted across the known or traditional summer range of the species, including potential expansion areas. In some instances, trumpeter swan observations were the result of other wildlife surveys or work programs. In Manitoba, Trumpeter swans were reported on the Pinawa Channel near Whiteshell Provincial Park in spring 1998 (Burgess and Bote 1999) and recently in spring 2005. Although swans were not observed in Manitoba during the 2000 survey, recent observations (Arquilla *et al.* 2002, Patton *et al.* 2004) resulted in extensive surveys in the Duck Mountains, Porcupine Hills, Riding Mountain National Park and Whiteshell Provincial Park in the province. In Alberta, the Cold Lake Air Weapons Range was surveyed for the first time. Existing survey areas were also expanded in some regions to cover incidental sightings outside the standard survey region and to monitor the expansion of the population.

2.0 METHODS

The majority of surveys were conducted by intensive searching from aircraft. Most surveys employed fixed-wing aircraft with an observer on either side of the aircraft, flying at elevations of 150 – 300 m above ground level and speeds of 100 - 150 km/h; two regions used a helicopter (Pincher Creek - Waterton, Alberta and High Level, Alberta). Regional survey efforts were coordinated by the individual highlighted at the start of each of the summaries (Appendix 1). One observer seated next to the pilot conducted navigation of the survey route or area as well as counts of swans. Elk Island National Park surveys were also conducted as regular ground checks during the summer. Incidental observations were provided by landowners and other non-survey individuals. The survey results are considered to be total minimum counts in each region.

Surveys were focused on established or traditional breeding areas of Trumpeter Swans. All water bodies known to have been occupied by swans in previous surveys were checked. In some regions other suitable water bodies in areas adjacent to traditional lakes were surveyed. We included additional wetlands or regions in our survey based on incidental reports of swan observations, made since the last continental survey in 2000. The number of birds in each survey area was tallied by adult (> 1year) and young-of-year (cygnet) age categories. Adults were classed as singles, singles with cygnets, paired, paired with cygnets or flocked (3 birds or more).

Locations of Trumpeter Swans were recorded with Global Positioning System (GPS) units or marked on 1:250,000 topographic paper maps. Topographic paper maps were used on some flights with the routes marked for navigation during the survey, while other surveys employed flight track logs recorded on GPS units or laptops using Moving map software (e.g. Fugawi). Swan locations were compared to previously documented sites and this year's numbers were added to corresponding site histories on the databases. New site locations and swan numbers were added to existing swan databases.

The majority of the surveys were conducted between 24 August and 14 September 2005 with incidental observations on 9 August, 24 September and 3 October. Personnel from the three provincial government wildlife agencies, the Canadian Wildlife Service, Parks Canada Agency, and Ducks Unlimited Canada (DUC) conducted all surveys (Appendix 2).

3.0 RESULTS

In summary, aerial survey flights (Appendix 1) totalled 93 hours in Alberta (eight crews), 9 hours in Saskatchewan (one crew), 13.5 hours in Manitoba (three crews) and 20.8 hours in the Northwest Territories (two crews). The distribution of total survey coverage is mapped as an index of regional survey maps (Appendix 3). Specific survey details are noted in each of the following geographic regional reports.

A total of 2,145 Trumpeter Swans were counted in the Rocky Mountain Population survey area, which included 1,499 adults and 646 cygnets (Table 1, Figure 1), while the Interior Population survey area had a total of 113 Trumpeter Swans with 78 adults and 35 cygnets (Table 2, Figure 1). Total recorded swan numbers by jurisdiction for the Rocky Mountain Population were Alberta 1,730 and the Northwest Territories 415; for the Interior Population they were Saskatchewan 78 and Manitoba 35. The distribution of adult swans as paired, flocked or single birds is provided in Table 3.

All Trumpeter swan locations in Alberta are recorded in Alberta's Fish and Wildlife Management Information System (WMIS - formerly BSOD). The records for the Saskatchewan, Manitoba, and Northwest Territories sites are recorded in the Canadian Wildlife Service Trumpeter Swan data files housed in the Edmonton office.

The number of swans observed in all regions except Lac La Biche and Pincher Creek - Waterton was higher than in any previous survey. Survey coverage for some of the regions was expanded in response to the expansion of swan occurrences and is discussed in the text below. In areas where the survey coverage was similar to that of 2000, and to the 1995 survey for several regions, comparisons of the results are made to show the increase (Table 4).

Table 1. Trumpeter Swan observations recorded for the Rocky Mountain Population of Trumpeter Swans in Alberta, Saskatchewan and the Northwest Territories in 2005.

Jurisdiction and Geographic Region	Total Swans	Adults	Cygnets	% Cygnets	Number of broods	Brood Size	
						Mean	S.E.
ALBERTA							
Grande Prairie - Valleyview	1013	703	310	30.6	96	3.23	0.15
Peace River – High Level – Bistcho Lake	388	247	141	36.3	40	3.53	0.19
High Prairie -Utikuma – Peerless	159	97	62	39.0	17	3.65	0.44
Edson – Whitecourt – Drayton Valley	68	47	21	30.9	7	3.00	0.82
Elk Island National Park – Miquelon Lakes	35	25	10	28.6	3	3.33	0.88
Lac La Biche – Cold Lake – Ft. Mc Murray	4	4	0	0	0	0	0
Pincher Creek – Waterton Lakes National Park	31	23	8	25.8	2	4.00	1.00
Hay – Zama Lakes	32	26	6	18.8	1	6.00	-
<i>TOTAL</i>	<i>1730</i>	<i>1172</i>	<i>558</i>	<i>32.2</i>	<i>166</i>	<i>3.36</i>	<i>0.12</i>
SASKATCHEWAN							
Cypress Hills Provincial Park	0	0	0	-	0	-	-
<i>TOTAL</i>	<i>0</i>	<i>0</i>	<i>0</i>	<i>-</i>	<i>0</i>	<i>-</i>	<i>-</i>
NORTHWEST TERRITORIES							
Deh Cho Region	400	312	88	21.2	37	2.37	0.21
Nahanni National Park	15	15	0	-	0	-	-
<i>TOTAL</i>	<i>415</i>	<i>327</i>	<i>88</i>	<i>21.2</i>	<i>37</i>	<i>2.37</i>	<i>0.21</i>
<i>Rocky Mountain Population Total</i>	<i>2145</i>	<i>1499</i>	<i>646</i>	<i>30.1</i>	<i>203</i>	<i>3.18</i>	<i>0.11</i>

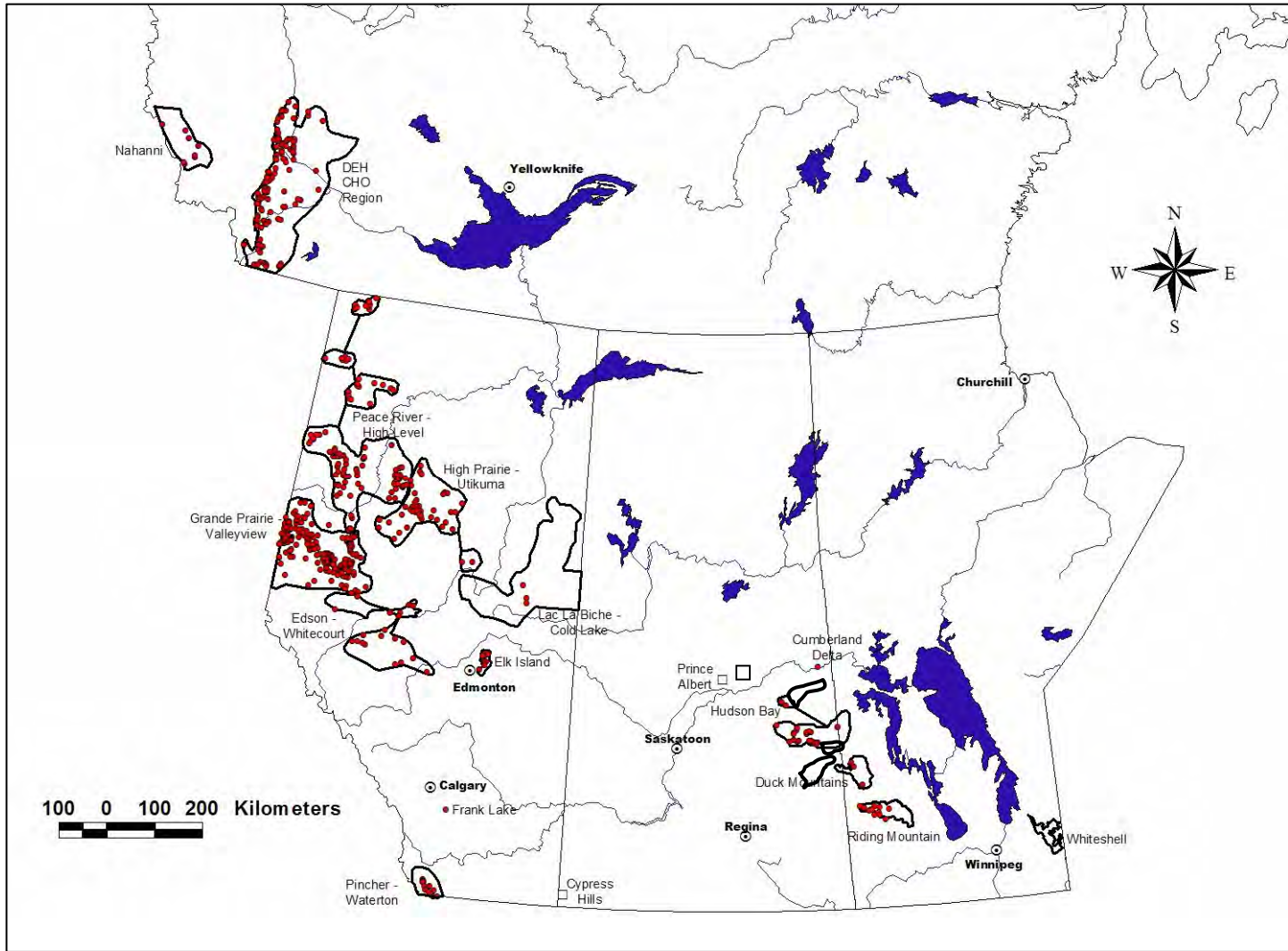


Figure 1. Survey coverage and Trumpeter Swan distribution in the 2005 survey in Alberta, Saskatchewan, Manitoba and the Northwest Territories.

Table 2. Trumpeter Swan observations recorded for the Interior Population of Trumpeter Swans in Saskatchewan and Manitoba in 2005.

Jurisdiction and Geographic region	Total Swans	Adults	Cygnet	% Cygnets	Number of broods	Brood Size	
						Mean	S.E.
SASKATCHEWAN							
Hudson Bay – Porcupine Forest & Hills – Pasquia Hills	74	51	23	31.1	8	2.88	0.44
Cumberland marshes – Saskatchewan River Delta	4	2	2	50.0	1	2.00	-
Prince Albert – Candle Lake	0	0	0	-	0	-	-
<i>TOTAL</i>	78	53	25	32.1	9	2.78	0.40
MANITOBA							
Duck Mountains – Porcupine Hills	5	5	0	-	0	-	-
Riding Mountain National Park	30	20	10	33.3	3	3.33	0.88
Whiteshell Provincial Park	0	0	0	-	0	-	-
<i>TOTAL</i>	35	25	10	28.6	3	3.33	0.88
<i>Interior Population Total</i>	113	78	35	31.0	12	2.92	0.36

Table 3. Total number of adult Trumpeter Swans in Alberta, Saskatchewan, Manitoba and the Northwest Territories observed in fall 2005.

Jurisdiction	Region	Singles		Paired		Flocked		Total
		No.	%	No.	%	No.	%	
Rocky Mountain Population								
Alberta	Grande Prairie – Valleyview	22	3.1	414	58.8	267	37.9	703
	Peace River – High Level – Bistcho Lake	11	4.0	194	71.1	68	24.9	273
	High Prairie - Utikuma – Peerless	7	7.2	66	68.1	24	24.7	97
	Edson – Whitecourt – Drayton Valley	3	6.4	32	68.1	12	25.5	47
	Elk Island National Park – Miquelon Lakes	5	15.4	20	84.6	0	0	25
	Lac La Biche – Cold Lake – Ft. McMurray	2	50.0	2	50.0	0	0	4
	Pincher Creek – Waterton National Park	4	17.4	16	69.6	3	13.0	23
Northwest Territories	Deh Cho Region	21	6.7	218	69.9	73	23.4	312
	Nahanni National Park	1	6.7	14	93.3	-	-	15
Interior Population								
Saskatchewan	Hudson Bay – Porcupine Forest & Hills – Pasquia Hills	2	3.8	36	71.7	13	24.5	51
	Cumberland Marshes – Saskatchewan River Delta	-	-	2	100.0	-	-	2
Manitoba	Duck Mountains – Porcupine Hills	1	20.0	4	80.0	0	0	5
	Riding Mountain National Park	4	20.0	16	80.0	0	0	20

Table 4. Comparison of Trumpeter Swan survey results for Alberta, the Northwest Territories and Saskatchewan where survey coverage is similar between years.

Jurisdiction	Sub-region	Year	No. Adults	No. Broods	No. Cygnets (mean)	Total Swans
Alberta	Grande Prairie - Valleyview	1995	392	41	141 (3.43)	533
		2000	404	60	204 (3.40)	608
		2005*	680	95	306 (3.22)	986
	Peace River - High Level**	1995	132	25	67 (2.68)	199
		2000	148	21	64 (3.05)	212
		2005	273	41	147 (3.59)	420
	Elk Island National Park	1995	11	0	0	11
		2000	8	2	5 (2.5)	13
		2005	25	3	10 (3.33)	35
	High Prairie - Utikuma - Peerless	2000	37	7	35 (4.5)	72
		2005	97	17	62 (3.65)	159
	Edson – Whitecourt – Drayton Valley	2000	29	2	3(1.50)	32
		2005*	42	7	21(3.0)	63
	Pincher Creek – Waterton National Park.	2000	27	4	10 (3.33)	37
		2005	23	2	8 (4.0)	31
Northwest Territories	Fort Liard - Tetcela	1995	132	15	47 (3.1)	179
		2000	204	32	90 (2.81)	294
		2005*	300	35	82 (2.34)	382
Saskatchewan	Hudson Bay	1995	21	1	5 (5.0)	26
		2000	21	4	17 (4.25)	38
		2005	51	9	25 (2.78)	76

* Expansion area swan numbers removed for comparisons between years of similar survey areas.

** Swan numbers include totals for the Hay/Zama survey component conducted on an earlier survey date.

3.1 Rocky Mountain Population of Trumpeter Swans

3.1.1 Alberta

3.1.1.a Grande Prairie – Valleyview

Gerry Beyersbergen, Bev Gingras and Dave Stepnisky. Aerial surveys were conducted out of Grande Prairie with a Cessna 206 chartered from Slave Air Services based at Slave Lake, Alberta. The surveys were conducted over a two day period and entailed flights of 8.7 hours on August 24 and 9.2 hours on August 25 (Table 1) with ideal weather conditions of slightly overcast skies and light to moderate winds. There were only two observers on either survey day. A pocket of lakes in the Birch Hills on the north-eastern edge of the survey area, between the Town of Spirit River and the Peace and Smoky Rivers, was checked by Dave Stepnisky and the Peace River survey crew on September 1. Incidental Trumpeter Swan observations were provided by individuals on the ground for wetlands in the survey area not checked during the aerial survey.

High amounts of precipitation over the past couple of years resulted in elevated water levels and improved wetland conditions throughout the area (Reg Arbuckle, DUC, pers. comm.). Improved condition and increased frequency of full wetland basins was evident during the aerial surveys based on past survey area observer experience and knowledge of habitat conditions over the years.

A minor complication during the survey was the presence of 200 American White Pelicans (*Pelecanus erythrorhynchos*), a first for the lead observer in this region, among the Trumpeter Swans roosting on Bear Lake. Several low-level passes over the lake were required to better differentiate the two species. During this process the pelicans lifted off while the swans remained on the water allowing observers to get an accurate count.

Higher numbers of adults and young were found than in previous surveys, with a record high total of 1013 swans on 250 waterbodies (Table 1). Aerial survey coverage was similar to previous surveys, except for the addition of a couple of small areas with suitable water bodies southeast towards Fox Creek and in the Birch Hills (Appendix 4). The majority of wetlands within the boundary of the survey area were checked. Incidental observations by several individuals on the ground were also included in the total count. A number of paired swans were observed southeast of Grande Prairie on waterbodies surveyed but not previously occupied near the junction of the Wapiti and Smoky Rivers. Flocks of swans were observed on local staging lakes including Bear Lake (113), Cutbank Lake (34) and La Glace Lake (42). It was assumed that these numbers represented a cohort of either nonbreeders or breeding swans that abandoned sites in the Saddle Hills due to adverse environmental conditions affecting hatch and brood survival. However, it was observed that paired swans still occupied most lakes in the Saddle Hills.

Cygnets and brood numbers were up significantly from the continental census in 1995 and 2000 (Norton and Beyersbergen 2000), however cygnet numbers in the Saddle Hills were

lower than in other parts of the survey area. Leucistic (white phase) cygnets were observed in two separate broods on Hughes Lake (2 of 7 cygnets) and Long Lake (3 of 6 cygnets). The slight increase in survey area coverage in 2005 accounted for 35 swans and if removed from the total (1013 swans), then similar survey area coverage and effort in all years allows for population size to be compared reliably between 1995, 2000 and 2005. Total adult numbers increased from 392 (1995) to 404 (2000) to 680 (2005), representing a 5.7% / year average growth rate over 10 years (Table 4) but the greatest recruitment occurred since the last survey where adult numbers increased by 11.0% / year. At this rate, the adult population would be expected to double every seven years.

3.1.1.b Peace River - High Level

Bill Johnson and Lyle Fullerton. Aerial surveys were conducted out of Peace River utilizing a Cessna 206 chartered from Allison Air based at Cooking Lake east of Edmonton, Alberta. Three successive days of flying from 29 to 31 of August, totalling 23.9 hours or an average of 8 hours / day, were required to complete the area of coverage. Recent high precipitation years resulted in higher water levels on numerous lakes and improved wetland conditions throughout the area.

Surveys were conducted over a very large tract of the north-western Alberta landscape and accounted for 420 swans on 112 waterbodies (Table 1). The survey route was similar to that of 2000, which focused on traditional lakes with minimal exploration of new areas, and flights up to the Bistcho Lake and Spawn Lake area on the Northwest Territories border (Appendices 5a, b, c). Numbers of cygnets and adults represented a 129% and 84.5% increase, respectively, over those observed in the 2000 survey. Total adult numbers (Table 4) increased from 132 (1995) to 148 (2000) to 273 (2005), an average annual growth rate of 7.5% / year over the ten year period and 13.0% / year over the last five years. The adult population would be expected to double at the later rate in 5.6 years. Observation of numerous unoccupied wetlands with visually suitable habitat indicates potential for continued expansion and concentration in this area.

3.1.1.c High Prairie – Utikuma – Peerless

Mark Heckbert and Gerry Labrie (pilot and observer). Aerial surveys were flown using a Cessna 206 chartered from Slave Air based at Slave Lake, Alberta. It required two days of flying, August 25 and 26, for a total of 14.9 hours to complete the swan survey. All wetlands in each of the townships within an area generally delineated by Kimiwan Lake on the west, Bison Lake and Peerless Lake to the north, North Wabasca Lake on the east and Lesser Slave Lake to the south were surveyed from the air. There was an additional pocket, to the south-east ranging from the eastern edge of Lesser Slave Lake east to Calling Lake (Appendix 6), checked for trumpeter swans. This survey differed slightly from the 2000 survey where the flight route was pre-defined while this year every wetland was checked within the survey area to provide a baseline for future efforts.

A total of 159 swans were found at 46 locations (Table 1). Adult numbers increased by an average annual rate of 21.3% / year over five years (Table 4) with cygnet numbers

slightly less than double and total swans more than double the number observed in the 2000 survey. The number of wetlands used by swans tripled from the 15 sites used in 2000, indicating the suitability of wetland habitat for trumpeter swan expansion in the area. Although the survey area remained the same, survey effort was more intense as all wetlands were checked within the prescribed area.

3.1.1.d Edson – Whitecourt – Drayton Valley

Jan Ficht, Dave Hobson and Brian Ficht. The aerial surveys were conducted out of Edson using a Cessna 177 from Airborne Energy Solutions, Whitecourt over a two day period, August 24 and 25. A total of 9.1 hours were flown to complete the survey (Appendix 7). The effort was focused on checking historically occupied lakes or ones with recent reported use by Trumpeter Swans. A total of 57 lakes were checked, including 49 traditional lakes (15 with swans while one lake was dry), 5 new lakes (swans on all of them) in the traditional survey area, and 3 new lakes in the expansion area (swans on one). The wetland areas surveyed had good water levels and productive shoreline vegetation.

More than double the swans were located this year in comparison to the 32 found in 2000 (Table 1, Figure 1). This year's search area included the traditional sites, sites of incidental observations from the 2000 survey, and wetland sites with unconfirmed reports of swans in later years. The expansion or non-traditional flight area accounted for five adults while the traditional search area had 42 adults and 21 cygnets (7 broods). Cygnet production was seven times higher this year than the three cygnets found in two broods in 2000. In the traditional survey area, the adult population increased by an average annual rate of 7.7% / year over the five years and at this rate would double in 9.4 years (Table 4).

3.1.1.e Lac La Biche – Cold Lake – Athabasca

Floyd Kunnas, Christine Found and Anne Hubbs. Aerial surveys were conducted out of Lac La Biche utilizing a Cessna 206 chartered from Allison Air based at Cooking Lake east of Edmonton, Alberta. The survey was flown over three days during the period from 3 to 6 September and entailed 20.0 hours of flight time.

In February 2005, the Wing Environmental Officer at the Department of National Defence Cold Lake Air Weapons Range (CLAWR) was contacted to request access permission to conduct an aerial survey of the CLAWR. A formal letter to the "4 Wing" Commander resulted in access but was governed by several restrictions. An operational orientation session was mandatory prior to access to the base and timing of surveys was restricted to several identified weekends. To ensure good coverage of the range, transects were flown along a north/south routing and covered all wetlands within the boundary of the range (Appendix 8b). Although there were numerous lakes in the range, they did not appear to be very suitable for swans as most are pure muskeg lakes with very little emergent vegetation and limited riparian habitat. During the one day flight on September 3, no swans were observed in the CLAWR.

The remainder of the survey area was similar to the 2000 census and covered lakes and wetlands east of Athabasca, around St. Paul and Lac La Biche, and north to Fort McMurray (Appendices 8a,b,c). Four adult swans were seen at three locations but no young were observed (Table 1). A pair was present at Elinor Lake, a traditional site, and two singles were observed in the vicinity of Lac La Biche. This represents less than half the nine adults observed in 2000 and is comparable in the lack of cygnet observations. Habitat availability does not appear to be a limiting factor in the area and currently there is no explanation for the continued fluctuation and low numbers of trumpeter swans in this region.

3.1.1.f Elk Island National Park – Miquelon Lakes

Rob Kaye and Cory Paul (pilot/observer). Aerial surveys were conducted out of Cooking Lake using a Cessna 172 chartered from Allison Air. Several intensive flights were conducted throughout the survey area (Appendix 9) and covered all wetlands during the spring and summer period as part of the ongoing monitoring of swans under the Trumpeter Swan reintroduction program in the park. This allowed for a shorter flight of 2.5 hours on 14 September, 2005. Thirty five swans were counted in the Elk Island National Park area (Table 1, Figure1) in an area similar to that of the last two continental surveys (1995 and 2000). Twenty five adult swans (10 pairs and five singles) were resident in the survey area during summer 2005. Three pairs successfully fledged broods of 5, 2 and 3 cygnets in this reintroduced population, which continues to grow each year. Total number of adults observed in 2005 represents an average annual increase of 9.0% / year over the past ten years (Table 4). Trumpeter swans continue to expand into suitable habitat outside the park and now occupy territories up to 25 km from the park.

3.1.1.g Pincher Creek – Waterton Lakes National Park

Richard Quinlan, Jim Clark and Keith MacDougal. Surveys were conducted out of Blairmore using a Bighorn Helicopters Bell 206 B helicopter and required 3.0 hours of flying on the 25 August to cover all the wetlands in the survey area (Appendix 10). Twenty eight swans including two broods (eight cygnets in total) were recorded in the Pincher Creek - Waterton Lakes National Park area on 14 waterbodies (Table 1). The adult numbers showed an average annual reduction of 3.2%/year from the 27 adults recorded in 2000. The number of broods was half during this survey year while the total cygnet numbers only dropped by two individuals.

The southwest Alberta Trumpeter Swan population is resident in an area of foothills parkland and montane habitat. This habitat, which contains numerous ponds, begins 20 km south of Pincher Creek, and extends 40 km southeast to the Canada/USA border, 5 km west of Carway. Habitat continues into Montana, but is not surveyed beyond what can be seen from the border. Most of the ponds are on provincial crown or private land, with some being situated along the boundary of Waterton Lakes National Park (both inside and outside the park). The area is subject to very heavy rainfall events (50 to 100mm or more) during June, often followed by extremely dry summers, and the ponds

therefore exhibit high water level fluctuations. Pairs of swans without young are often observed in the high spring rainfall years, and this is likely due to flooding of nests. This has been supported by anecdotal observations. In 2005 there was a spring rainfall of this nature, and the low number of cygnets in the August survey is attributed to this situation.

Other possible influences on the South-western Alberta swan population include rural subdivisions (a new home is located beside one of the Margaret Lake ponds, and a subdivision beside Police Outpost Wetlands), and predation during some summers when the pond levels are extremely low. A minor expansion of this population may be possible, as there are several unoccupied ponds, but production and recruitment will always be hindered by the extreme climatic and environmental fluctuations. There are some ponds to the east in prairie habitat, and a very small number to the north between the Crowsnest Pass and Kananaskis area; however the best habitat for expansion appears to be to the south in the United States along the eastern front of the Montana Rockies. It is unknown if this area is surveyed and therefore, it is possible that there may already be a swan population in that area. It should be noted that two of the wetlands surveyed in the south-western Alberta survey extend partially into Montana.

A waterfowl banding crew led by Paul Pryor of the Canadian Wildlife Service, observed an isolated group of three adult Trumpeter Swans that spent the summer of 2005 at Frank Lake, east of High River. During the 2000 surveys, there was a non-breeding pair of swans observed on Frank Lake. Habitat conditions would be suitable for a pair to nest on the northern basin of the lake.

3.1.1.h Hay - Zama Lakes

Ken Wright. Trumpeter Swans were observed in the Hay-Zama Lakes wetland complex during regular scheduled waterfowl surveys (Appendix 5c). These waterfowl surveys have been conducted since 1995 as a monitoring component of the oil/gas activities on the complex. The survey was conducted using an R44 helicopter chartered from Delta Helicopter based in Rainbow Lake, Alberta. The survey, conducted on 30 August, 2005, required approximately 3.5 hours of flying to cover the entire 50,000 hectare complex. The complex was flown the following day by the Peace River survey crew but few birds were observed on the site with the exception of an additional brood that was not observed on this flight and is recorded in the Peace River data section.

Most of the adults were observed on Zama Lake-south, with four groups totalling 18 birds and 2 non-breeding pairs (Table 1). A single brood of six cygnets was observed on one of the north-western basins and another non-breeding pair was noted on an unnamed wetland. Water levels were low in a number of basins with open mud shorelines, which is typical for this time of the year in the annual cycle of the complex. The wetland complex during years with suitable water conditions could support several breeding pairs of Trumpeter Swans because of its size and partitioning into numerous basins.

3.1.2 Northwest Territories

3.1.2.a Deh Cho Region (SW Mackenzie District)

Paul Latour and Donna Mulders. Surveys were conducted using a Cessna 185 aircraft chartered from Wolverine Air based in Fort Simpson, Northwest Territories. The survey was flown during the period 24-27 August, 2005 and required 18.3 hours of flight time to complete. The area surveyed in 2000 was re-surveyed, although in 2005 the survey area was expanded to the north (Wrigley River and Fish Lake areas) and northeast (Bulmer Lake area) of the 2000 area. (Appendix 11a,b) The Deh Cho region had received higher than average amounts of precipitation prior to the survey, therefore all wetlands were likely fully charged. All wetlands that contained swans in 2000 had swans in 2005, but it appeared there were many wetlands that could have supported additional swans. A number of wetlands, mainly in the north-eastern expansion portion of the survey area (e.g., Bulmer Lake area) that appeared to be good swan habitat did not contain swans at the time of the survey.

Surveys of the Deh Cho Region, previously referred to as the Southwest Mackenzie District, resulted in a total count of 400 birds, including 37 broods (88 cygnets) (Table 1, Figure 1). Despite the increase in survey area, survey effort was fairly comparable to the 2000 survey however more birds were found in 2005 (400) than in 2000 (294). The expansion of the survey area accounted for 12 adults and 6 cygnets (2 broods). If the expansion area is excluded, the total number of adults observed in 2005 was still higher than the number observed in 2000 by 96 birds—an average annual increase of 8% / year over the five years (Table 4). Although brood numbers in the core area were slightly higher, the number of cygnets and average brood size was lower in 2005; adults and young were distributed over the survey area while the Tetcela River valley showed the highest concentrations.

3.1.2.b Nahanni National Park

Sharon Hayes and Scott Cameron. Surveys were conducted using a Cessna 206 chartered from Simpson Air Limited based in Fort Simpson, Northwest Territories. The upper reaches of the South Nahanni River were surveyed despite poor weather conditions. Several attempts were made prior to successful completion of the flight on 8 September, 2005 and required 2.5 hours of flight time (Appendix 12). The lower portion of the park area was covered in the flight by Latour and Mulders.

There were several suitable wetlands available throughout the north western portion of the survey and not being used by swans, particularly in the area between the Flat River and Rabbitkettle. Water levels on the river were generally high throughout the summer.

There were 15 adults but no young observed on eight wetlands within the survey area (Table 1). Severe weather conditions in the spring may have resulted in the loss of production of young this year but cannot be verified. Extreme weather conditions in

2000 precluded a survey of the area so no comparison can be made with this year's results.

3.1.3 Saskatchewan

3.1.3.a Cypress Hills Provincial Park

Sue McAdams. No visit was made to the park, however, Park staff and visitors have not reported any Trumpeter Swans for quite a few years. Trumpeter Swans used to be seen at Adams Lake, which can be seen from Conglomerate Cliffs, and swans would be visible with a spotting scope from the cliffs if they are present (Appendix 13). No swans were observed in 2005 (Table 1), which was similar to the 2000 survey year. A lone adult was observed during the 1995 continental survey.

3.2 Interior Population of Trumpeter Swans

3.2.1 Saskatchewan

3.2.1.a Hudson Bay - Porcupine Forest/Hills - Pasquia Hills

Gerard Beyersbergen, Bev Gingras and Bob Simpson (pilot/observer). The survey was conducted out of Dauphin, Manitoba using a Cutlass RG-II (Cessna 172) chartered from Dauphin Air Services based in Dauphin, Manitoba. The survey was flown on 21 August, 2005 and entailed 7.5 hours of flying with refuelling at Swan River, Manitoba.

The survey covered the majority of the wetlands within the boundary around the Porcupine Forest southwest of Hudson Bay, the Porcupine Hills of Saskatchewan and the Pasquia Hills (Appendix 14a,b). We observed 74 swans, including 23 cygnets in eight broods (Table 2, Figure 1). Adults numbers showed an average annual increase of 9.3% / year over the 10 years with the total observed at 51 (2005) compared to the 21 seen in 1995 and 2000 (Table 4). The number of broods increased eight times compared to those observed in 1995 while cygnet numbers increased five times during the same period.

The majority of the Pasquia Hills wetlands we checked appeared to be composed of habitat that had lower potential for swan use compared to the Porcupine Forest and Porcupine Hills. Most of these muskeg lakes had very little emergent vegetation and limited riparian habitat. Observations of swans were limited to the southern sections of the Pasquia Hills, with habitat similar to the Porcupine Forest and Hills. Abundant suitable wetland habitat was unoccupied in the Porcupine Forest and Porcupine Hills survey area. Water conditions appeared good from the air and most wetlands had water well into the emergent vegetation.

3.2.1.b Cumberland Delta

Kim Eskowich. This was not an official swan survey but rather a two hour flight to get an idea of the flooding by the Saskatchewan River and water conditions in the Cumberland marshes/delta, located north of the Pasquia Hills (Appendix 15). Most years, throughout the course of the spring and summer we manage to see probably 75% of the basins from the air and some years there is extensive coverage on the water. This is the first time I have flown over this particular lake in two years but these are the first Trumpeter Swans seen on the Ducks Unlimited Canada projects at Cumberland. There were two adults and at least two cygnets on North Petabec Lake on 28 June, 2005 (Table 2). The Cumberland Delta marshes have numerous wetlands potentially suitable for swan use.

3.2.1.c Prince Albert – Candle Lake

Rhys Beaulieu. No special flight was scheduled for Trumpeter Swans but the provincial forestry branch conducts regular fire surveillance flights in the Candle Lake area during the summer months. No swans were observed this year during flights over the area, which included Birchbark Lake and Kelsey Lake where swans were observed in the 2000 survey year (Norton and Beyersbergen 2000) (Appendix 16).

3.2.2 Manitoba

3.2.2.a Duck Mountains – Porcupine Hills

Gerard Beyersbergen, Bev Gingras and Bob Simpson (pilot/observer). The survey was conducted out of Dauphin, Manitoba using a Cutlass RG-II (Cessna 172) chartered from Dauphin Air Services based in Dauphin, Manitoba. The survey was flown on 19 and 21 August, 2005 and entailed 4.2 hours and 1.5 hours of flying, respectively, with refuelling at Swan River, Manitoba on the Porcupine Hills flight on the second day.

The Porcupine Hills extend from Saskatchewan into Manitoba and the survey flights are separated by jurisdictional or provincial boundaries (Appendix 14a). The provincial forests on the Manitoba side had more intensive logging activity, forest fires, as well as cottage development on the larger lakes, all of which appear to have restricted use by Trumpeter Swans. A large number of wetlands on the northern end of the plateau, although appearing to have good water conditions, do not appear to provide suitable habitat for swans due to the lack of emergent vegetation in or around the shore of the waterbody. A large number of the lakes surveyed had single and paired white birds, but upon closer inspection, these birds were identified as American White Pelicans. No Trumpeter Swans were observed on any of the wetlands on the Manitoba portion of the Porcupine Hills as was the case in 2000.

The Duck Mountains are composed of two parts: the provincial forest and the provincial park (Appendix 17). The first confirmed observation and breeding of Trumpeter Swans in this area was in June 2002 by Ducks Unlimited Canada personnel while conducting aerial surveys for waterfowl (Chris Smith, DUC, pers. comm.). Habitat and water

conditions of the numerous wetlands observed in the Duck Mountains were ideal and there is good potential for continued growth in swan numbers in the region. The majority of wetlands in the defined area were checked for birds and Trumpeter Swans including 2 pairs and a single swan but no cygnets were observed on three sites (Table 2).

3.2.2.b Riding Mountain National Park

Tim Sallows, Sean Frey and Mellisa Gibbons. A Cutlass RG-II (Cessna 172) chartered from Dauphin Air Services based in Dauphin, Manitoba was used to conduct the survey that covered all wetlands within the area (Appendix 18). The survey flown on 29 and 30 August, 2005 entailed 6.2 hours of flying and was conducted in the morning. The elevated plateau on which the park sits can result in turbulent conditions for flying later in the day.

Wetland water and habitat were ideal in the western segment of the park and there were numerous waterbodies suitable for use by Trumpeter Swans. A total of 30 swans were observed, including 10 cygnets in three broods, on 12 wetlands (Table 2).

The first confirmed observation and breeding of Trumpeter Swans in the park was in September 2002 by Park's staff conducting fire patrols in the park. Annual monitoring of the swans in the park has occurred since 2002. They have been observed on a number of different lakes during the annual surveillance indicating potential for expansion within the park. The total numbers of adults have remained fairly stable although fluctuation in the number of cygnets has been observed. The number of swans observed in 2005 is similar to 2003 and represents the highest total count for the park.

3.2.2.c Whiteshell Provincial Park

Ron Bazin and Garth Ball. A Cessna 185 chartered from Blue Water Aviation Services Limited based in Pine Falls, Manitoba was used to cover the survey area (Appendix 19). The flight on 30 August, 2005 lasted for 3.0 hours.

In the spring of 2005, additional unconfirmed reports of Trumpeter Swans were received from the Pinawa area on the west edge of Whiteshell Provincial Park. An extensive survey flight of all the lakes and wetland complexes was conducted in late August. There appeared from the air to be suitable wetlands available and in good condition for use by Trumpeter Swans however no swans were detected during the flight in the area of Whiteshell Provincial Park. Trumpeter Swans are documented just across the Manitoba and Ontario border in the Kenora area.

4.0 DISCUSSION

The Trumpeter Swan population has experienced growth in our region throughout the International surveys (Appendix 20) and continues to do extremely well across the region with large increases in most survey areas in 2005 compared to the 2000 survey. The exceptions are the Lac La Biche and Pincher Creek – Waterton areas, which registered declines in total swan numbers. Alberta has the largest number of swans and they are

dispersed across seven geographic areas or sub-regions (birds in a geographic area are sometimes referred to as a “flock”). Alberta’s regional or flock population sizes ranged from 4 to 1,013 Trumpeter Swans for the Lac La Biche and Grande Prairie areas respectively. The Deh Cho Region, formerly the Southwest Mackenzie District, had poor cygnet production this year and observed cygnet numbers represented only 21% of total swans observed and the mean brood size (2.37) was the lowest for the region.

As Trumpeter Swans continue to expand across the region it will become increasingly more difficult to make comparisons between survey years if survey effort changes to compensate for the expanded areas. This was the case for the 2000 survey and although survey effort was expanded slightly in a number of areas in 2005, there was a minimal increase in the number of swans recorded in these expanded areas. It appeared that the density of swans and occupancy rate of survey lakes increased in a number of sub-regions resulting in the large increases in swan numbers. It is not known why more paired and breeding adults were not observed in 2005 in the Lac La Biche area, which appears to have numerous suitable wetlands. It is expected that breeding adults from the core breeding flocks in the High Prairie-Utikuma-Peerless and Peace River areas will expand into the Lac La Biche areas, however it may take several more years for this expansion to occur. However, across the survey region, overall increases in the Trumpeter Swan population were observed in Alberta (74%), Saskatchewan (100%) and the Northwest Territories (56%) while Manitoba is in its first survey year in 2005.

A number of survey crews noted the presence of large numbers of unoccupied but apparently suitable wetlands for Trumpeter Swans indicating the potential for increased swan numbers in their areas in future years. The Trumpeter Swans surveyed in this region are components of two distinct continental populations. Those birds that breed and summer in Alberta and the Northwest Territories are part of the Rocky Mountain Population that winters primarily in the Greater Yellowstone area. The swans in eastern Saskatchewan and Manitoba are considered part of the Interior Population and are known to winter in the region of the LaCreek National Wildlife Refuge in South Dakota. Both of these wintering areas have limited capacity for supporting increased numbers of Trumpeter Swans. Thus, restriction on expansion of the wintering areas will more likely limit overall population growth than will the availability of summer habitat for Trumpeter Swans in this region.

5.0 ACKNOWLEDGMENTS

These results would not have been available without the efforts of all the survey crews across the region. Financial support for the surveys was provided by the respective agencies that conducted the regional surveys. Maps and graphics were created by Sam Barry of the Canadian Wildlife Service, who also provided comments on the manuscript and statistical assistance. Figure 1 of the survey area and swan distribution was prepared by Bev Gingras of the Canadian Wildlife Service. Additional comments and editing of the manuscript were provided by Wendy Calvert.

6.0 LITERATURE CITED

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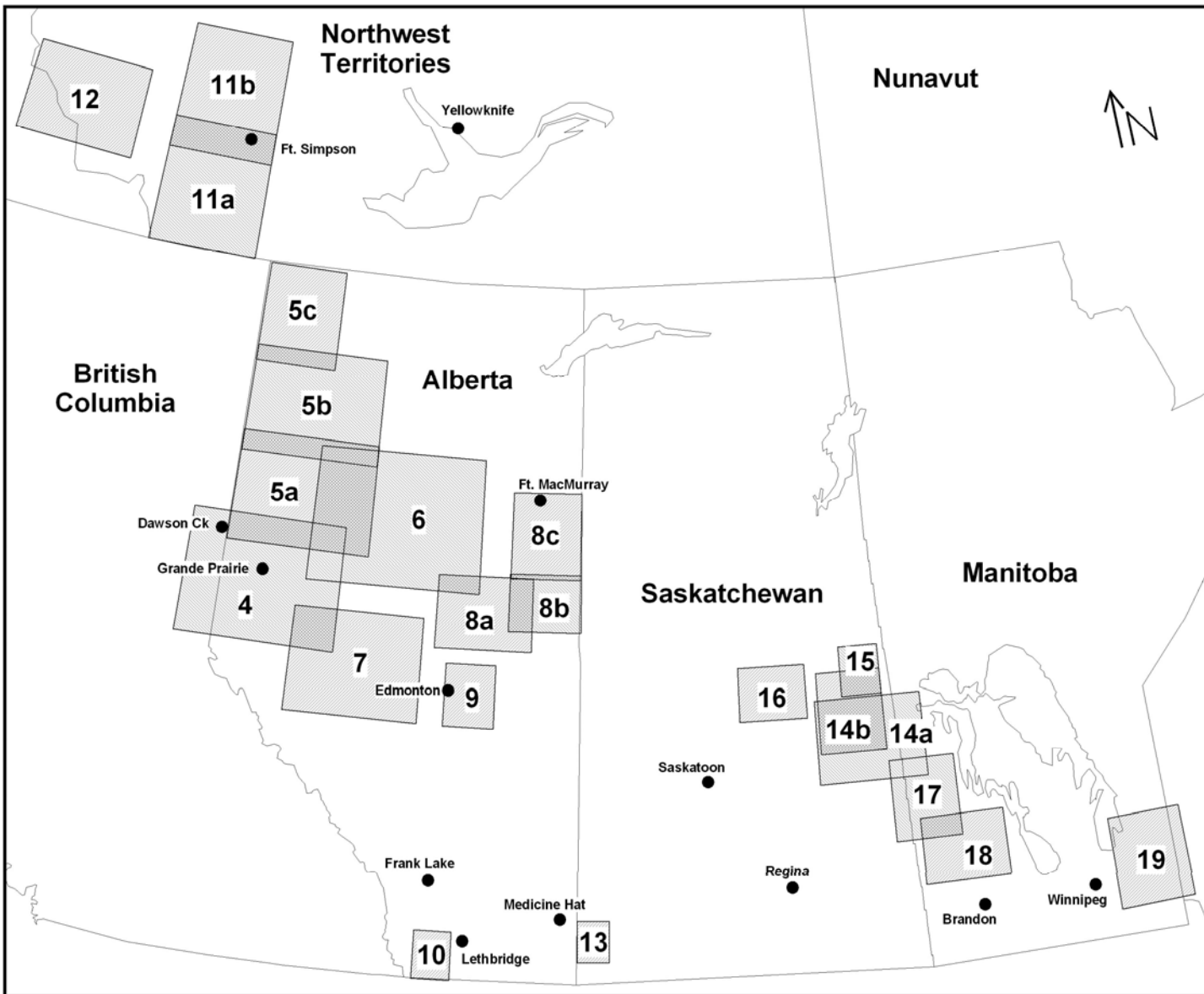
7.0 APPENDICES

Jurisdiction	Geographic region – survey area	Dates	Coordinator	Observer	Pilot / Observer	Survey Method	Effort (hours)
Alberta	Grande Prairie - Valleyview	24, 25 August, 1 September	Gerard Beyersbergen	Dave Stepniski Bev Gingras	Mark Fremmerlid	Fixed-wing	17.0 Hours
	Peace River – High Level	29, 30, 31 August	Bill Johnson	Lyle Fullerton	Cory Paul	Fixed-wing	23.9 Hours
	Hay Zama	30 August	Ken Wright			Helicopter	3.5 Hours
	High Prairie - Utikuma – Peerless	25, 26 August	Mark Heckbert		Gerry Labrie	Fixed-wing	14.9 Hours
	Edson – Whitecourt – Drayton Valley	24, 25 August	Jan Ficht	Dave Hobson	Brian Ficht	Fixed-wing	9.1 Hours
	Elk Island National Park – Blackfoot - Ministik	14 September	Rob Kaye		Cory Paul	Fixed-wing	2.5 Hours
	Lac La Biche – Cold Lake – Athabasca	3, 6, 7 September	Floyd Kunnas	Anne Hubbs Christine Found	Cory Paul	Fixed-wing	20.0 Hours
	Pincher Creek – Waterton National Park	25 August	Richard Quinlan	Jim Clark Keith MacDougal		Helicopter	3.0 Hours
	Saskatchewan	Hudson Bay – Porcupine Hills – Pasquia Hills	21 August	Gerard Beyersbergen	Bev Gingras	Bob Simpson	Fixed-wing
Manitoba	Duck Mountains – Porcupine Hills	19 August	Gerard Beyersbergen	Bev Gingras	Bob Simpson	Fixed-wing	4.3 Hours
	Riding Mountain National Park	29, 30 August	Tim Sallows	Sean Frey Mellisa Gibbons	Bob Simpson	Fixed-wing	6.2 Hours
	Whiteshell Provincial Park	30 August	Ron Bazin	Garth Ball		Fixed-wing	3.0 Hours
Northwest Territories	Fort Liard –Tetcela R.	24 – 27 August	Paul Latour	Donna Mulders	Jacques Rousseau	Fixed-wing	18.3 Hours
	Nahanni National Park	8 September	Doug Tate	Sharon Hayes Scott Cameron		Fixed-wing	2.5 Hours

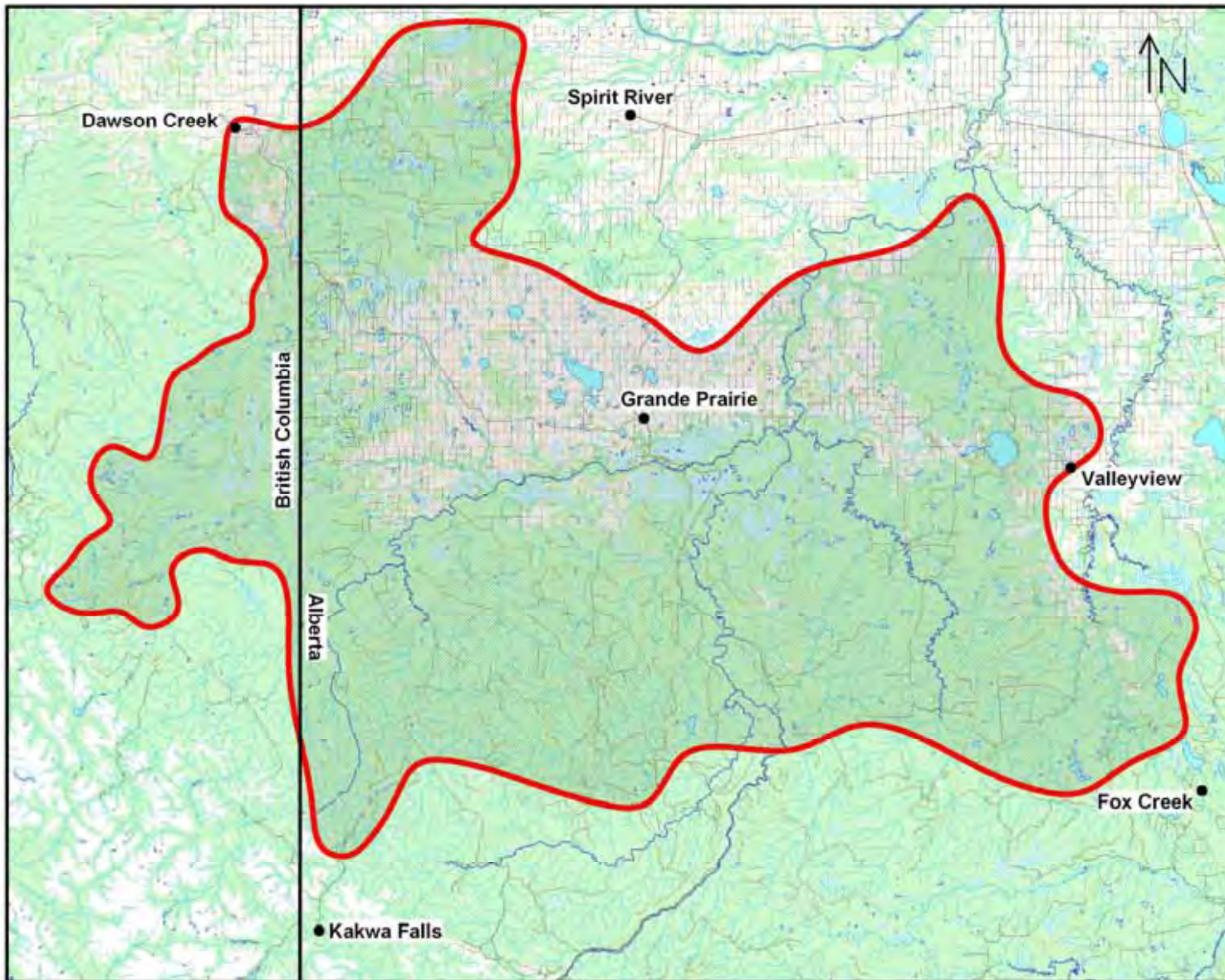
Appendix 1. Trumpeter Swan survey effort in 2005 for Alberta, Saskatchewan, Manitoba and the Northwest Territories.

Appendix 2. List of personnel and casual observers involved in the Trumpeter Swan survey of Alberta, Saskatchewan, Manitoba, and the Northwest Territories.

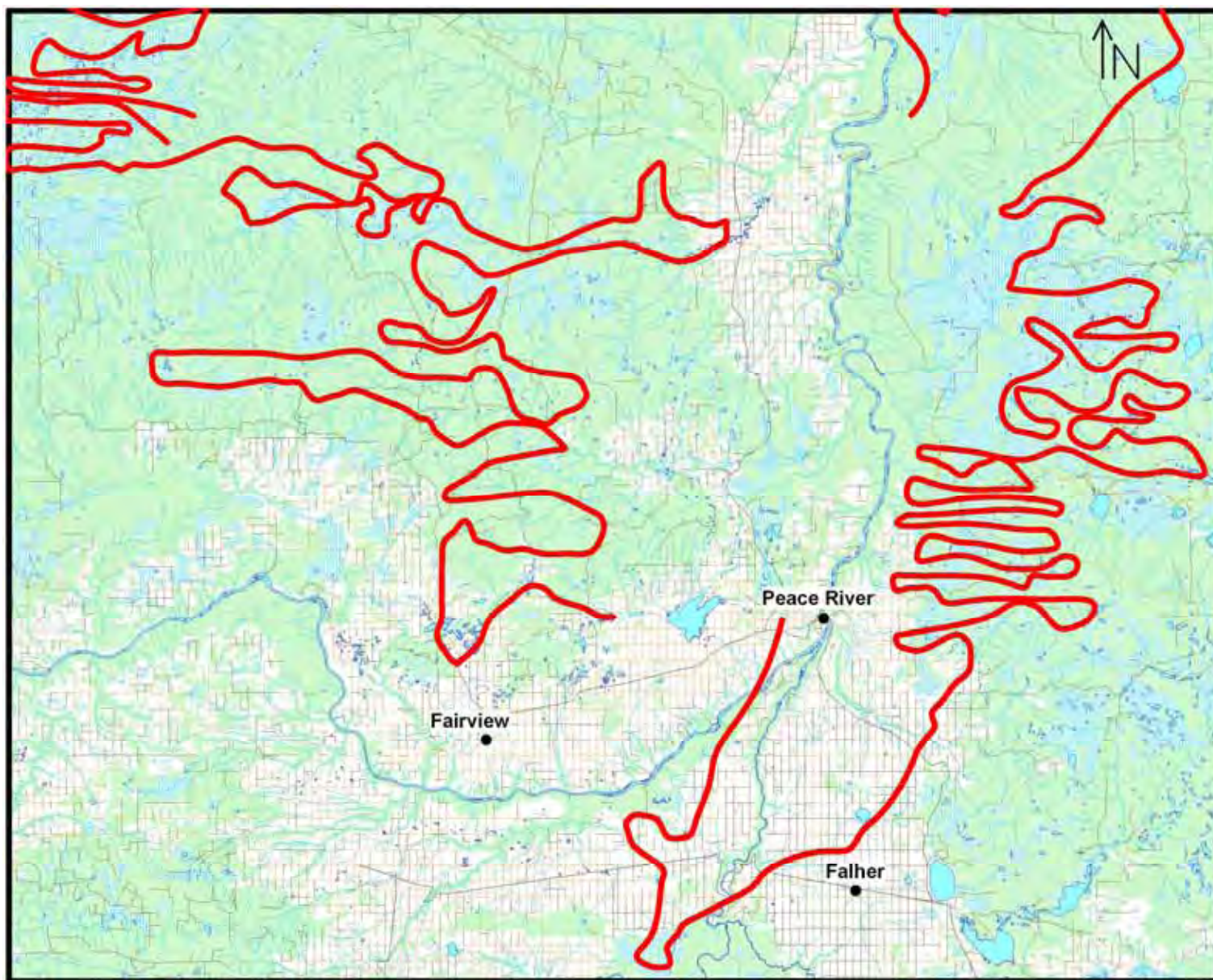
Observers	Agency or organization name, or volunteer	Survey Region
Reg Arbuckle	Ducks Unlimited Canada	Alberta
Garth Ball	Manitoba Department of Natural Resources	Manitoba
Ron Bazin	Environment Canada / Canadian Wildlife Service	Manitoba
Gerard Beyersbergen	Environment Canada / Canadian Wildlife Service	Alberta, Saskatchewan and Manitoba
Scott Cameron	Parks Canada Agency	Northwest Territories
Jim Clark	Alberta Sustainable Resource Development / Fish & Wildlife Division	Alberta
Kim Eskowich	Ducks Unlimited Canada	Saskatchewan
Jan Ficht	Alberta Sustainable Resource Development / Fish & Wildlife Division	Alberta
Brian Ficht	Observer (aerial surveys) - Alberta	Alberta
Christine Found	Alberta Sustainable Resource Development / Fish & Wildlife Division	Alberta
Mark Fremmerlid	Slave Air	Alberta
Sean Frey	Parks Canada Agency	Manitoba
Mellisa Gibbons	Parks Canada Agency	Manitoba
Bev Gingras	Environment Canada / Canadian Wildlife Service	Alberta, Saskatchewan and Manitoba
Jeffrey Hartley	Incidental observations - Alberta Public Lands Department	Alberta
Sharon Hayes	Parks Canada Agency	Northwest Territories
Mark Heckbert	Alberta Sustainable Resource Development / Fish & Wildlife Division	Alberta
Dave Hobson	Alberta Sustainable Resource Development / Fish & Wildlife Division	Alberta
Anne Hubbs	Alberta Sustainable Resource Development / Fish & Wildlife Division	Alberta
Bill Johnson	Alberta Sustainable Resource Development / Fish & Wildlife Division	Alberta
Rob Kaye	Parks Canada Agency	Alberta
Floyd Kunnas	Alberta Sustainable Resource Development / Fish & Wildlife Division	Alberta
Gerry Labrie	Slave Air	Alberta
Paul Latour	Environment Canada / Canadian Wildlife Service	Northwest Territories
Keith MacDougal	Parks Canada Agency	Alberta
Donna Mulders	Environment Canada / Canadian Wildlife Service	Northwest Territories
Cory Paul	Allison Air Service	Alberta
Rod Porter	Incidental observations - landowner, Alberta	Alberta
Paul Pryor	Environment Canada / Canadian Wildlife Service	Alberta
Richard Quinlan	Alberta Sustainable Resource Development / Fish & Wildlife Division	Alberta
Tim Sallows	Parks Canada Agency	Manitoba
Bob Simpson	Dauphin Air	Manitoba
Dave Stepniski	Alberta Sustainable Resource Development / Fish & Wildlife Division	Alberta
Doug Tate	Parks Canada Agency	Northwest Territories
Ken Wright	Alberta Conservation Association	Alberta



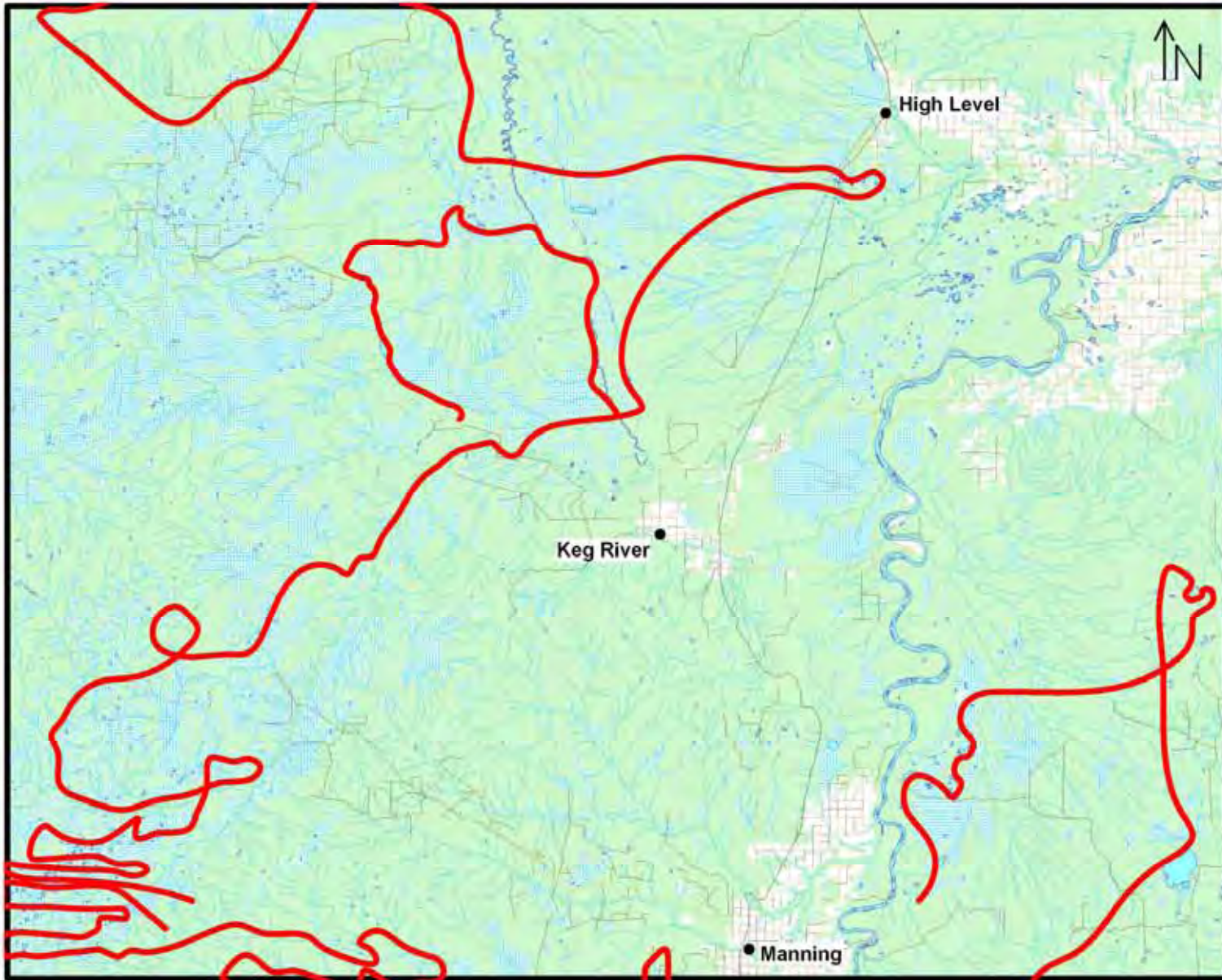
Appendix 3. Index of regional maps for the 2005 International Trumpeter Swan survey.



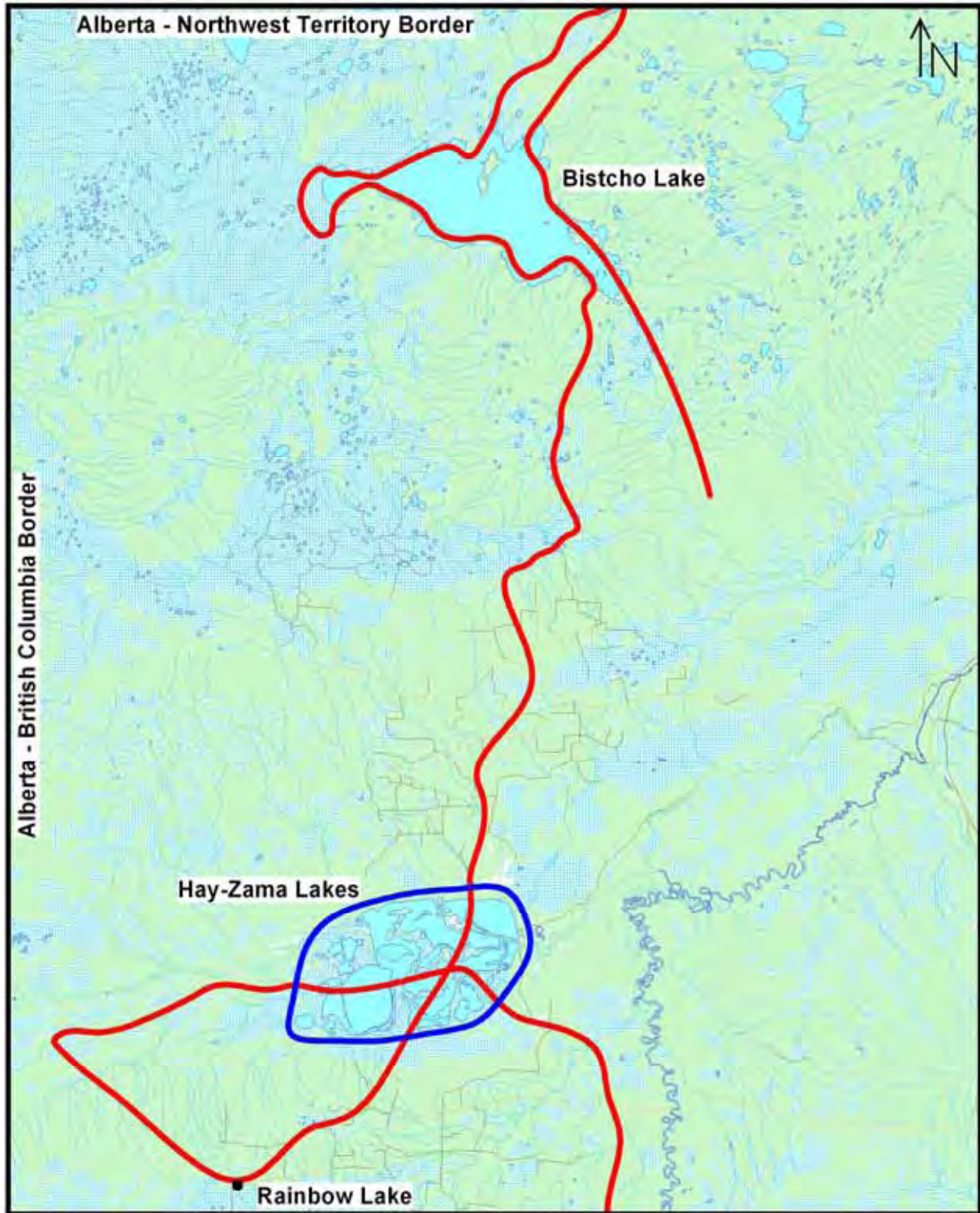
Appendix 4. Aerial survey coverage of the Grande Prairie - Valleyview region. All wetlands were surveyed within the enclosed boundary.



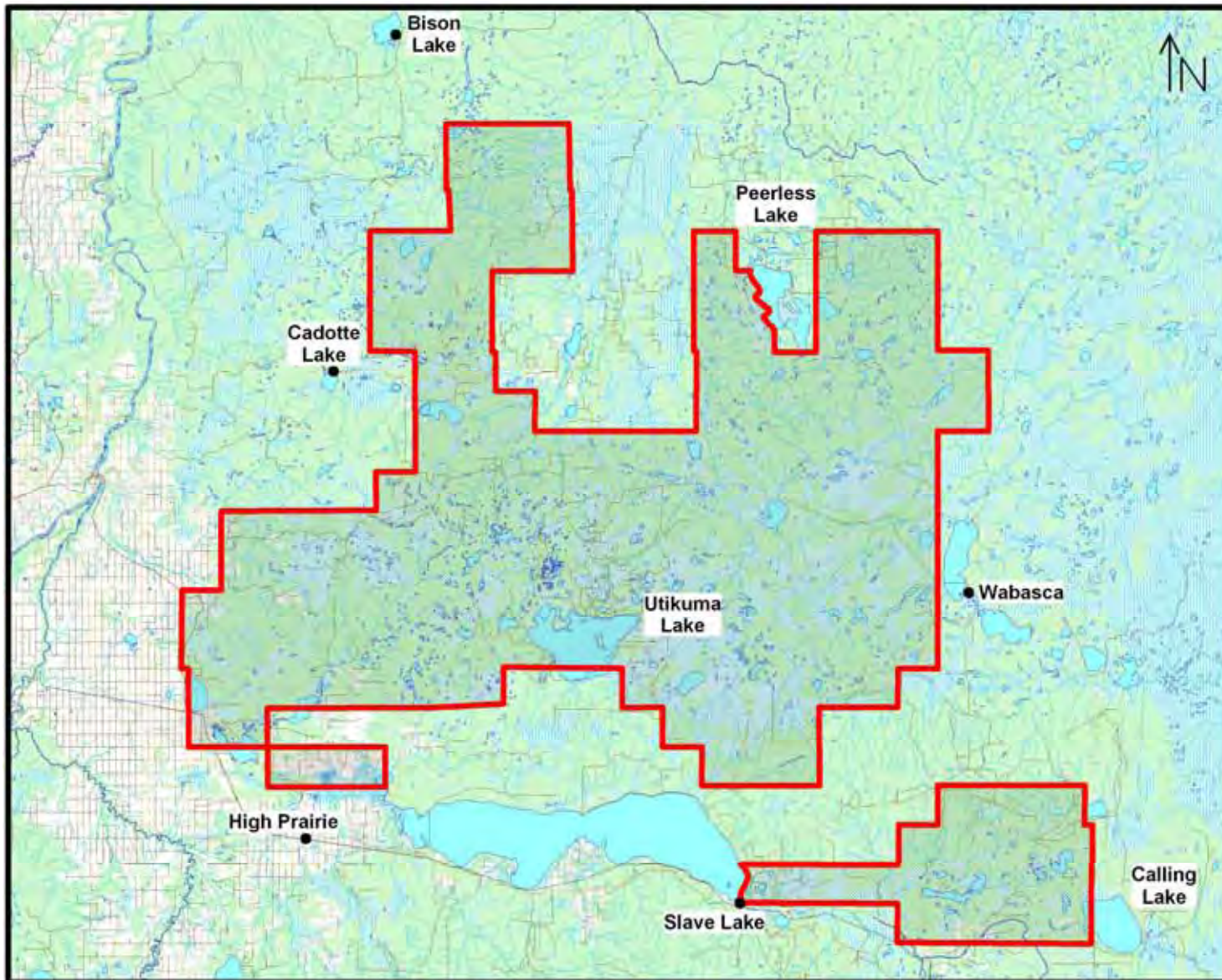
Appendix 5a. Flight path during surveys of the southern segment of the Peace River – High Level region.



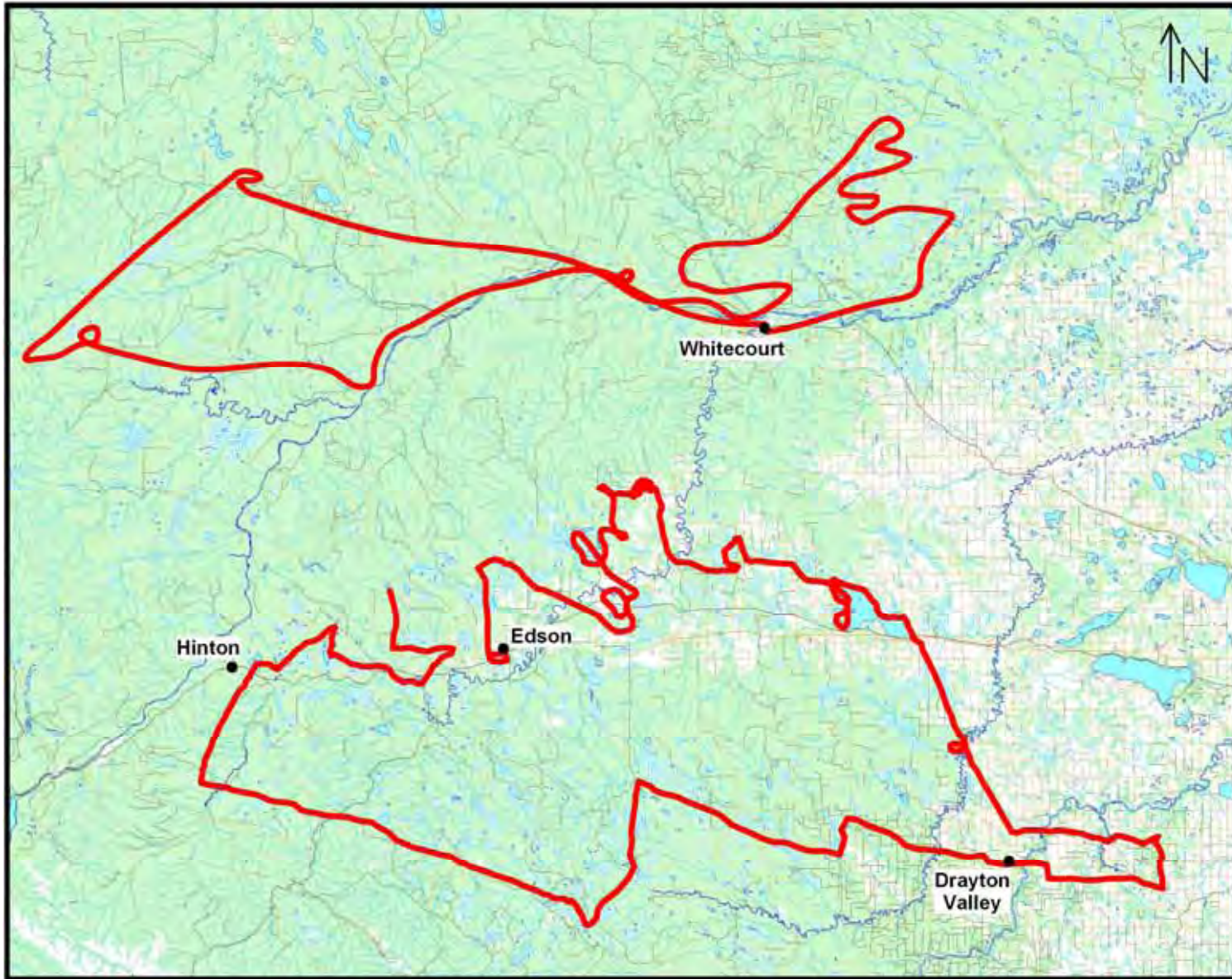
Appendix 5b. Flight path during surveys of the middle segment of the Peace River – High Level region.



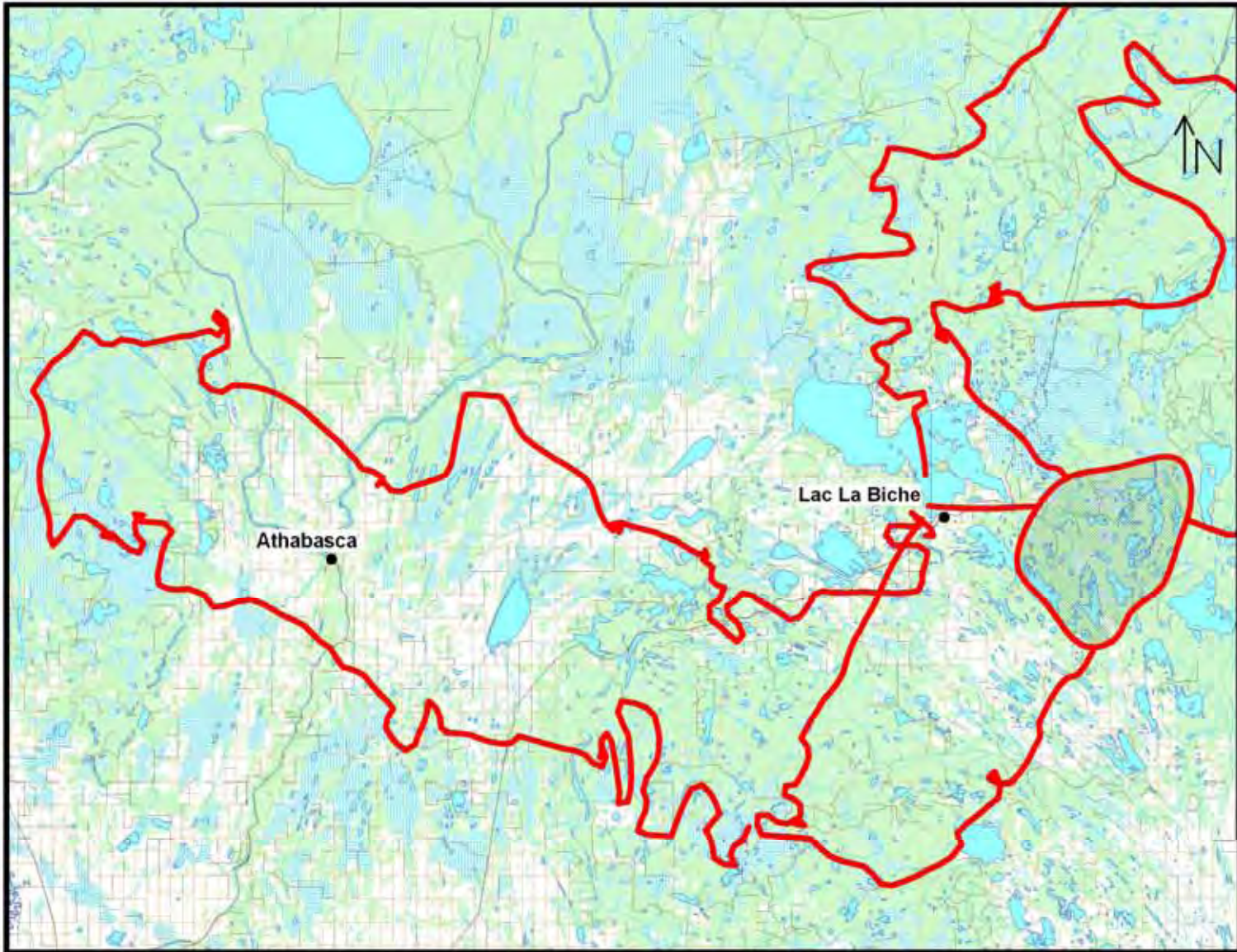
Appendix 5c. Flight path during surveys of the northern segment of the Peace River – High Level region. The Hay–Zama Lakes wetland complex, bounded by a solid line, had complete coverage of all wetlands within this area.



Appendix 6. Aerial survey coverage of the High Prairie – Utikuma – Peerless region. It includes all wetlands within the enclosed boundaries.



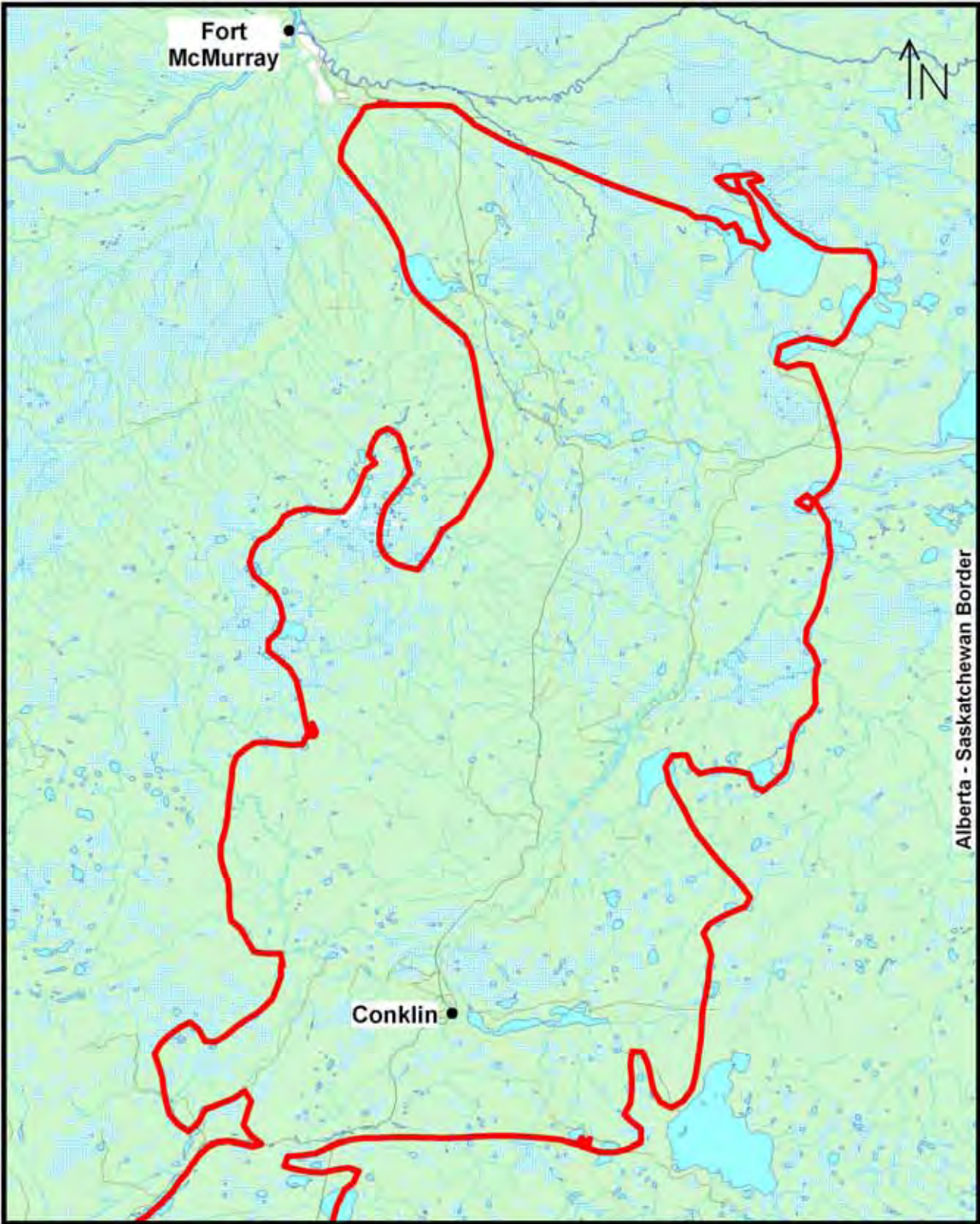
Appendix 7. Flight path during the survey of the Edson – Whitecourt – Drayton Valley region.



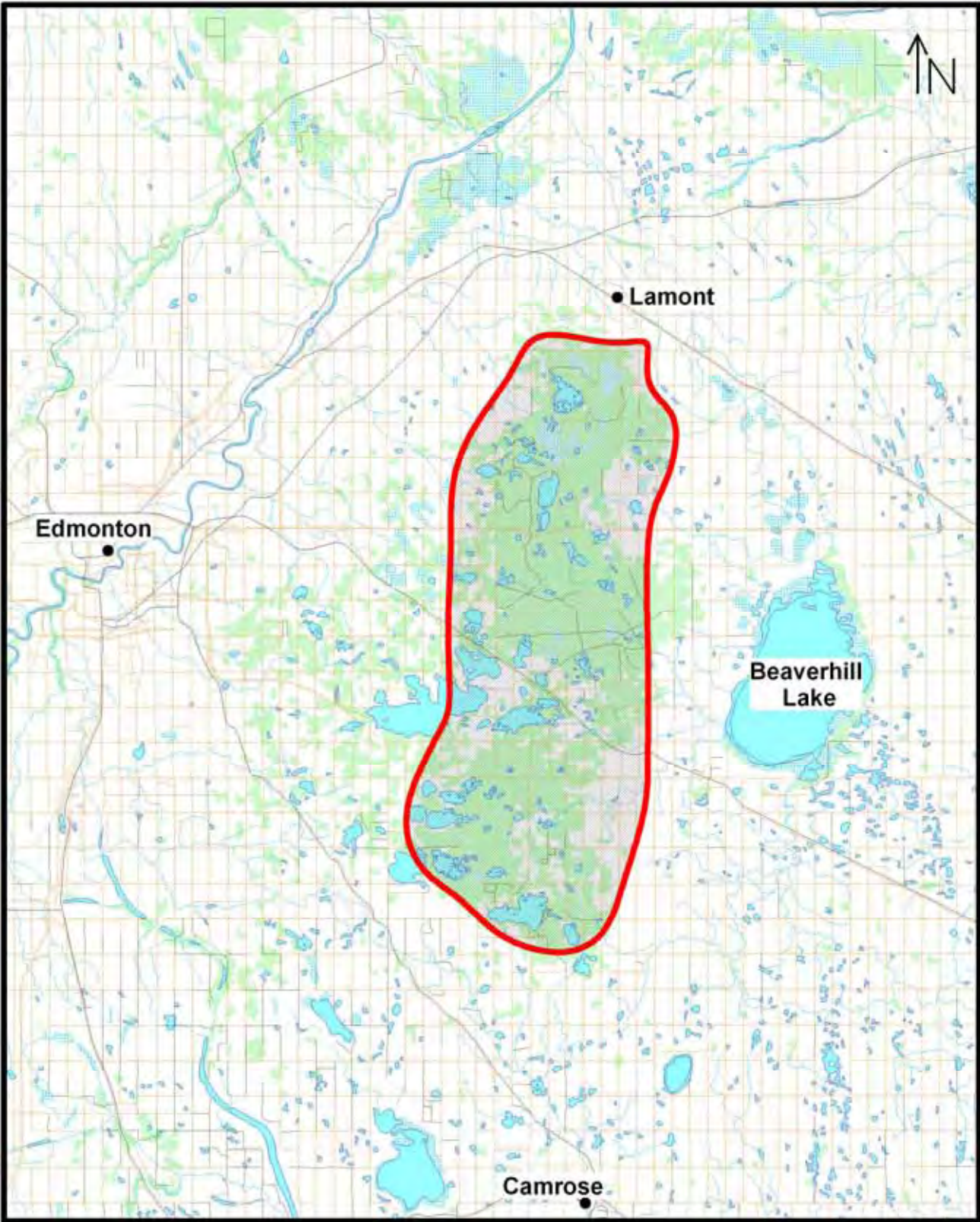
Appendix 8a. Western segment of the aerial survey of the Lac La Biche – Cold Lake – Athabasca region. It includes flight path and area of complete wetland coverage (shaded and enclosed area).



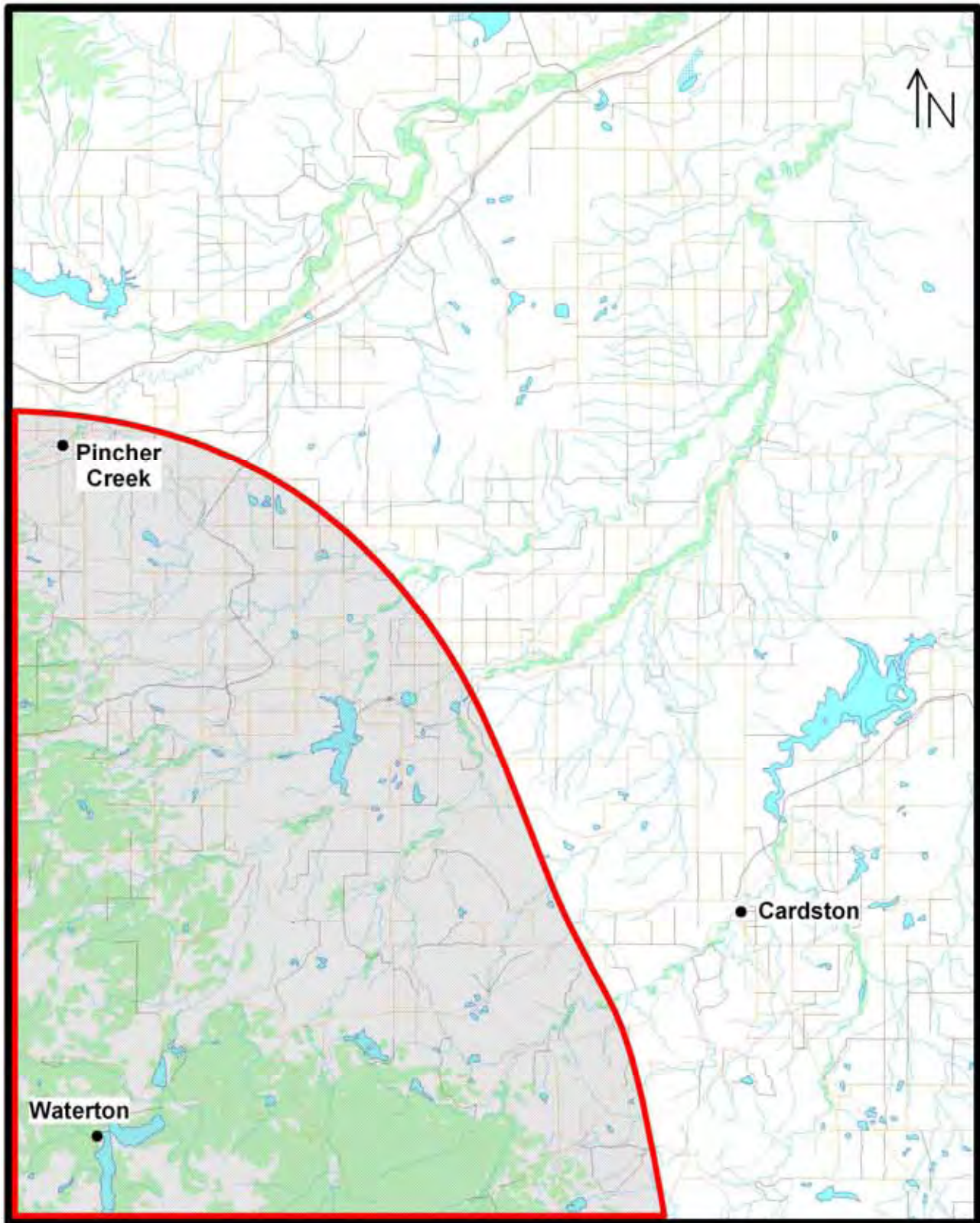
Appendix 8b. Central segment of the aerial survey of the Lac La Biche – Cold Lake – Athabasca region. The Cold Lake Air Weapons Range was surveyed through a series of north-south transects. Other lines are survey flight paths.



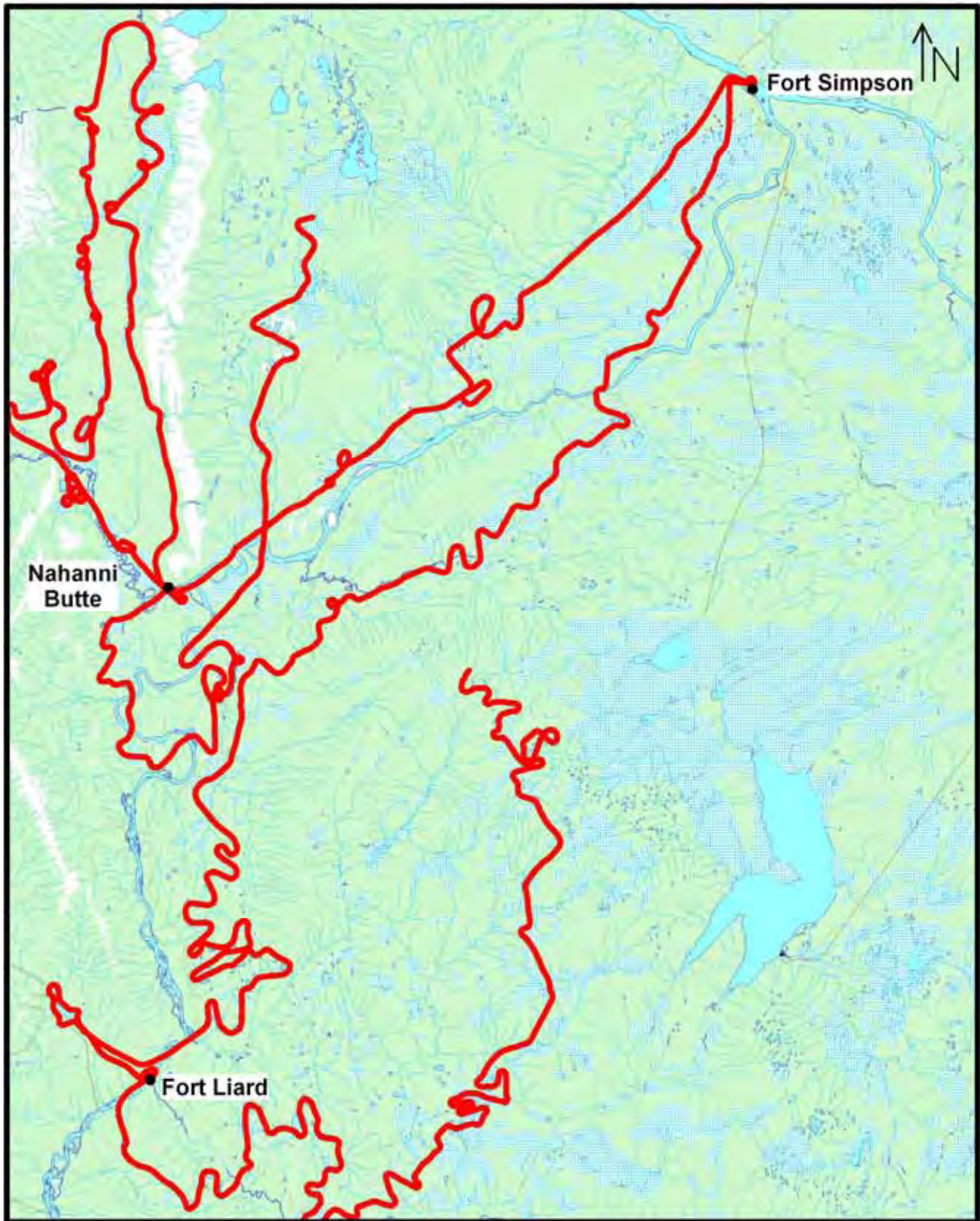
Appendix 8c. Northern segment of the aerial survey of the Lac La Biche – Cold Lake – Athabasca region. Map shows survey flight path.



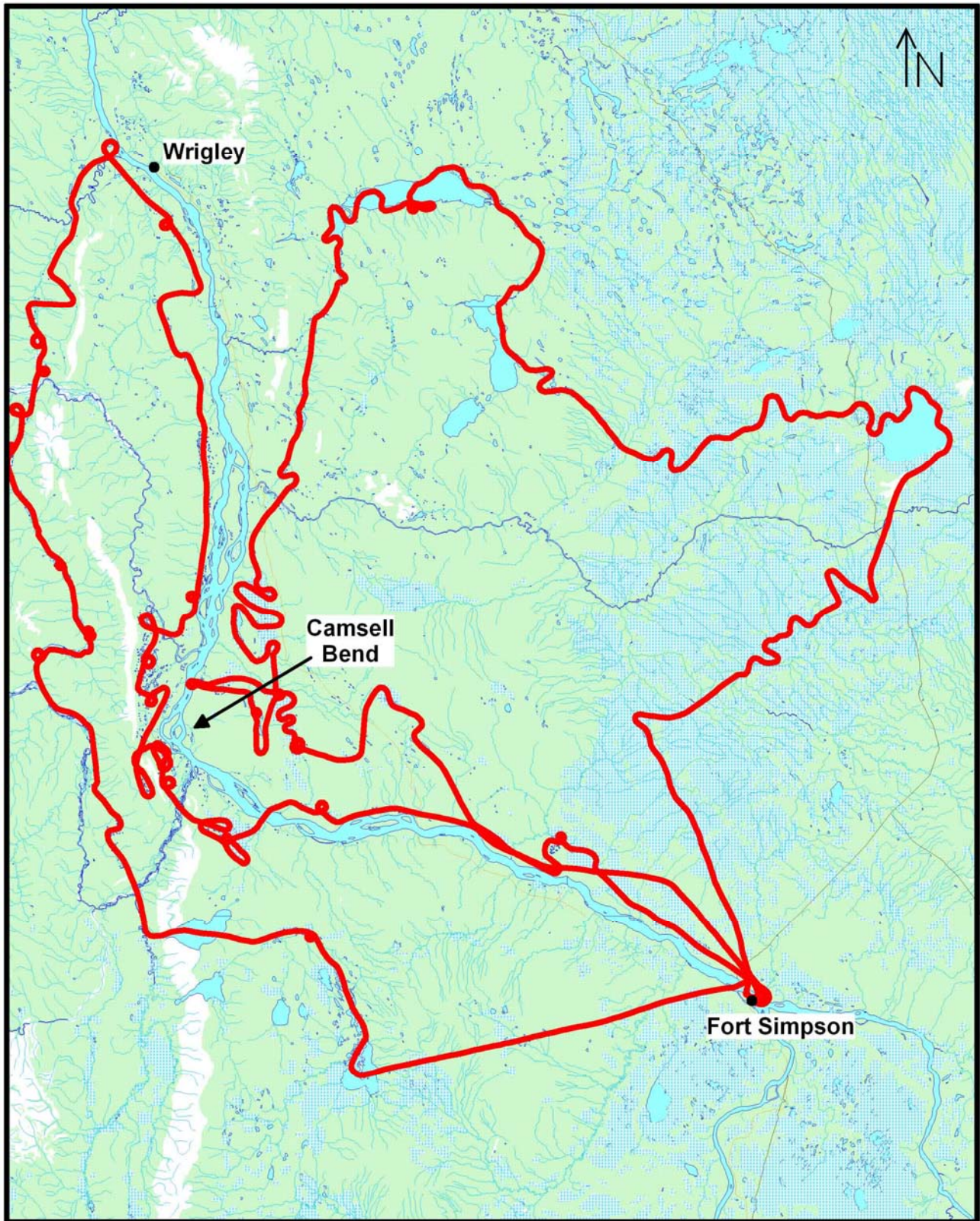
Appendix 9. Survey coverage of the Elk Island National Park – Miquelon Lakes region. It includes all wetlands within the enclosed boundary.



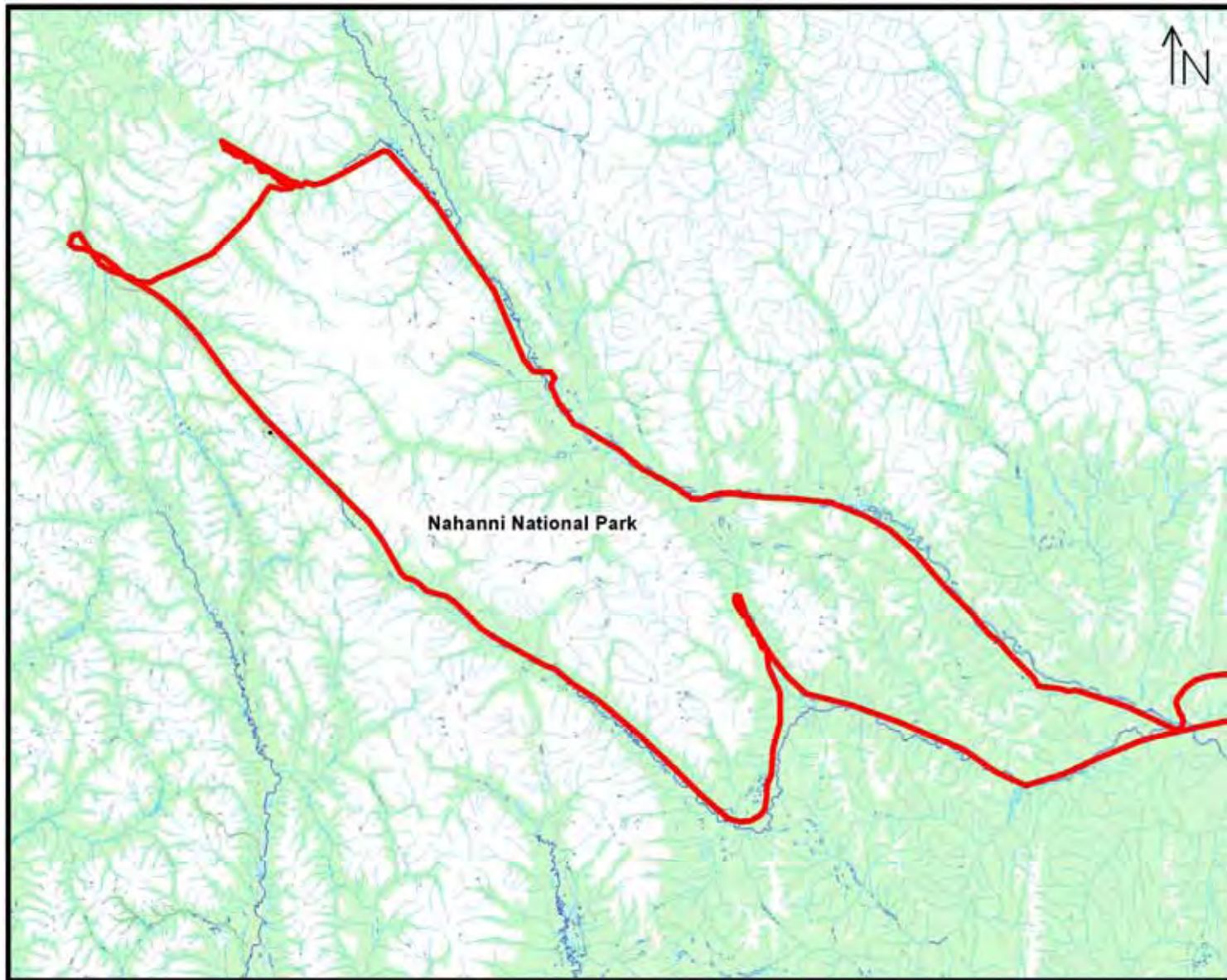
Appendix 10. Aerial survey coverage of the Pincher Creek – Waterton National Park region. All wetlands were surveyed within the enclosed area.



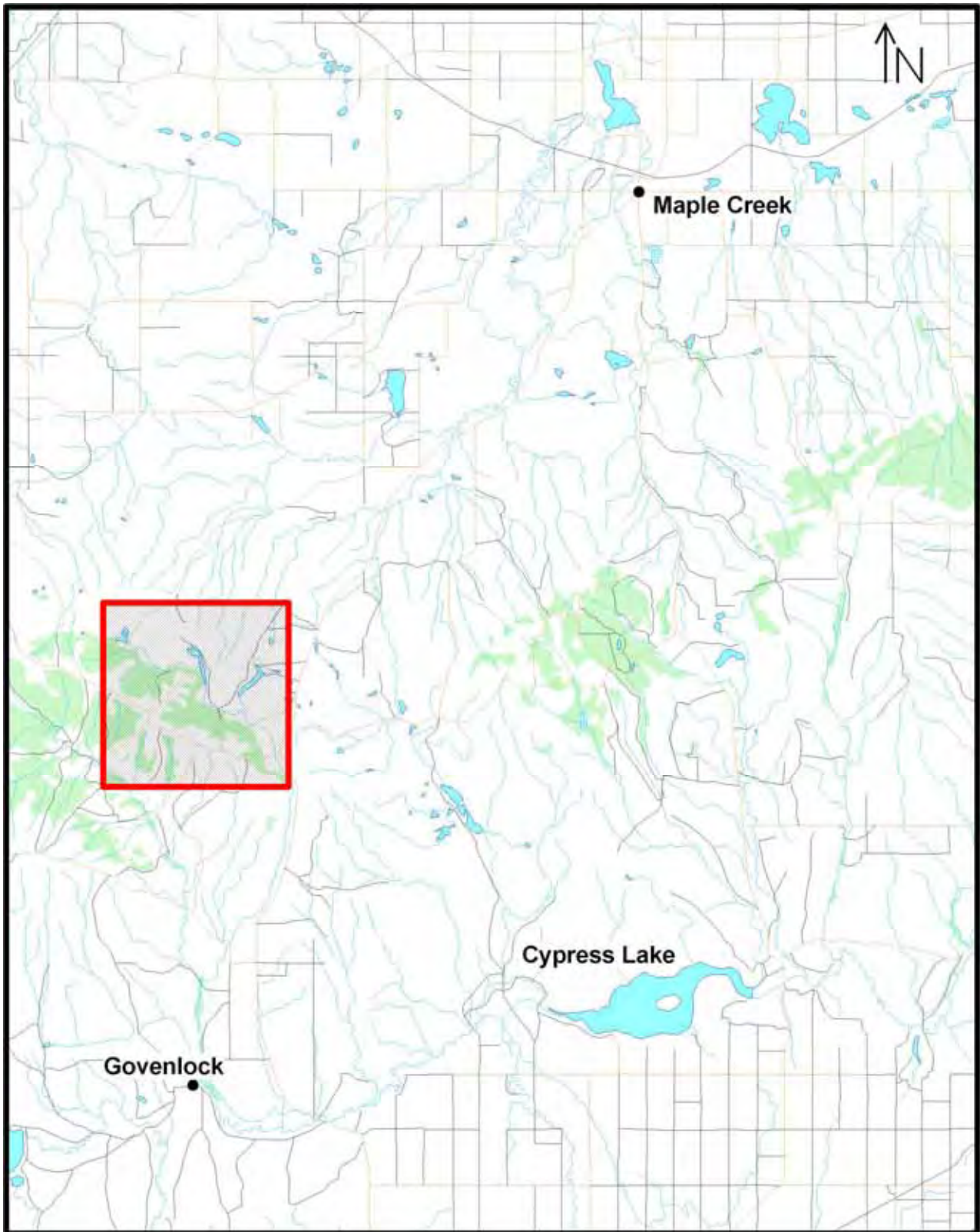
Appendix 11a. Southern segment of the aerial survey of the Deh Cho region. Map shows survey flight lines.



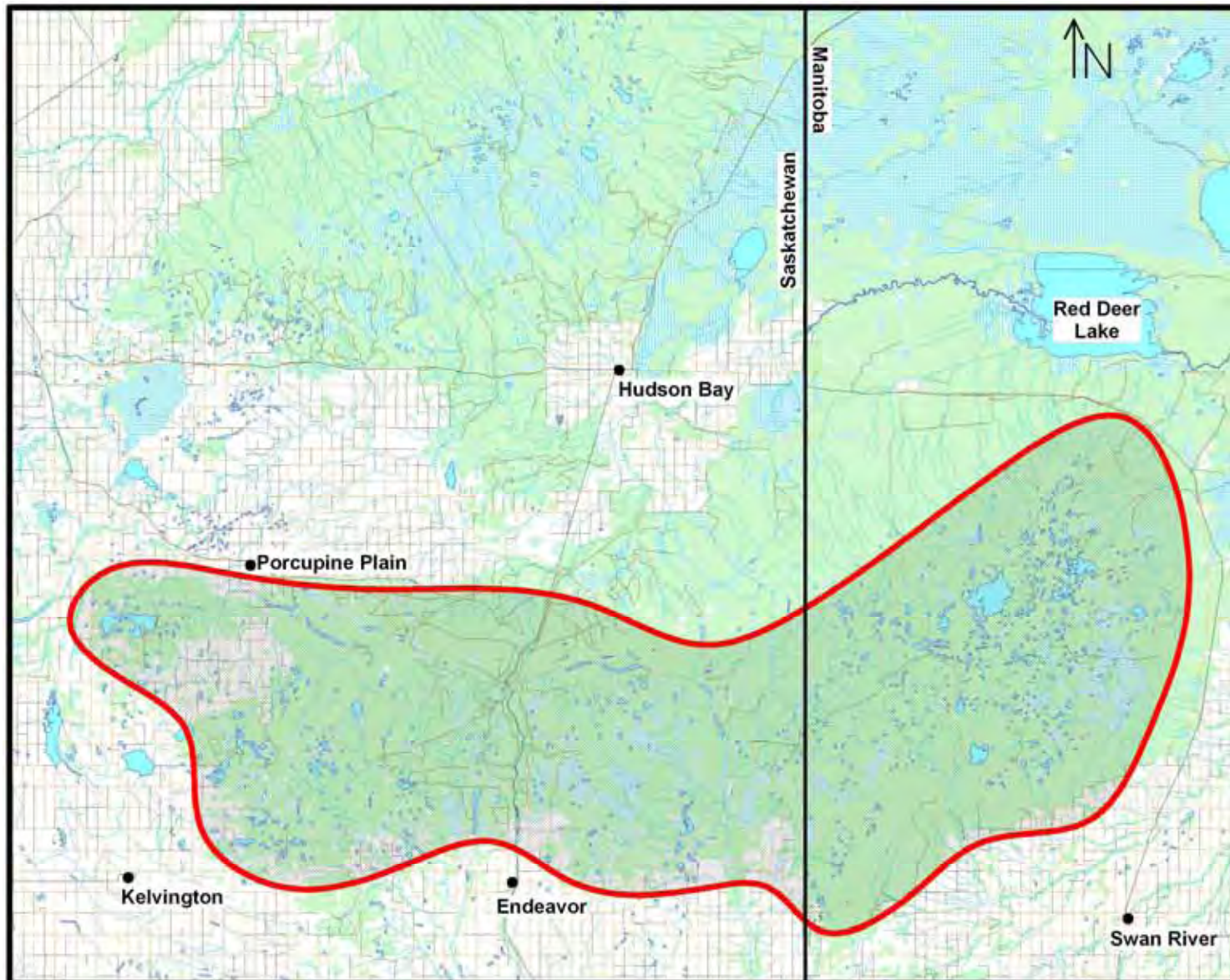
Appendix 11b. Northern segment of the aerial survey of the Deh Cho region. Map shows survey flight lines.



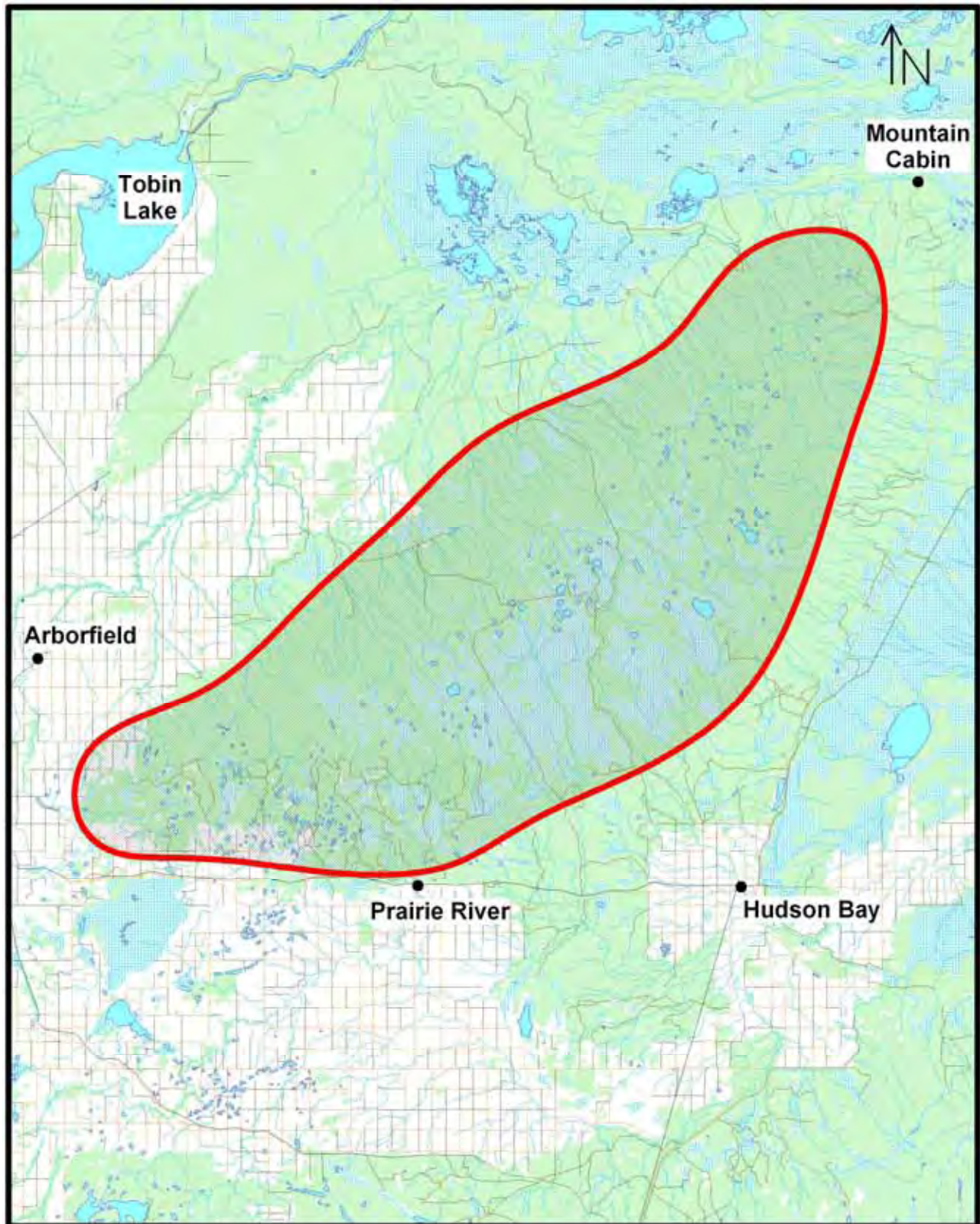
Appendix 12. Flight lines of the survey of the river valleys of the Nahanni National Park region.



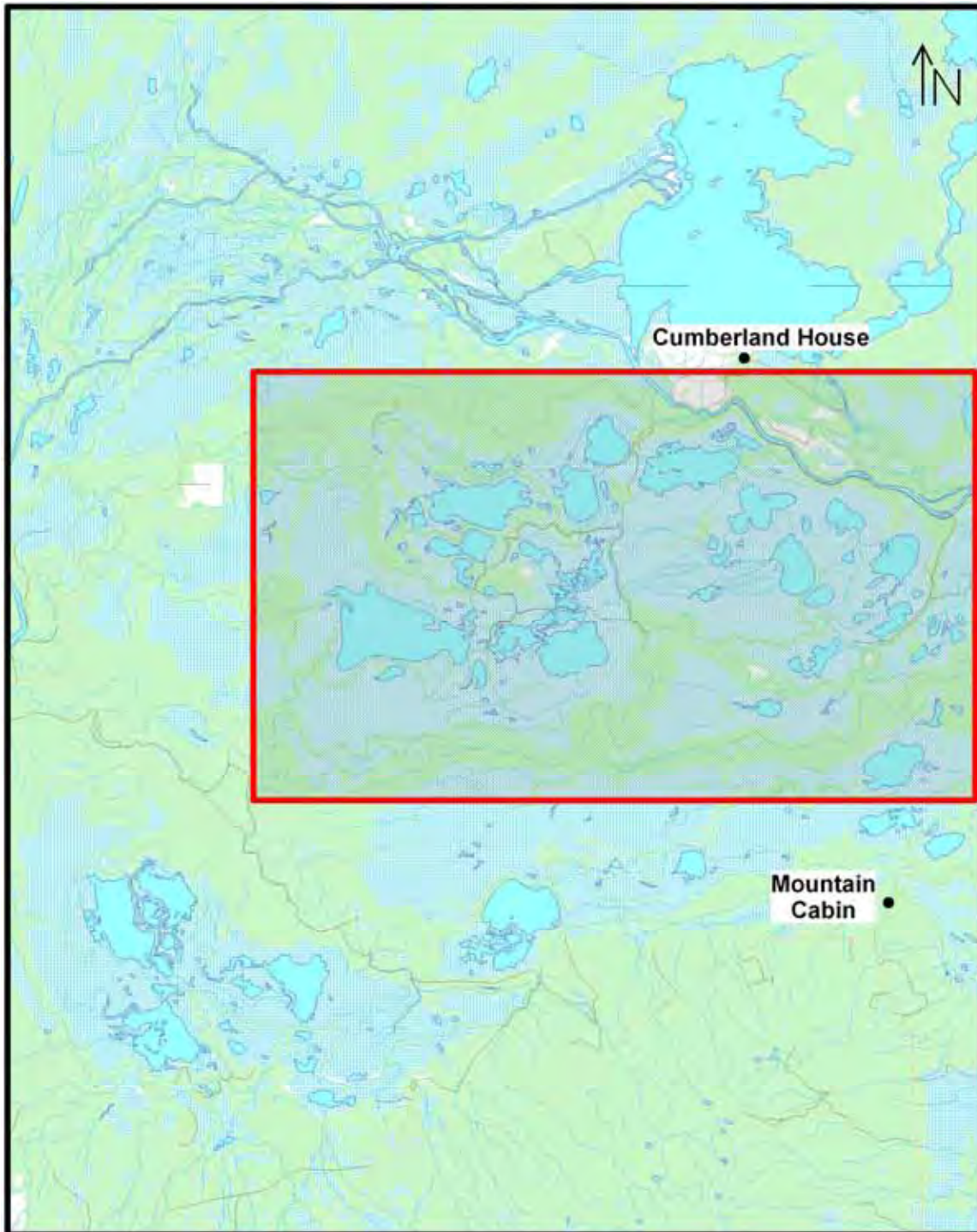
Appendix 13. Cypress Hills Provincial Park region. Shows lakes where Trumpeter Swans have been observed in past surveys.



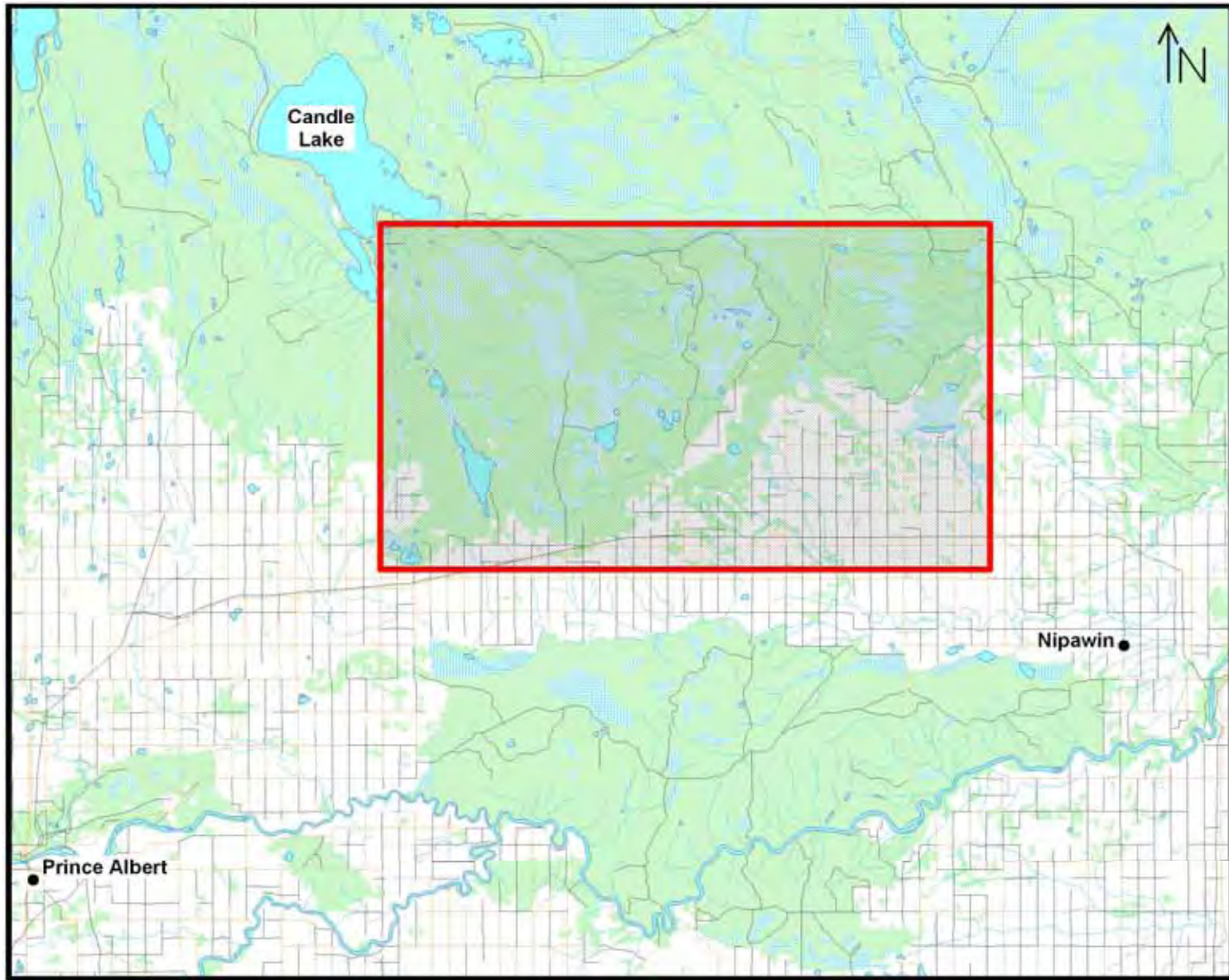
Appendix 14a. Southern segment of the aerial survey of the Hudson Bay – Porcupine Hills – Pasquia Hills region. All wetlands in the enclosed area were surveyed for Trumpeter Swans.



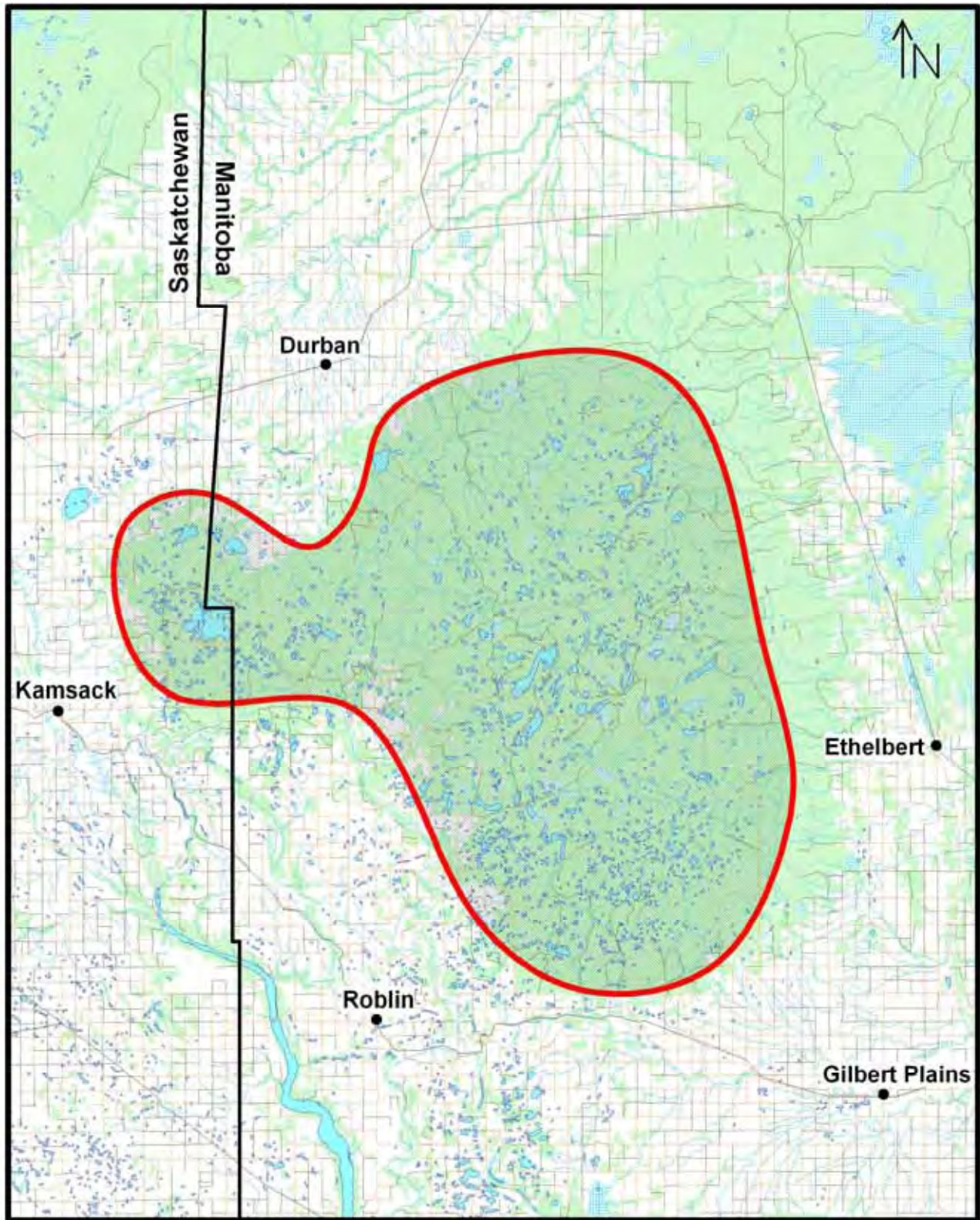
Appendix 14b. Northern segment of the aerial survey of the Hudson Bay – Porcupine Hills – Pasquia Hills region. All wetlands within the enclosed area were surveyed for Trumpeter Swans.



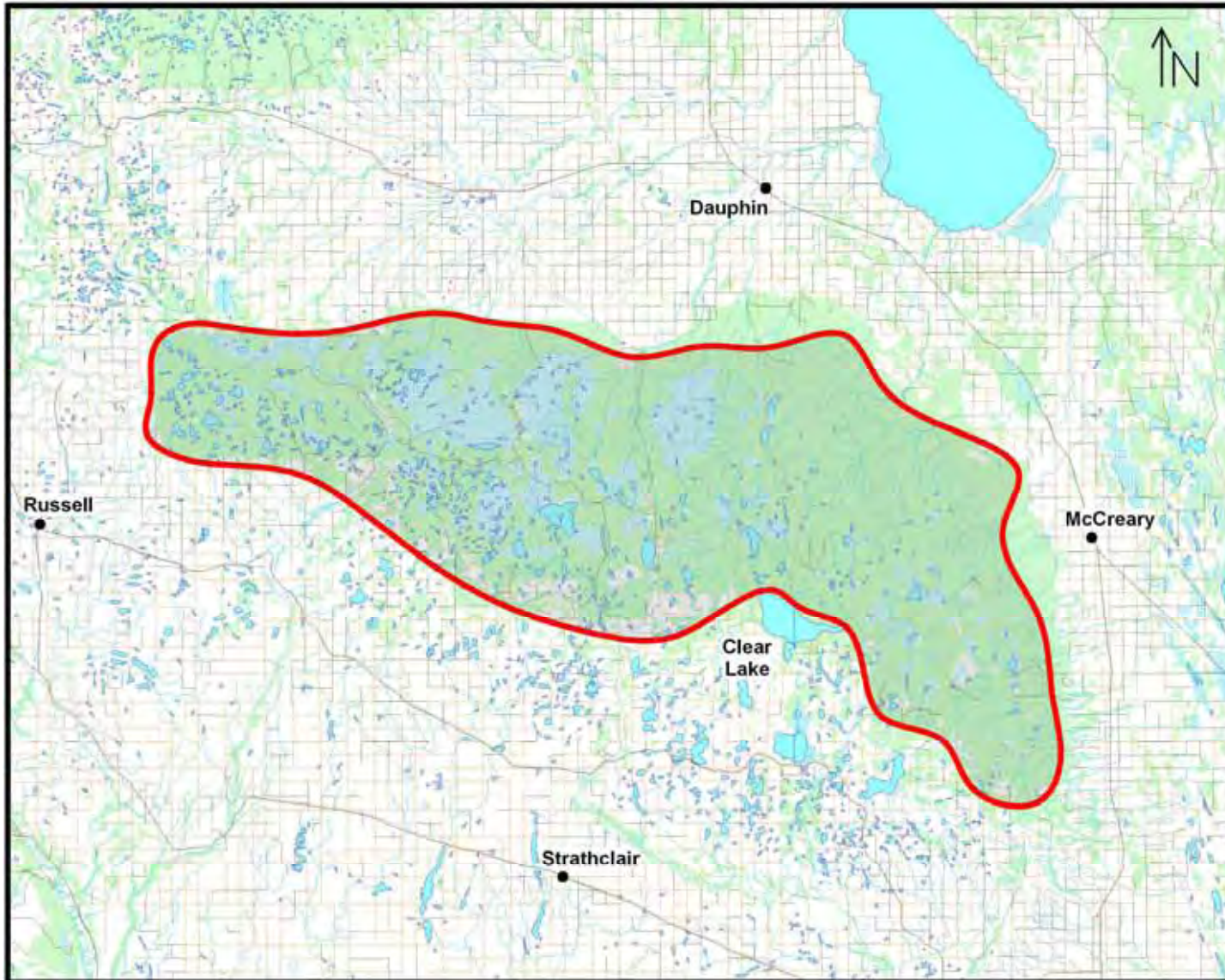
Appendix 15. The Cumberland Delta survey region. Wetland where the Trumpeter Swan pair and brood were observed during waterfowl surveys is located in the southeast corner of the complex.



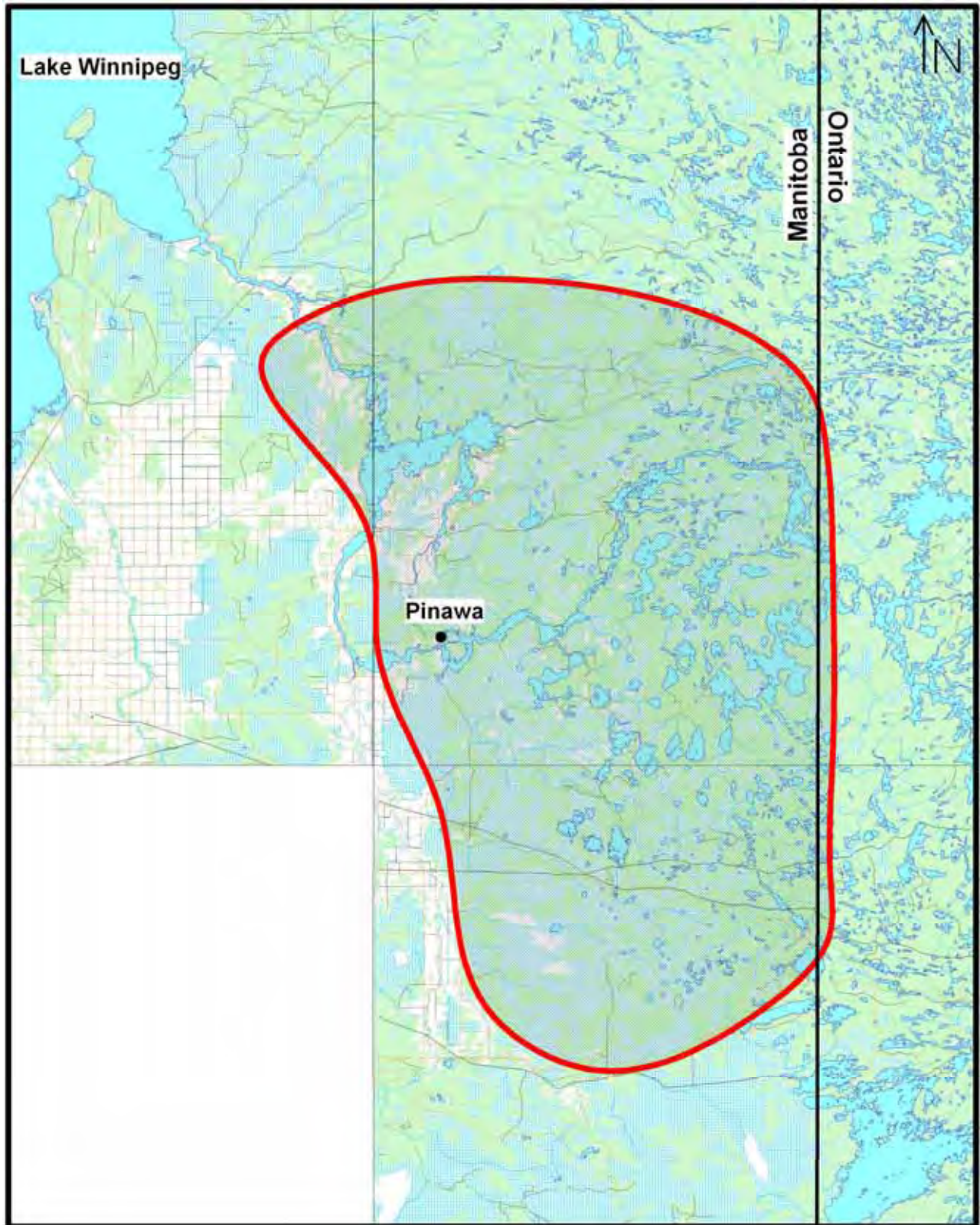
Appendix 16. The Prince Albert – Candle Lake region.



Appendix 17. The Duck Mountains Provincial Park and Forest survey region. Aerial survey coverage included all wetlands within the enclosed boundary.



Appendix 18. The Riding Mountain National Park survey region. Aerial surveys covered all wetlands within the enclosed boundary.



Appendix 19. The Whiteshell Provincial Park survey region. Aerial surveys covered all wetlands within the enclosed boundary.

Appendix 20. Summary of regional Trumpeter Swan population records for the International Surveys.

Rocky Mountain Population							
Province	Year	Total Swans	Adults	Cygnets	% Cygnets	Broods	Comments
Alberta	2005	1730	1172	558	32.2	166	
	2000	995	668	327	32.9	98	
	1995	779	563	216	27.7	68	
	1990	466	306	160	34.3	49	
	1985	340	228	112	32.9	28	
	1980	210	138	72	34.3	23	Grande Prairie flock only
	1975	121	84	37	30.6	12	Grande Prairie flock only
	1968	106	75	31	29.2	11	Grande Prairie flock only
Saskatchewan	2005	0	0	0	0	0	Cypress Hills area
	2000	0	0	0	0	0	Cypress Hills area
	1995	1	1	0	0	0	Cypress Hills area
	1990	3	2	1	33.3	1	Cypress Hills area
	1985	6	4	2	33.3	1	Cypress Hills area
	1980	?	?	?	?	?	Unknown for this year
	1974	10	4	6	60	2	Cypress Hills area
	1971	16	7	9	56.3	3	Cypress Hills area
Northwest Territories	2005	415	327	88	21.2	37	
	2000	294	204	90	30.6	32	
	1995	220	161	59	26.8	21	
	1990	188	124	64	34	33	
	1985	75	51	24	32	7	
	1980	31	26	5	16.1	1	
Interior Population							
Province	Year	Total Swans	Adults	Cygnets	% Cygnets	Broods	Comments
Saskatchewan	2005	78	53	25	32.1	9	
	2000	49	32	17	34.7	4	
	1995	26	21	5	19.2	1	
	1990	5	2	3	60	1	Observed on Greenwater Lake in October after survey.
Manitoba	2005	35	25	10	28.6	3	
	2000	0	0	0	0	0	