

2008 Taltson Basin Wildlife Baseline Study



Executive Summary

This report presents the results of bird and amphibian surveys conducted in June and July, 2008 within the Taltson Basin Hydroelectric Expansion Project area. Surveys for yellow rails, waterfowl and northern leopard frogs were conducted in order to fill in information gaps on these species for the area. Both the yellow rail and northern leopard frog are federally listed as species of Special Concern by the Committee on the Status of Wildlife in Canada (COSEWIC) and under Schedule 1 of the Species at Risk Act (SARA), yet little was known about their presence or distribution in the Trudel Creek and Taltson River areas. Call playback surveys were conducted for yellow rails at 18 sites in Trudel Creek (Zone 5), Taltson River (Zones 1 and 3) and Nonacho Lake. Zone 1 was given particular focus as it contains the most suitable habitat for the species. Aerial waterfowl surveys were also conducted in these areas; five transects were flown by helicopter to determine species present. Northern leopard frog visual encounter surveys were used to document presence/undetected of the species in Trudel Creek and the Taltson River. Twenty-nine sites were surveyed for northern leopard frogs in these two areas.

The goals of the 2008 baseline work were to:

- survey the area for birds associated with wetlands, specifically focusing on yellow rails;
- determine the presence of waterfowl and waterbird species that are listed under the federal SARA, species under consideration by COSEWIC and species listed in the *General Status Rankings for Species in the NWT (2006)*; and
- determine the presence of the northern leopard frog and availability of suitable wetland breeding habitat.

Fifty-six species of birds, including waterfowl and other incidental observations, were documented within the three areas: 27 in Trudel Creek, 39 in Taltson River and 24 in Nonacho Lake. No yellow rails were detected although a secondary target species (e.g., sora) was detected in all three areas. Evidence of breeding was observed for Canada goose, bald eagle and spotted sandpiper.

Of the species observed, five are federally listed by COSEWIC, two as species of Special Concern (rusty blackbird, short-eared owl), two as Threatened species (common nighthawk, olive-sided flycatcher) and one as an Endangered species (whooping crane). Six other species observed (lesser scaup, lesser yellowlegs, northern pintail, surf scoter, white-throated sparrow and white-winged scoter), are listed as sensitive by the Government of the Northwest Territories (NWT ENR, 2006).

Northern leopard frogs were observed at five sites during this survey and incidentally at an additional three sites in early July, 2008 and August, 2007 and 2008. One site containing northern leopard frogs was in Trudel Creek, two were along the Taltson River in Zone 3 and five were along Taltson River in Zone 1. One of the locations was a breeding site for the species detected in Zone 1.

Executive Summary

In conclusion, the present report suggests the Taltson Basin Project area provides habitat for breeding and migrating waterfowl some of which are of conservation concern. The Taltson Basin study area also provides summer and possibly overwintering habitat for the northern leopard frog.

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2008 Taltson Basin Wildlife Baseline Study

TABLE OF CONTENTS

Executive Summary	i
Acknowledgements	iii
Table of Contents	v
List of Appendices	vi
List of Figures	vii
List of Tables	vii
List of Plates	vii
List of Acronyms	ix
1. Introduction	1-1
1.1 Yellow Rail and Waterbirds.....	1-1
1.2 Northern Leopard Frog	1-3
1.3 Objectives	1-3
2. Study Area	2-1
3. Methods	3-1
3.1 Introduction.....	3-1
3.2 Yellow Rail Call Playback Surveys.....	3-1
3.3 Waterfowl Aerial Surveys.....	3-1
3.4 Northern Leopard Frog Visual Encounter Surveys.....	3-2
4. Results	4-1
4.1 Trudel Creek (Zone 5)	4-1
4.1.1 Yellow Rail Surveys.....	4-1
4.1.2 Waterfowl Surveys and Incidental Waterfowl Observations	4-1
4.1.3 Additional Incidental Bird Observations	4-1
4.1.4 Northern Leopard Frog Surveys	4-1
4.1.5 Incidental Frog Observations.....	4-1
4.1.6 Additional Incidental Wildlife Observations.....	4-2
4.2 Taltson River (Zones 1 and 3)	4-7
4.2.1 Yellow Rail Surveys.....	4-11
4.2.2 Waterfowl Surveys and Incidental Waterfowl Observations	4-11
4.2.3 Additional Incidental Bird Observations	4-11
4.2.4 Northern Leopard Frog Surveys	4-11

Table of Contents

4.2.5	Incidental Wildlife Observations.....	4-17
4.3	Nonacho Lake	4-19
4.3.1	Yellow Rail Surveys	4-19
4.3.2	Waterfowl Surveys and Incidental Waterfowl Observations	4-19
4.3.3	Additional Incidental Bird Observations	4-19
4.3.4	Northern Leopard Frog Surveys	4-19
4.3.5	Incidental Wildlife Observations.....	4-19
5.	Discussion	5-1
5.1	Trudel Creek (Zone 5)	5-1
5.1.1	Yellow Rails and Wetland-Associated Birds	5-1
5.1.2	Waterfowl.....	5-1
5.1.3	Northern Leopard Frogs	5-2
5.1.4	Incidental Wildlife.....	5-2
5.2	Taltson River (Zones 1 and 3)	5-2
5.2.1	Yellow Rails and Wetland-Associated Birds	5-2
5.2.2	Waterfowl.....	5-3
5.2.3	Northern Leopard Frogs	5-3
5.2.4	Incidental Wildlife.....	5-4
5.3	Nonacho Lake	5-4
5.3.1	Yellow Rails and Wetland-Associated Birds	5-4
5.3.2	Waterfowl.....	5-4
5.3.3	Northern Leopard Frogs	5-4
5.3.4	Incidental Wildlife.....	5-4
5.4	Summary	5-5
References.....		1

LIST OF APPENDICES

Appendix 1 – Yellow Rail Call Playback Survey Data

Appendix 2 – Yellow Rail Survey Habitat Data

Appendix 3 – Waterfowl Survey Data

Appendix 4 – Incidental Observation Data

Appendix 5 – Northern Leopard Frog Survey Data

Appendix 6 – Northern Leopard Frog Observations by Jason Côté (B.Sc.) and Nonacho Lake Amphibian Observation by Carmen Tattersfield (B. NRSc.)

Appendix 7 – Northern Leopard Frog Observations by Wade Brunham (B.Sc.)

LIST OF FIGURES

Figure	Page
1-1 Study Area and Historical Observations of Northern Leopard Frogs in the Taltson River Basin	1-2
4.1-1 Yellow Rail Survey in Trudel Creek (Zone 5), June 2008	4-2
4.1-2 Waterfowl Observed in Trudel Creek, June 2008	4-7
4.1-3 Northern leopard frog survey within Trudel Creek (Zone 5), July 2008.....	4-8
4.1-4 Incidental Observations of Mammals in Trudel Creek (Zone 5), 2008	4-10
4.2-1 Yellow Rail Survey in Taltson River (Zones 1 and 3), June 2008	4-12
4.2-2 Bird Species at Risk in Taltson River (Zones 1 and 3), 2008.....	4-13
4.2-3 Waterfowl Observed in Taltson River, June 2008	4-15
4.2-4 Northern Leopard Frog Survey within Taltson River (Zones 1 and 3), July 2008	4-17
4.2-5 Incidental Observations of Mammals in Taltson River (Zone 1 and 3), 2008.....	4-21
4.3-1 Yellow Rail Survey in Nonacho Lake, June 2008	4-23
4.3-2 Waterfowl Observed in Nonacho Lake, June 2008	4-24
4.3-3 Incidental Observations of Mammals in Nonacho Lake, 2008	4-25

LIST OF TABLES

Table	Page
4.1-1 Total Bird Species Detected in Trudel Creek, Taltson River and Nonacho Lake	4-3
4.1-2 Conservation Status of Birds Detected in Trudel Creek, Taltson River and Nonacho Lake	4-5

LIST OF PLATES

Plate	Page
4.1-1 Sandpiper hatchling observed at site SV10.	4-8
4.1-2 Incidental wildlife observations within Trudel Creek (Zone 5)	4-8

Table of Contents

4.2-1	Northern leopard frog breeding habitat along the Taltson River. The primary vegetation on the water surface is yellow pond lily (<i>Nuphar lutea</i>) while the darker green vegetation surrounding the water is a species of horsetail (<i>Equisetum arvense</i>). The lighter green is primarily beaked sedge (<i>Carex utriculata</i>).....	4–16
4.2-2	A closer view of the northern leopard frog breeding habitat with horsetail in the forefront, yellow pond lilies on the water surface and lighter green sedges in front of the shrubs.	4–16

List of Acronyms

B.Sc. – Bachelor of Science

B. NRSc. – Bachelor of Natural Resource Science

CARCNET – Canadian Amphibian and Reptile Conservation Network

COSEWIC – Committee on the Status of Endangered Wildlife in Canada

DAR – Developers Assessment Report

DEC - Dezé Energy Corporation

GNWT – Government of the Northwest Territories

M.Sc. – Master of Science

NCPC - Northern Canada Power Commission

NWT ENR – Northwest Territories Department of Environment and Natural Resources

PESEA - Preliminary Environmental and Social Effects Assessment

SARA – Species at Risk Act

SVS - South Valley Spillway

UTM - Universal Transverse Mercator

1. Introduction

The Dezé Energy Corporation (DEC) has proposed the Taltson Basin Hydroelectric Expansion Project (the Project), located northeast of Fort Smith in the Northwest Territories (Figure 1-1). The Project would expand the existing Twin Gorges generating facility and increase power production to supply energy to four existing and proposed diamond mines in the Northwest Territories.

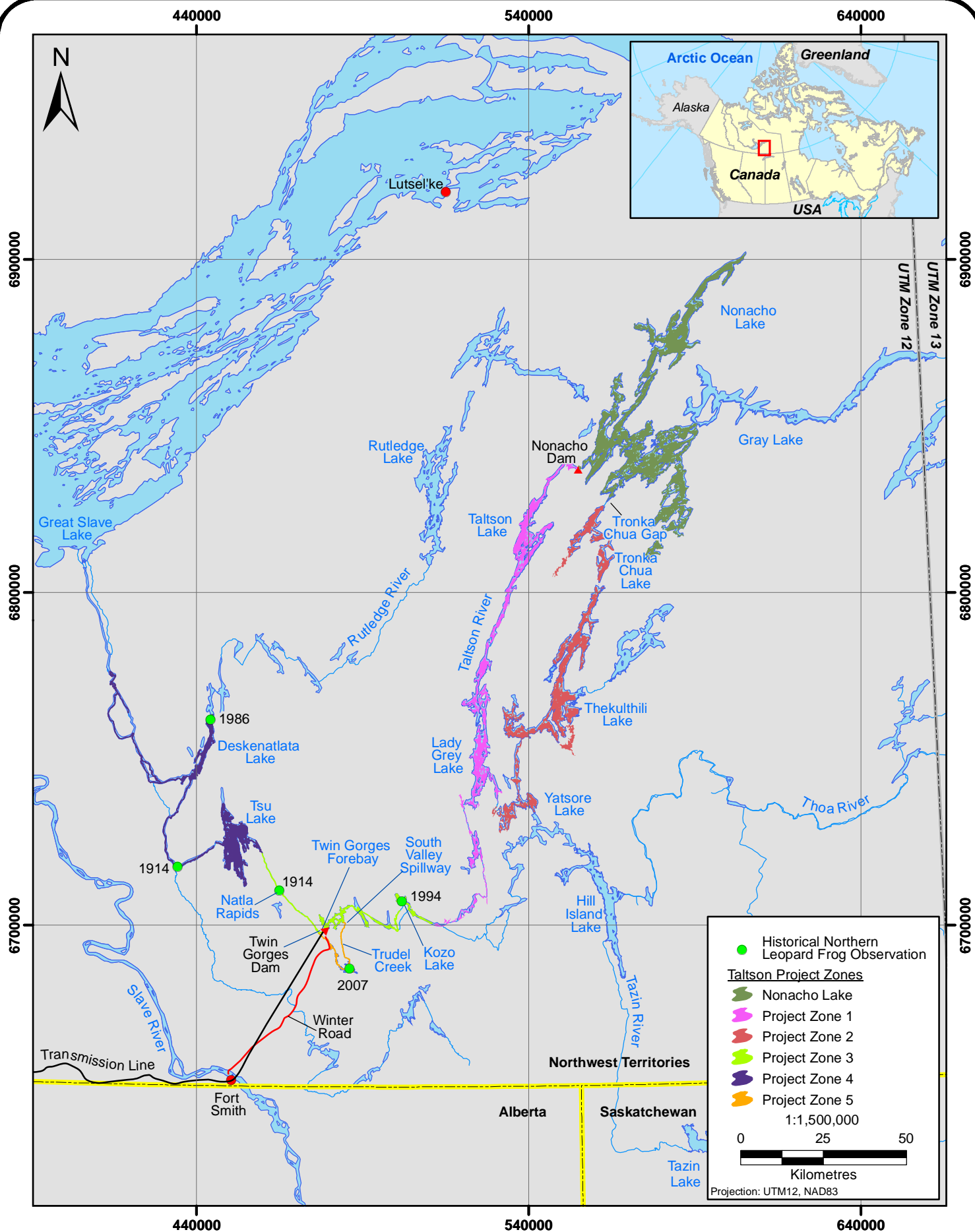
The results from the modelled hydrographs for the Project zones indicate lower water levels for many areas (Nonacho Lake, Zones 2, 3, and 5), increased variation in water levels (Nonacho Lake, Zone 2), and a change in seasonality of water level maximum and minimums (Zone 1). Zones 1, 5 and Nonacho Lake, were predicted to experience the largest changes in water levels and their associated hydrographs. These changes in the hydrologic regime could potentially affect wildlife; however, data gaps existed for two species, the yellow rail (*Coturnicops noveboracensis*) and northern leopard frog (*Lithobates pipiens*) in those areas.

The following report summarizes bird and amphibian studies conducted in 2008 for the Project. Surveys conducted in 2008 focused on yellow rail, waterfowl and northern leopard frog in Trudel Creek (Zone 5), Taltson River (Zones 1 and 3) and Nonacho Lake (Figure 1-1); however, incidental data for all wildlife species encountered were recorded during surveys. Surveys were designed to determine presence of yellow rails, waterfowl species at risk, northern leopard frogs and their habitat and spatial associations.

1.1 Yellow Rail and Waterbirds

The yellow rail is a small waterbird that breeds in wet meadows and shallow wetlands across Canada and which has a breeding range that potentially extends into the Project area (Alvo and Robert, 1999). In the northern portion of their breeding range, yellow rails arrive from late April to late May and depart from September to early November (Arnold, 1896; Salt and Salt, 1976; Robert and Laporte, 1997). The yellow rail is federally designated as a species of Special Concern (COSEWIC, 2001). Although yellow rails have not been documented in association with the Project area, they are an elusive species that is easily overlooked unless special effort is made to survey for them.

Nesting yellow rails are typically associated with marshes dominated by sedges, true grasses and rushes, where there is little or no standing water (generally 0 to 12 cm), and where the substrate remains saturated throughout the summer (Alvo and Robert, 1999). They can be found in damp fields and meadows, on the floodplains of rivers and streams, in the herbaceous vegetation of bogs and at the upper levels (drier margins) of estuarine and salt marshes. Nesting habitats usually require a dry mat of dead vegetation from previous growing seasons. Water levels appear to influence yellow rail abundance, as there are fewer in drier years; however, the influence of water levels on population or breeding success overall is unknown.



Additional waterbird species that have ranges overlapping with the Project area and that are listed as sensitive or that may be at risk according to the NWT include (NWT ENR, 2006): northern pintail, Caspian tern, least sandpiper, red-necked phalarope, lesser yellowlegs, American bittern and white-winged scoter. Of these species the least sandpiper, red-necked phalarope and American bittern would be most vulnerable to potential changes in water levels. The least sandpiper nests in sedge meadows, bogs and muskegs on damp ground near water (Cooper, 1994). The red-necked phalarope nests in sedges sometimes less than 10 cm above standing water (Rubega et al., 2000). The American bittern nests in dense emergent vegetation above water that is 5 – 20 cm deep (Gibbs et al., 1992).

1.2 Northern Leopard Frog

The prairie populations of the northern leopard frog that extend up into the Northwest Territories are federally designated as a species of Special Concern by COSEWIC (2000), due to loss of populations, range contraction and increased isolation of remaining populations. This species is designated as sensitive by the government of the NWT (NWT ENR, 2006). Although the range of the northern leopard frog is limited in the NWT, it has been documented in the Taltson River Basin (Figure 1-1; Fournier, 1997; GNWT, 2008). The Taltson River basin is at the very northern edge of the species' range. Wildlife populations at the edge of their ranges are particularly important, due to potential genetic differences and adaptations compared to populations within the center of their range; therefore, such populations are considered potential contributors to future speciation events (Lesica and Allendorf, 1995).

Northern leopard frogs breed in ponds, backwaters of creeks or rivers, oxbows, marshes and flooded meadows from mid to late spring, where they attach their egg masses to submerged vegetation (CARCNET, 2008). These attached egg masses take 1 to 3 weeks to hatch into tadpoles, depending on the water temperature. This life stage would therefore be particularly susceptible to variation in water levels and associated potential changes in temperature. Northern leopard frogs overwinter in well-oxygenated waterbodies that do not freeze solid (Seburn and Seburn, 1998). Mortality of northern leopard frogs during the winter due to insufficient oxygen levels, freezing, disease, and toxic exposures have been reported. Northern leopard frog is the only frog in NWT that overwinters under water.

1.3 Objectives

The specific objectives of collecting data on birds and amphibians were to:

- survey the area for waterbirds associated with wetlands, specifically focusing on yellow rails, a species of Special Concern as designated by COSEWIC (2001) and under Schedule 1 of federal Species at Risk Act (SARA);
- determine the presence of waterbird species that are listed under the federal SARA, species under consideration by the Committee on the Status of Endangered Wildlife in Canada (COSEWIC) and species listed in the *General Status Rankings for Species in the NWT (2006)*; and

- determine the presence of the northern leopard frog, a species of Special Concern as designated by COSEWIC (2000) and under Schedule 1 of *SARA*, and availability of suitable wetland breeding habitat.

Collection of baseline information to meet each of the aforementioned objectives will enable forecasting about the potential effects of habitat alteration due to predicted hydrological changes on wetland-associated birds and waterfowl in the area and will help in developing management strategies to mitigate potential impacts of the Project on species of conservation concern.

2. Study Area

The existing power generation facility was built by the Northern Canada Power Commission (NCPC) in 1964/1965 at what was a natural falls on the Taltson River, known as Twin Gorges; this was located approximately 60 km northeast of Fort Smith and 30 km upstream of Tsu Lake (Figure 1-1). The Twin Gorges facility was originally built in order to provide electricity to Cominco's Pine Point Mine, a large polymetallic mine near Fort Resolution, NWT. The Taltson River Watershed drains over 58,000 km² upstream of Tsu Lake and has a mean annual discharge of 190 m³/s at the outlet of Tsu Lake. The proposed Project will alter the hydrological regime from Nonacho Lake to the area downstream of the Twin Gorges Dam.

Discharge from Nonacho Lake into the Taltson River flows over 130 km through a complex series of slow-moving, low gradient river-reaches divided by a series of large lakes, short rapids and waterfalls. Flow dynamics through the system are controlled by lake storage and flow restrictions (i.e., hydraulic control points) at rapids and lake outflow points. Downstream of Lady Grey Lake, where the Tronka Chua system re-enters the Taltson River, the river passes through several smaller lakes as it flows the remaining 110 km to the Twin Gorges Forebay. The Tazin River joins the Taltson River within this reach.

Prior to the construction of the dam and South Valley Spillway (SVS) at the Twin Gorges facility in 1965, Trudel Creek was normally a small meandering stream interconnecting the three lakes in this reach, with a possible connection to the Taltson River mainstem during periods of higher flows. Since the use of Trudel Creek as the spillway route, additional high flows have been routed into this drainage. From 1965 to 1986, in the period when the mine was operating, and in particular after the construction of the Nonacho Lake dam in 1968, spill flows were likely minimized and flows over the SVS were relatively variable. Since the mine closed in 1986, the flow through the plant has decreased and approximately 75% of the flow passes over the spillway. Trudel Creek has therefore had several distinct flow regimes prior to and since the Twin Gorges facility was constructed.

The study area for bird and amphibian surveys encompassed wetland habitat within Trudel Creek (Zone 5), Taltson River (Zones 1 and 3) and Nonacho Lake. The dominant wetland types within the study area included: riparian marshes, fens and bogs. A review of these wetland types and the way in which wetland classification was conducted can be found in the Taltson Basin Wetland Baseline Report (Rescan, 2008b).

3. Methods

3.1 Introduction

Survey methodology differed between target species. Call playback surveys were conducted for yellow rails, aerial surveys were flown for waterfowl and visual encounter surveys were used to detect presence of northern leopard frogs. Further details are provided below.

3.2 Yellow Rail Call Playback Surveys

The methodology used to detect yellow rails followed the Canadian Wildlife Service standardized protocol (Bazin and Baldwin, 2007). This protocol also encourages recording the calls of additional marsh birds (e.g., sora) and passerine species of interest (e.g., Le Conte's sparrow) as secondary target species that use similar habitat as, and often co-occur with, yellow rails.

Yellow rail call playback surveys were conducted between June 6 and 11, 2008. Two observers covered riparian wetlands extending from Trudel Creek (Zone 5) through Taltson River (Zones 1 and 3) to Nonacho Lake during the five day survey. Prior to commencement of surveys, potential survey areas were identified by examining topographical maps and aerial photos. The greatest degree of survey effort was focused within the Taltson River (Zones 1 and 3) area since it contained habitat that appeared to be the most suitable for the target species.

During the courtship pre-egg laying period, yellow rail males make a distinctive, ticking mating call that is discernable by an experienced ornithologist and the ticking sound can also be elicited by use of a call playback system where the male song is broadcast over a long distance. Call playbacks were conducted at a subset of sites that were evaluated for habitat (Bazin and Baldwin, 2007). Surveys began at 23:00 and were completed by 4:00. Male yellow rails often call during the night, commencing after complete darkness (Fryer, 1937; Stenzel, 1982; Robert and Laporte, 1993), and therefore surveys were conducted between sunset and sunrise. Observers were transported to sites by helicopter. The start and end times that observations began at each sampling location were recorded. Surveys were not conducted when it was unsafe to fly or land the helicopter such as during storms. All wildlife species that were observed incidentally during travel to and from sample locations, or on the ground during surveys were recorded as incidental observations.

3.3 Waterfowl Aerial Surveys

Waterfowl aerial surveys were conducted between June 8 and 11, 2008. Encounter transects, which are useful for presence/not detected information were flown in Zone 5, 1 and Nonacho Lake. An experienced ornithologist made verbal observations of waterfowl (species and number of individuals) through binoculars while the assistant recorded the observations. Surveys were conducted in a Bell 206B helicopter. In Zone 5, two waterfowl transects were flown for 64 survey minutes in total. A single waterfowl transect was flown, 30 minutes in duration in Zone 1. Two waterfowl surveys were flown for a total of 162 survey minutes in Nonacho Lake area. Incidental observations of waterfowl were also made during yellow rail surveys.

Whenever possible, observations of evidence of breeding were recorded (e.g., nests). The times and locations that aerial surveys began and ended were recorded.

3.4 Northern Leopard Frog Visual Encounter Surveys

Northern leopard frog surveys were conducted between July 18 and 21, 2008. Prior to commencement of surveys, potential survey areas were identified by examining topographical maps and aerial photos for wetland areas or sheltered bays and inlets where wetlands may occur. Survey effort was focused within Trudel Creek (Zone 5) as northern leopard frogs had been observed in or near this area previously (Fournier, 1997; Figure 1-1) and hydrological changes may be the greatest within Trudel Creek in the future. The Taltson River (Zone 1) was also surveyed because northern leopard frogs have been found at comparable latitudes west of the area so it was presumed that their presence might extend as far north as Lady Grey Lake.

Visual encounter surveys were conducted at each survey location following protocols described by Crump and Scott (1994) and Kendell (2002). Visual encounter surveys are appropriate for detecting the presence of northern leopard frogs at sites and confirming previous observations or anecdotal records (Kendell, 2002). Surveys began at 08:15 and were completed by 15:50 as northern leopard frogs are more likely to bask along exposed shorelines during the morning and early afternoon (Kendell, 2002). Observers were transported to sites by helicopter. The primary observer was an experienced herpetologist who has been conducting herpetological surveys since 1998. In addition, a field assistant was trained to differentiate wood frogs (*Lithobates sylvaticus*) from northern leopard frogs, the only two amphibian species observed. The start and end times that observations began at each survey location were recorded. The observers conducted the surveys by slowly walking along the shoreline of riparian areas or around the circumference of ponds. Each observer carried a long-handled trout net in order to capture observed amphibians for species confirmation if needed. Breeding at a site was confirmed when tadpoles or metamorphs (recently metamorphosed/transformed tadpoles) were observed at a wetland location. Habitat was classified as breeding if tadpoles were observed. Where amphibians were detected but no evidence of breeding was found the habitat was classified as summer. The number of amphibians observed during the search period was recorded as well as their general life stage (tadpole, metamorph, juvenile, adult). All wildlife species that were observed incidentally during travel to and from sample locations, or on the ground during surveys were recorded as incidental observations.

4. Results

4.1 Trudel Creek (Zone 5)

4.1.1 Yellow Rail Surveys

Zone 5 was evaluated at four locations for wetland habitat classes and cover types and call playback surveys were conducted at two of the sites during the night-time period (Figure 4.1-1; Appendix 1 and 2). This zone contained fragments of suitable habitat, however most habitat areas were extremely small. No yellow rails were detected in Zone 5. The secondary target species that were detected in this area included Le Conte's sparrow and sora (Table 4.1-1). The only species at risk that was incidentally observed in Zone 5 during yellow rail surveys was the common nighthawk, which was seen at site TC3 (Table 4.1-2).

4.1.2 Waterfowl Surveys and Incidental Waterfowl Observations

In total there were fifteen species of waterfowl, geese and cranes observed in this area (Figure 4.1-2; Table 4.1-1; Appendix 3) including whooping cranes, a species at risk (Table 4.1-2). Twelve species were observed during the waterfowl surveys and three were observed incidentally. The three most common species were Canada geese, mallards and buffleheads (Figure 4.1-2).

4.1.3 Additional Incidental Bird Observations

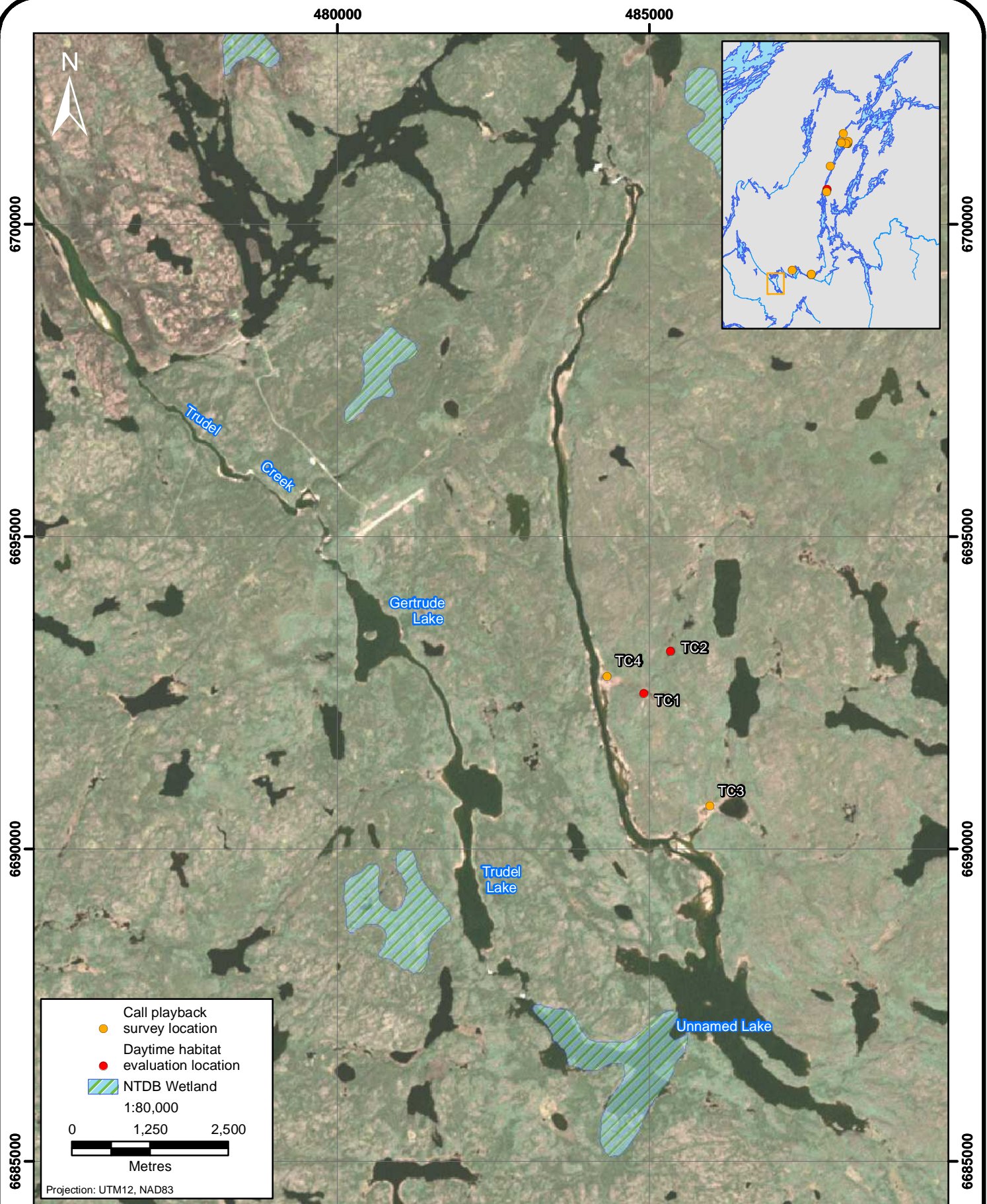
A total of 29 species of birds as detected directly or via bird sign, (e.g., scat) were observed in Zone 5 during June and July, 2008 (Table 4.1-1). This included one gamebird, two gruids (e.g., cranes), two shorebirds, seven songbirds and three raptor species (Appendix 4). A bald eagle nest was seen on a cliff face at the northern leopard frog survey site SV19. An adult had been observed at the nest earlier in July (personal communication with Johnny Desjarlais, local knowledge holder). Sandpiper hatchlings were observed July 19, 2008 at northern leopard frog sites SV9, SV10 and SV14 (Plate 4.1-1).

4.1.4 Northern Leopard Frog Surveys

Fourteen sites were searched for northern leopard frogs in Trudel Creek as well as one nearby site upstream of Elsie Falls within Zone 3 (Figure 4.1-3; Appendix 5). Two of these sites had previous northern leopard frog observations from August, 2007 and earlier in July, 2008 (personal communication with Jason Côté, B.Sc.; Appendix 6). Northern leopard frogs were not detected again at these sites (SV14 and SV22) in late July, 2008. These two sites were classified as northern leopard frog summer habitat, individual northern leopard frogs were probably transient and in low densities. Wood frogs were observed at thirteen of the sites including tadpoles at site SV7 which was classified as wood frog breeding habitat.

4.1.5 Incidental Frog Observations

One juvenile wood frog was observed during the yellow rail surveys in June, 2008 at site TR2.



Yellow Rail Survey Locations in Trudel Creek (Zone 5), June 2008

Table 4.1-1
Total Bird Species Detected in Trudel Creek,
Taltson River and Nonacho Lake

Avian Group	Common Name	Scientific Name	# Observed		
			Trudel Creek (Z5)	Taltson River (Z1 & Z3)	Nonacho Lake
Gamebirds	Ptarmigan sp.	<i>Lagopus sp.</i>	***	***	
Species subtotal			1	1	
Gruids	Sandhill crane	<i>Grus canadensis</i>			2
	Sora	<i>Porzana carolina</i>	2	5	1
	Whooping crane	<i>Grus americana</i>	5	2	
Species subtotal			2	2	2
Shorebirds	Greater yellowlegs	<i>Tringa melanoleuca</i>	1	7	
	Lesser yellowlegs	<i>Tringa flavipes</i>		17	
	Solitary sandpiper	<i>Tringa solitaria</i>		1	
	Spotted sandpiper	<i>Actitis macularia</i>		1/1*	
	Unknown sandpiper	<i>Tringa sp./Actitis sp.</i>	11*		
	Unknown yellowlegs	<i>Tringa sp.</i>	4*	6/1*	
Species subtotal			2	4	
Songbirds	American redstart	<i>Setophaga ruticilla</i>		1	
	Chipping sparrow	<i>Spizella passerina</i>		1	
	Common nighthawk	<i>Chordeiles minor</i>	1	1	
	Gray jay	<i>Perisoreus canadensis</i>		1*	
	Hermit thrush	<i>Catharus guttatus</i>	1	1	
	Le Conte's sparrow	<i>Ammodramus leconteii</i>	1	4	1
	Lincoln's sparrow	<i>Melospiza lincolnii</i>	1	7	
	Nelson's sharp-tailed sparrow	<i>Ammodramus nelsoni</i>		2	
	Olive-sided flycatcher	<i>Contopus cooperi</i>		1	1
	Red-winged blackbird	<i>Agelaius phoeniceus</i>		2	1
	Ruby crowned kinglet	<i>Regulus calendula</i>		1	
	Rusty blackbird	<i>Euphagus carolinus</i>		2	
	Savanna sparrow	<i>Passerculus sandwichensis</i>		1	
	Swainson's thrush	<i>Catharus ustulatus</i>	1	7	
	Swamp sparrow	<i>Melospiza georgiana</i>		1	
	Unknown flycatcher	<i>Empidonax sp.</i>		2	
	White-crowned sparrow	<i>Zonotrichia leucophrys</i>		2	
	White-throated sparrow	<i>Zonotrichia albicollis</i>		1	
	Wilson's snipe	<i>Gallinago delicata</i>	1*	12/1*	1
	Wilson's warbler	<i>Wilsonia pusilla</i>	1		
Species subtotal			7	19	4
Raptors	Bald eagle	<i>Haliaeetus leucocephalus</i>	3	6**	6
	Golden eagle	<i>Aquila chrysaetos</i>	1*		
	Northern harrier	<i>Circus cyaneus</i>	1*		
	Short-eared owl	<i>Asio flammeus</i>		1	
Species subtotal			3	2	1

(continued)

Table 4.1-1
Total Bird Species Detected in Trudel Creek,
Taltson River and Nonacho Lake (completed)

Avian Group	Common Name	Scientific Name	# Observed		
			Trudel Creek (Z5)	Taltson River (Z1 & Z3)	Nonacho Lake
Waterfowl and Geese	American wigeon	<i>Anas americana</i>	31	4	2
	Blue-winged teal	<i>Anas discors</i>	4		
	Bufflehead	<i>Bucephala albeola</i>	32/1*	1/2*	35
	Canada goose	<i>Branta canadensis</i>	83/**	22	87
	Common goldeneye	<i>Bucephala clangula</i>	5		
	Common loon	<i>Gavia immer</i>	12/1*	5/4*	36
	Common merganser	<i>Mergus merganser</i>	16	11	10
	Eurasian wigeon	<i>Anas Penelope</i>		1	
	Greater scaup	<i>Aythya marila</i>			7
	Green-winged teal	<i>Anas crecca</i>	6		
	Hooded merganser	<i>Lophodytes cucullatus</i>			1
	Horned grebe	<i>Podiceps auritus</i>	2		1
	Lesser scaup	<i>Aythya affinis</i>		10	61
	Mallard	<i>Anas platyrhynchos</i>	44	3	22
	Northern pintail	<i>Anas acuta</i>		16	13
	Northern shoveler	<i>Anas clypeata</i>	2	12	
	Pacific loon	<i>Gavia pacifica</i>			4
	Red-breasted merganser	<i>Mergus serrator</i>		4	4
	Red-necked grebe	<i>Podiceps grisegena</i>	2		
	Red-throated loon	<i>Gavia stellata</i>			2
	Ring-necked duck	<i>Aythya collaris</i>	3		1
	Surf scoter	<i>Melanitta perspicillata</i>		8	17
	Tundra swan	<i>Cygnus columbianus</i>	1		
	White-winged scoter	<i>Melanitta fusca</i>			23
	Species subtotal		14	12	17
	Total Species	56	29	40	24

*Seen during July, 2008 northern leopard frog surveys.

**Flocks of juveniles seen during July, 2008 northern leopard frog surveys.

***Winter scat observed.

Z = zone

Table 4.1-2
Conservation Status of Birds Detected in Trudel Creek,
Taltson River and Nonacho Lake

Common Name	Global Rank	COSEWIC	SARA	NWT General Status
American redstart	G5			Secure
American wigeon	G5			Secure
Bald eagle	G5			Secure
Blue-winged teal	G5			Secure
Bufflehead	G5			Secure
Canada goose	G5			Secure
Chipping sparrow	G5			Secure
Common goldeneye	G5			Secure
Common loon	G5	NAR		Secure
Common merganser	G5			Secure
Common nighthawk	G5	T		Secure
Eurasian wigeon	G5			Vagrant/Accidental
Golden eagle	G5	NAR		Secure
Gray jay	G5			Secure
Greater scaup	G5			Secure
Greater yellowlegs	G5			Undetermined
Green-winged teal	G5			Secure
Hermit thrush	G5			Secure
Hooded merganser	G5			Secure
Horned grebe	G5			Secure
Le Conte's sparrow	G4			Secure
Lesser scaup	G5			Sensitive
Lesser yellowlegs	G5			Sensitive
Lincoln's sparrow	G5			Secure
Mallard	G5			Secure
Nelson's sharp-tailed sparrow	G5	NAR		Undetermined
Northern harrier	G5	NAR		Secure
Northern pintail	G5			Sensitive
Northern shoveler	G5			Secure
Olive-sided flycatcher	G4	T		Sensitive
Pacific loon	G5			Secure
Ptarmigan sp.	G5			Secure
Red-winged blackbird	G5			Secure
Red-breasted merganser	G5			Secure
Red-necked grebe	G5			Secure
Red-throated loon	G5			Secure
Ring-necked duck	G5			Secure
Ruby-crowned kinglet	G5			Secure
Rusty blackbird	G4	SC		May Be At Risk
Sandhill crane	G5	NAR		Secure

(continued)

Table 4.1-2
Conservation Status of Birds Detected in Trudel Creek,
Taltson River and Nonacho Lake (completed)

Common Name	Global Rank	COSEWIC	SARA	NWT General Status
Savannah sparrow	G5			Secure
Short-eared owl	G5	SC	Schedule 3	Sensitive
Solitary sandpiper	G5			Undetermined
Sora	G5			Secure
Spotted sandpiper	G5			Secure
Surf scoter	G5			Sensitive
Swainson's thrush	G5			Secure
Swamp sparrow	G5			Secure
Tundra swan	G5			Secure
White-crowned sparrow	G5			Secure
White-throated sparrow	G5			Sensitive
White-winged scoter	G5			Sensitive
Whooping crane	G1	E	Schedule 1	At Risk
Wilson's snipe	G5			Undetermined
Wilson's warbler	G5			Secure
Yellow rail*	G4	SC	Schedule 1	May Be At Risk

*Yellow rail were not detected but were a target species.

Global Rank (www.natureserve.org/explorer/ranking.htm)

·G1 (Critically Imperiled) - At very high risk of extinction due to extreme rarity (often 5 or fewer populations), very steep declines, or other factors.

·G2 (Imperiled) - At high risk of extinction due to very restricted range, very few populations (often 20 or fewer), steep declines, or other factors.

·G3 (Vulnerable) - At moderate risk of extinction due to a restricted range, relatively few populations (often 80 or fewer), recent and widespread declines, or other factors.

·G4 (Apparently Secure) - Uncommon but not rare; some cause for long-term concern due to declines or other factors.

·G5 (Secure) - Common; widespread, and abundant.

COSEWIC Ranking (www.cosewic.gc.ca)

·E (Endangered) - A wildlife species facing imminent extirpation or extinction.

·T (Threatened) - A wildlife species likely to become endangered if limiting factors are not reversed.

·SC (Special Concern) - A wildlife species that may become a threatened or an endangered species because of a combination of biological characteristics and identified threats.

·NAR (Not At Risk) - A wildlife species that has been evaluated and found to be not at risk of extinction given the current circumstances.

SARA Listing (www.sararegistry.gc.ca/default_e.cfm)

·Schedule 1 - Species listed in Schedule 1 are protected under SARA as of proclamation in June 2003. These species were assessed by COSEWIC using the revised assessment criteria. The list classifies the species as being either extirpated, endangered, threatened, or a special concern.

·Schedules 2 and 3 - Species listed in these schedules were assessed prior to October 1999, and require re-assessment using the revised criteria, following which the Governor in Council may, on the recommendation of the Minister, add the species to the Federal List of Wildlife Species at Risk.

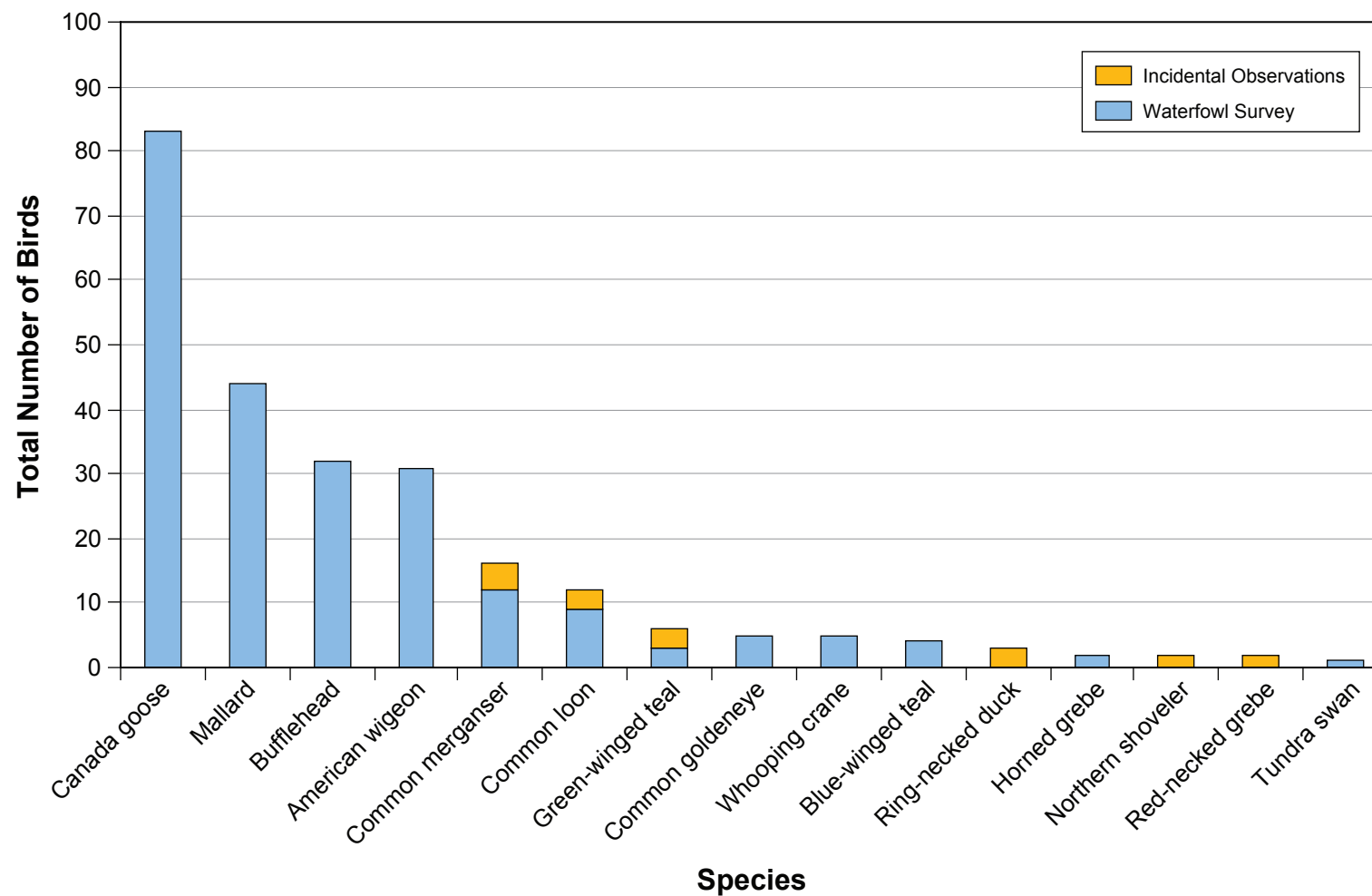
NWT General Status (www.nwtwildlife.com/monitoring/speciesmonitoring/2006.htm)

·At Risk - species for which a detailed assessment has already been completed (e.g., by COSEWIC or jurisdictional status reports) that determined the species to be at risk of extirpation or extinction. This is a special category that may be used only for species that have been assessed as Endangered or Threatened according to COSEWIC.

·May Be At Risk - species that may be at risk of extinction or extirpation, and are therefore candidates for detailed risk assessment.

·Sensitive - species that are not at risk of extinction or extirpation but may require special attention or protection to protect them from becoming at risk

Secure - species which are not at risk or sensitive.



Waterfowl Observed in Trudel Creek, June 2008

4.1.6 Additional Incidental Wildlife Observations

Incidental observations of mammals along Trudel Creek included a black bear, bear tracks, lynx tracks, moose, moose tracks and pellets, beaver, beaver dams and lodges, muskrat sign (e.g., bank entranceway), houses and pushups, snowshoe hare pellets and wolf tracks (Figure 4.1-4, Plate 4.1-2 and Appendix 4).

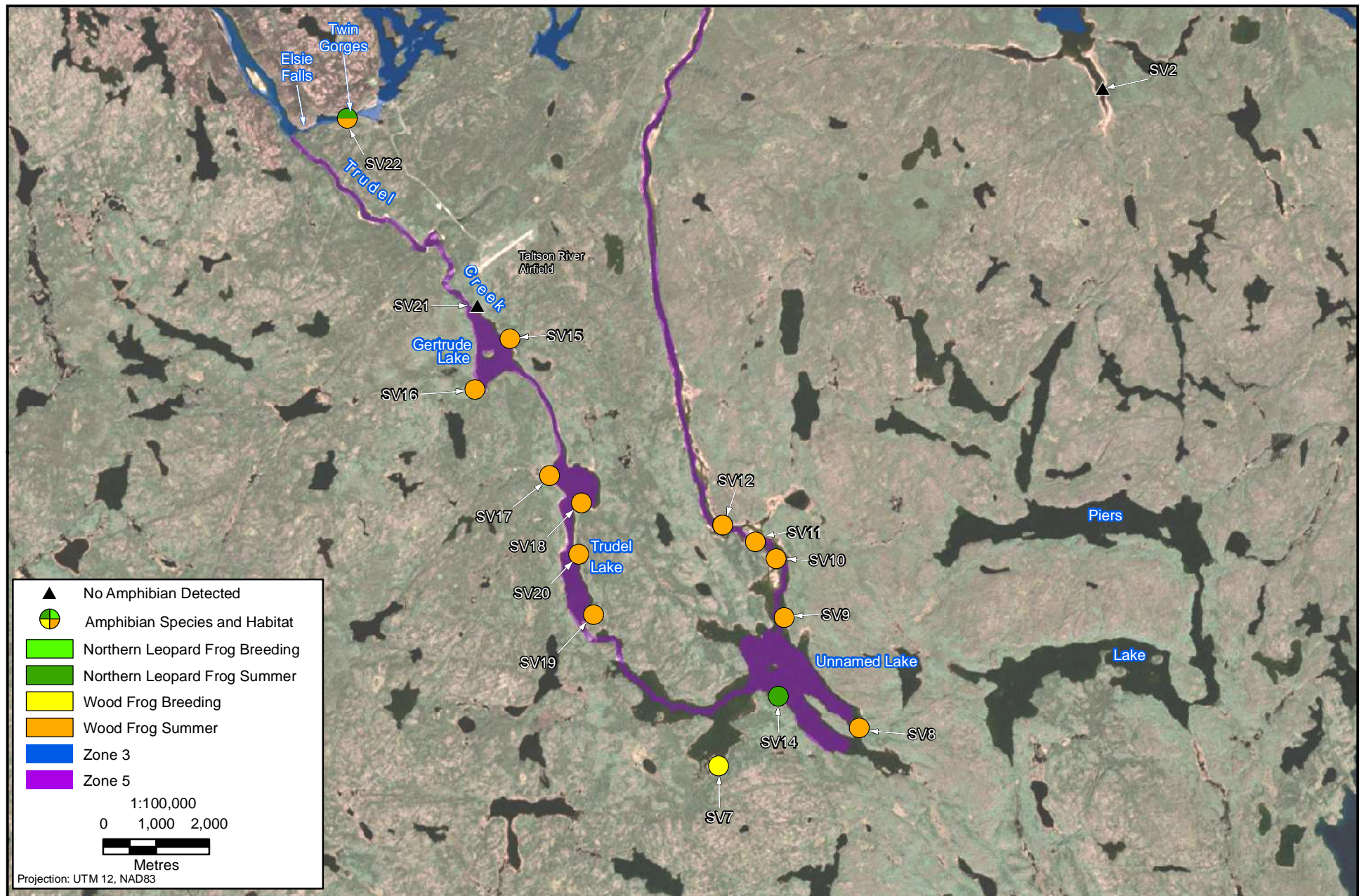


Plate 4.1-1. Sandpiper hatchling observed at site SV10.



(a) ptarmigan scat, (b) snowshoe hare winter pellets, (c) otter sign: broken clam shells, (d) lynx tracks, (e) bear track, (f) muskrat pushup

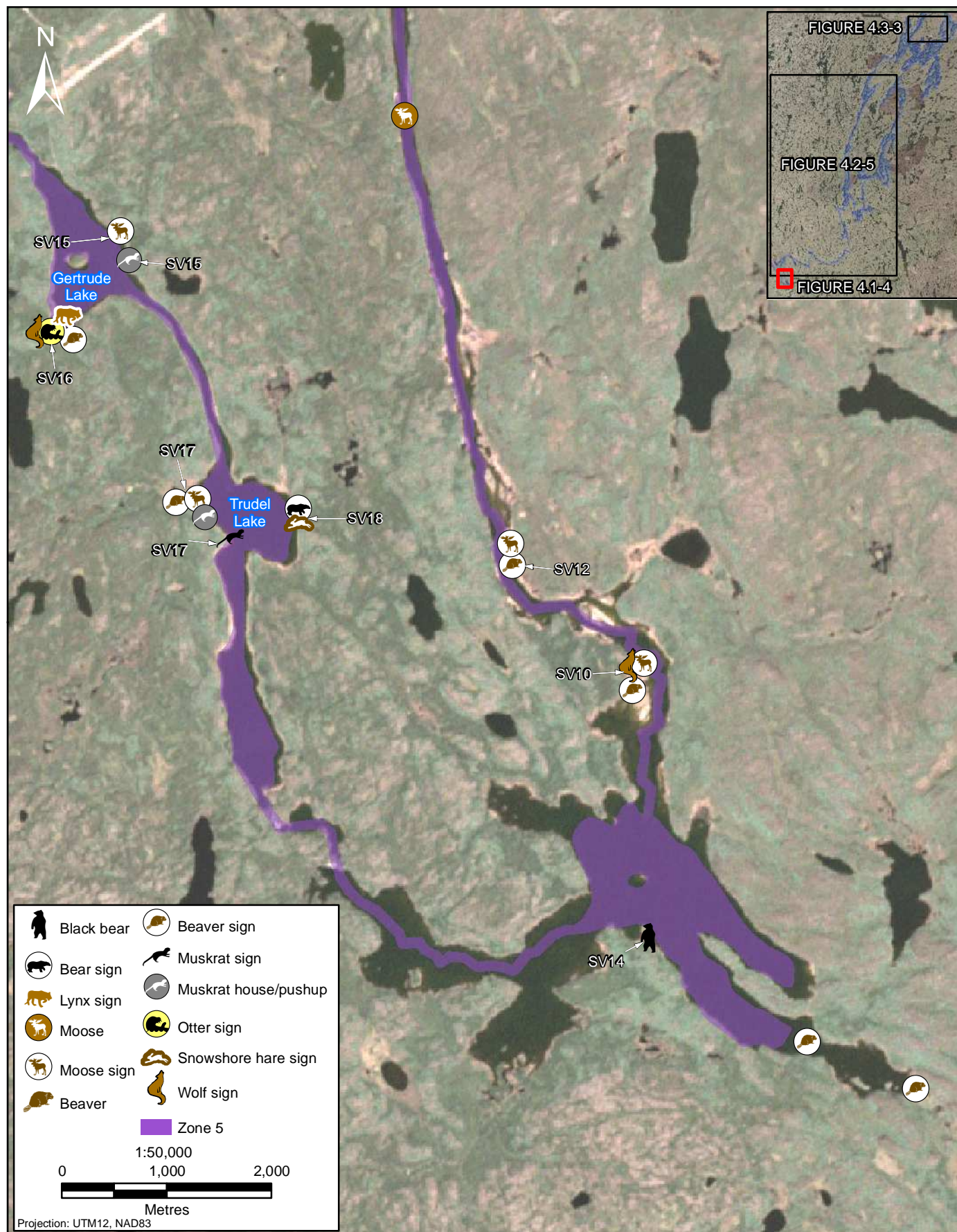
Plate 4.1-2. Incidental wildlife observations within Trudel Creek (Zone 5).



**Northern Leopard Frog Survey Locations within
Trudel Creek (Zone 5), July 2008**

FIGURE 4.1-3





**Incidental Observations of Mammals in
Trudel Creek (Zone 5), 2008**

FIGURE 4.1-4

4.2 Taltson River (Zones 1 and 3)

4.2.1 Yellow Rail Surveys

Zones 1 and 3 were evaluated for wetland habitat classes and cover types at 16 sites during the daytime reconnaissance period (Figure 4.2-1). Fifteen of those sites were subsequently sampled for yellow rails during the nocturnal calling period (Appendix 1 and 2). Zone 1 contained the most extensive areas of suitable habitat, with a few places comprised of marshy wetlands several hundred hectares in size. No yellow rails were detected. The secondary target species that were detected included Le Conte's sparrow, Nelson's sharp-tailed sparrow and sora (Table 4.1-1). Six species at risk were detected in Zones 1 and 3; common nighthawk, lesser yellowlegs, olive-sided flycatcher, rusty blackbird, short-eared owl and white-throated sparrow (Table 4.1-2, Figure 4.2-2).

4.2.2 Waterfowl Surveys and Incidental Waterfowl Observations

In total, thirteen species of waterfowl, geese and cranes were observed in Zone 1 (Figure 4.2-1; Table 4.1-1; Appendix 3). This included the lesser scaup, northern pintail, surf scoter and whooping cranes, all of which are considered species at risk (Table 4.1-2). Eight of the species were observed during waterfowl surveys and five were observed incidentally. The three most common species observed were Canada geese, northern pintails and northern shovelers (Figure 4.2-3).

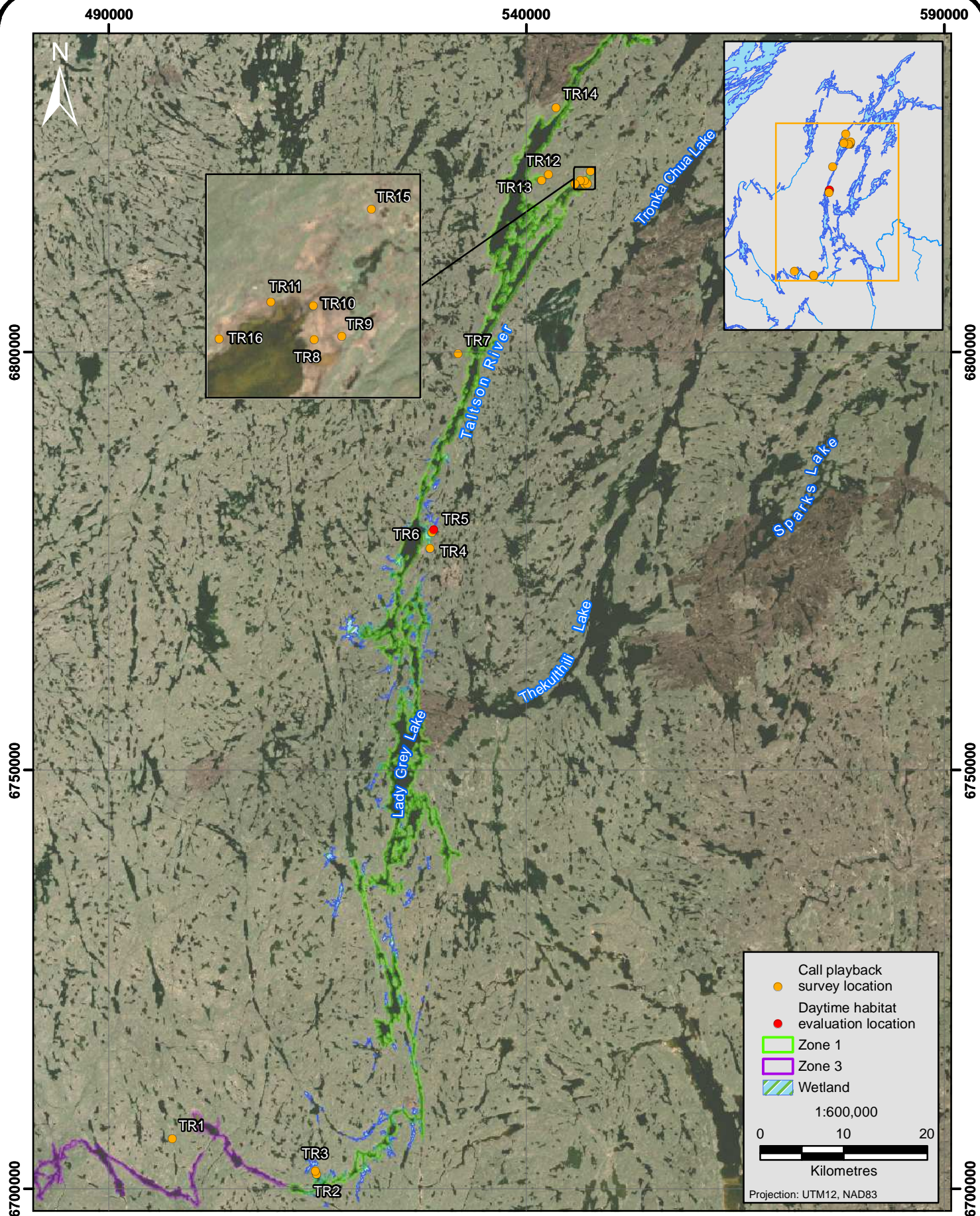
4.2.3 Additional Incidental Bird Observations

A total of 39 bird species or sign were observed in Zones 1 and 3 during June and July, 2008. This included one gamebird, two gruids, 19 songbirds and two raptors (Table 4.1-1; Appendix 4). An active bald eagle nest with a chick and an adult was observed at northern leopard frog survey site SV29. The nest was constructed in a tree along the shoreline of the Taltson River.

4.2.4 Northern Leopard Frog Surveys

Nine sites in Zone 1 and five sites in Zone 3 were surveyed along the Taltson River (Figure 4.2-4; Appendix 5). In total northern leopard frogs were observed at five of these sites. Sites were only identified as amphibian habitat for either northern leopard frogs or wood frogs if an individual of the species was observed. A northern leopard frog female or subadult was observed at Kozo Lake where the species had last been documented in 1994 (Fournier, 1997). Breeding was detected at site SV5; tadpoles with both front and hind limbs were observed. This may be the only documented breeding location for the species in the Northwest Territories (Plates 4.2-1 and 4.2-2).

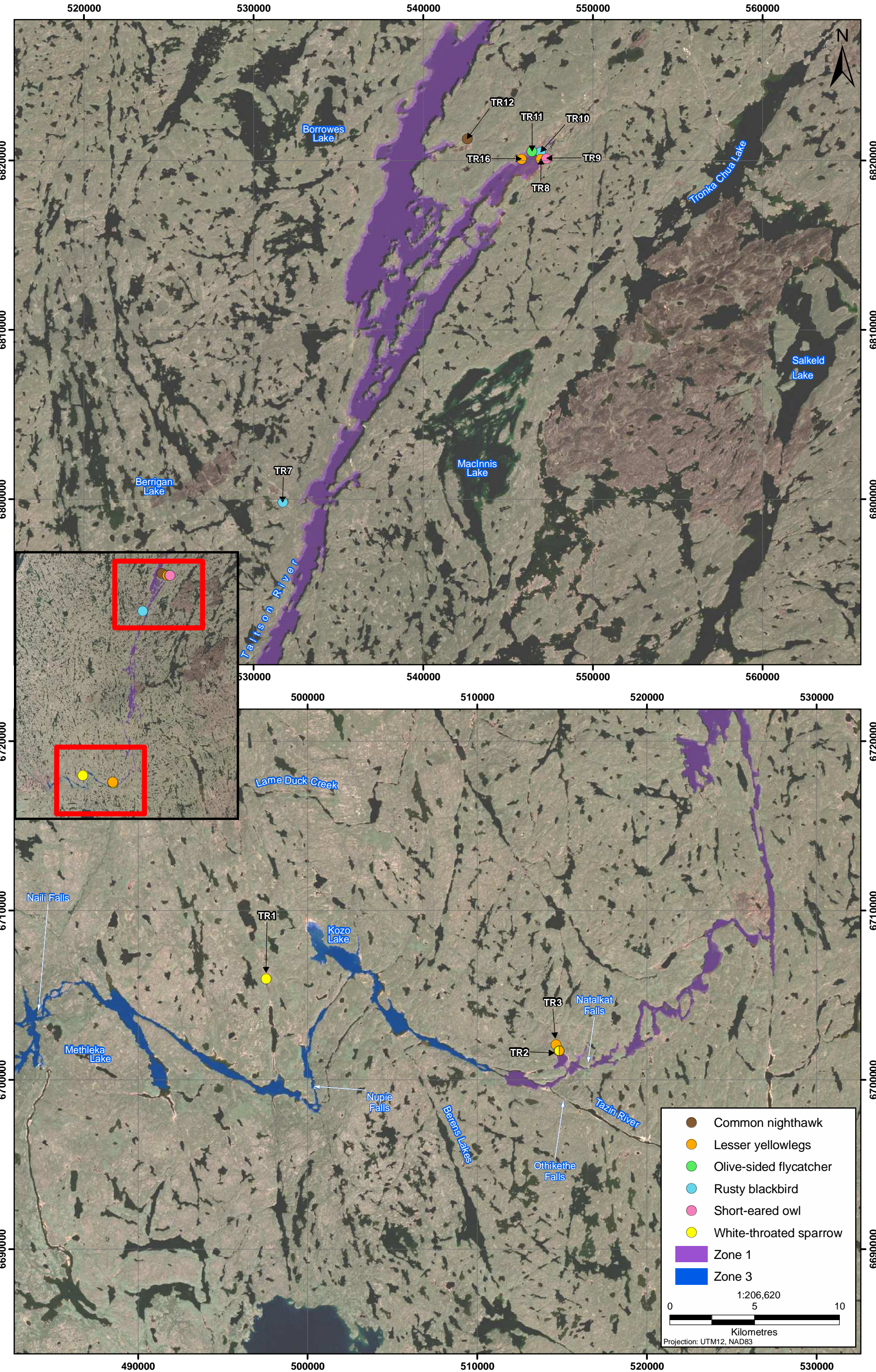
Adult northern leopard frogs were also observed at sites TW19 and TW21 in August, 2008 by the Rescan wetlands biologist, Wade Brunham (B.Sc.) (Figure 4.2-4; Appendix 7; Rescan, 2008b). Site TW19 is close to site SV5 where northern leopard frog breeding was documented. Therefore, if that observation is included with site SV5 then there were a total of six sites in Zones 1 and 3 where northern leopard frogs have been observed in 2008. Wood frogs were detected at seven sites with breeding at two of these; wood frog tadpoles were observed at site SV13 and a metamorph with a tail bud was observed at site SV25.



Yellow Rail Survey Locations in Taltson River (Zones 1 and 3), June 2008

FIGURE 4.2-1





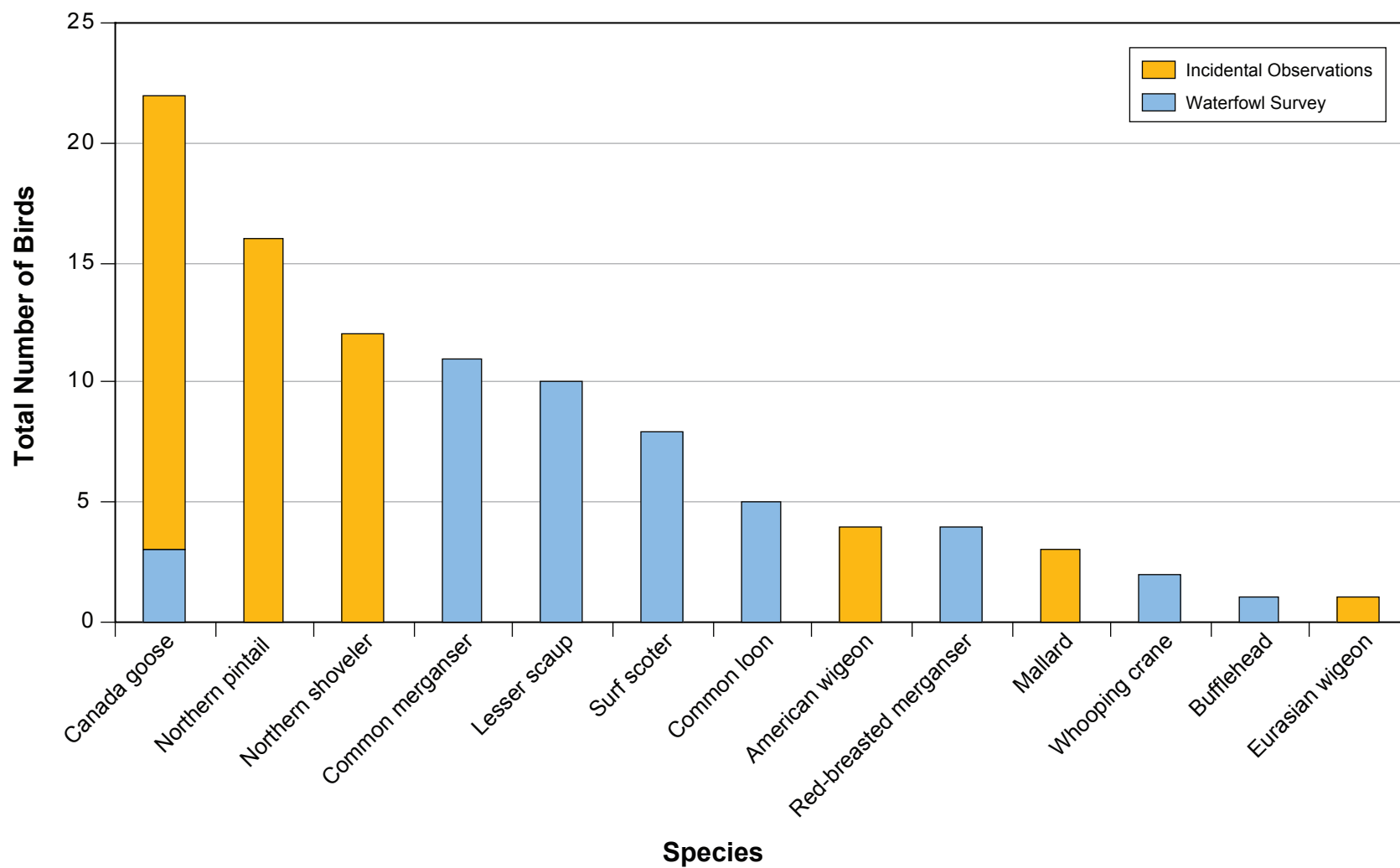
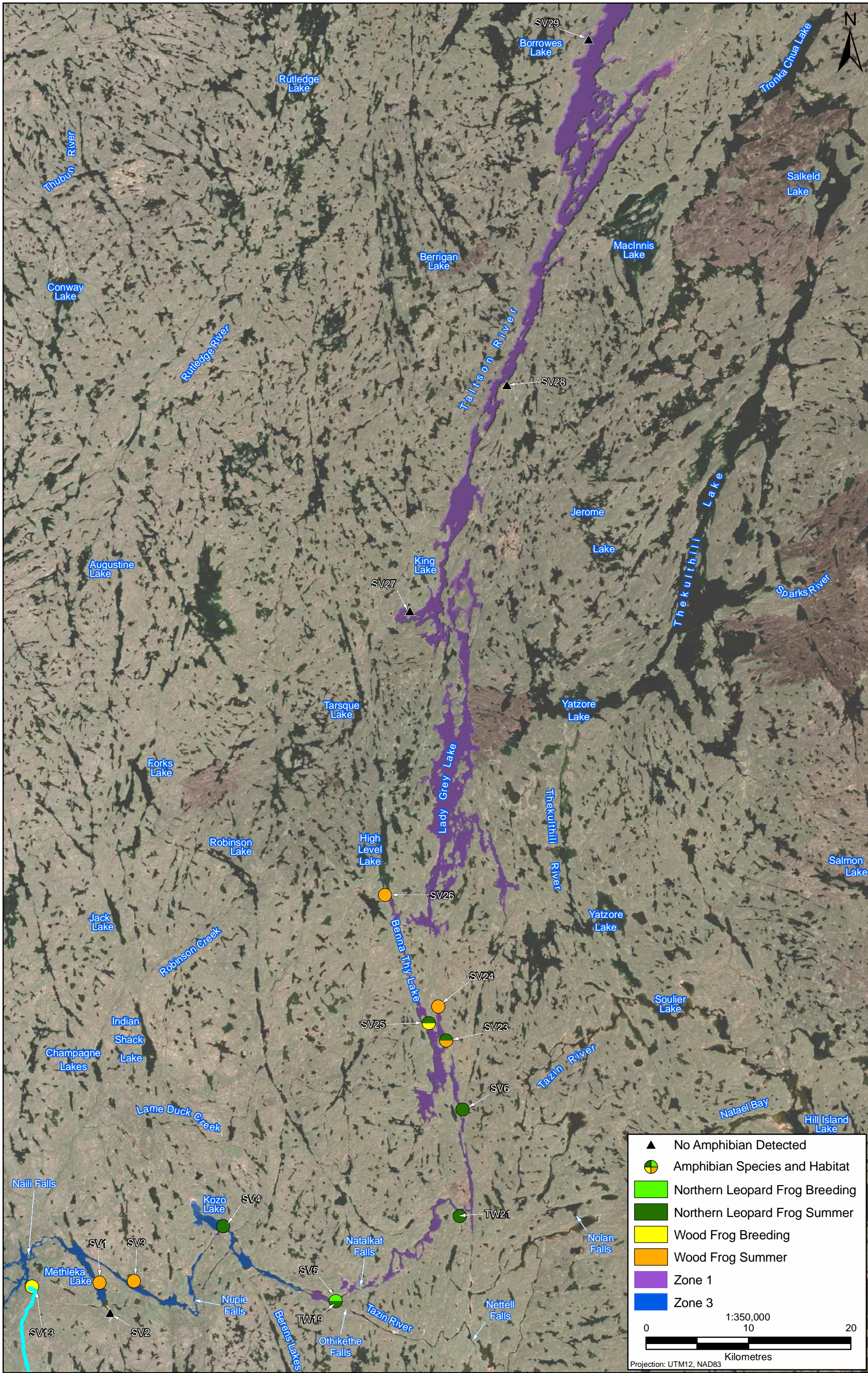




Plate 4.2-1. Northern leopard frog breeding habitat along the Taltson River. The primary vegetation on the water surface is yellow pond lily (*Nuphar lutea*) while the darker green vegetation surrounding the water is a species of horsetail (*Equisetum arvense*). The lighter green is primarily beaked sedge (*Carex utriculata*).



Plate 4.2-2. A closer view of the northern leopard frog breeding habitat with horsetail in the forefront, yellow pond lilies on the water surface and lighter green sedges in front of the shrubs.



4.2.5 Incidental Wildlife Observations

Incidental observations of mammals along the Taltson River included a pair of caribou antlers, beaver, beaver lodges and dams, moose, moose tracks and pellets, snowshoe hare pellets, muskrat pushups and houses and otter tracks (Figure 4.2-5 and Appendix 4).

4.3 Nonacho Lake

4.3.1 Yellow Rail Surveys

Nonacho Lake was evaluated at three locations for wetland habitat classes and cover types and a call playback survey for yellow rails was conducted at one of these locations during the night-time period (Figure 4.3-1). No yellow rails were detected (Appendix 1 and 2). The secondary target species that were detected in this area were Le Conte's sparrow and sora (Table 4.1-1). The only species at risk that was detected was the olive-sided flycatcher at site NL2 (Table 4.1-2). The wetland habitat associated with Nonacho Lake seemed too wet and boggy for yellow rails. However, vegetation and standing water in this area were still frozen in several places and thus surveys conducted here may have been premature.

4.3.2 Waterfowl Surveys and Incidental Waterfowl Observations

Seventeen species of waterfowl, geese and cranes were observed (Figure 4.3-2; Table 4.1-1; Appendix 3). This included lesser scaup, northern pintail, surf scoter and white-winged scoters, all of which are classified as species at risk (Table 4.1-2). The three most common species observed were Canada geese, lesser scaups and common loons (Figure 4.3-1).

4.3.3 Additional Incidental Bird Observations

A total of 24 bird species were observed in Nonacho Lake during June, 2008 (Table 4.1-1; Appendix 4). This included two species of gruids, four songbird species and one raptor species (bald eagle). A bald eagle's nest was observed at universal transverse mercator coordinate (UTM) 562846 6854533.

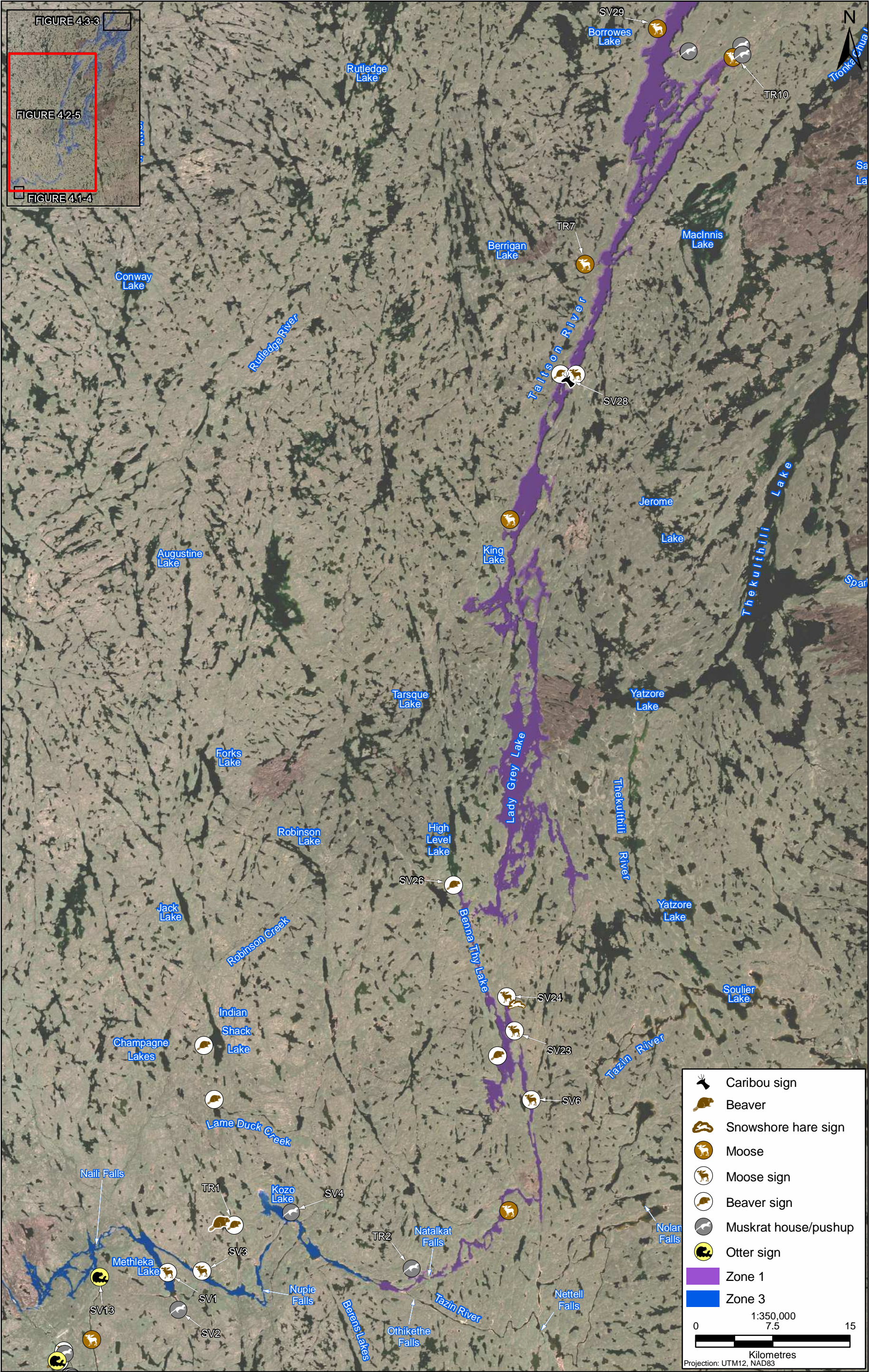
4.3.4 Northern Leopard Frog Surveys

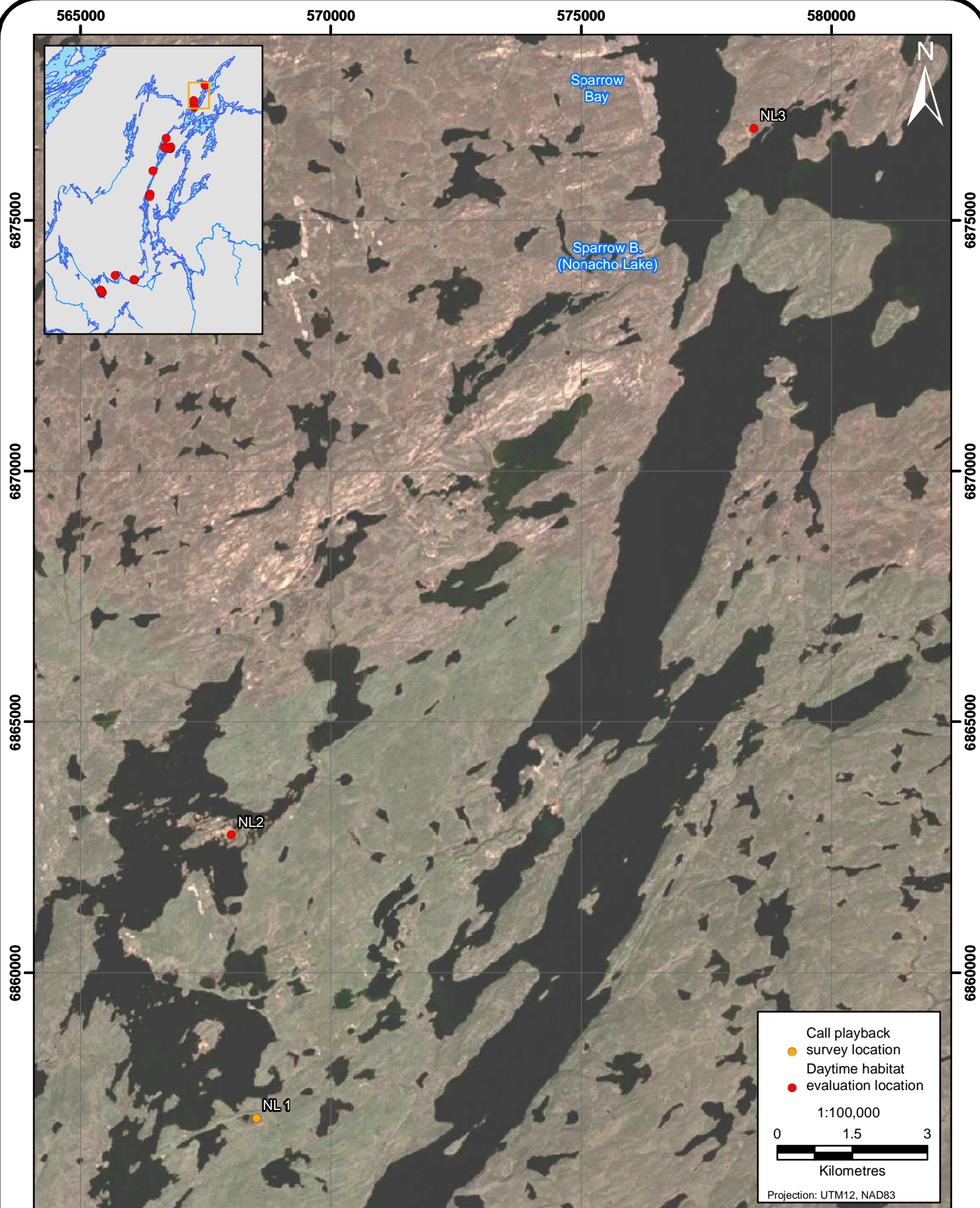
No leopard frog surveys were conducted in this area as it is approximately 70 km north of the latitude where northern leopard frogs have historically been observed (Figure 1-1; Fournier, 1997). It was assumed that due to observed habitat changes commencing at the latitude of Lady Grey Lake, the environment would be too harsh for northern leopard frogs to successfully overwinter. However, Carmen Tattersfield (B.NRSc.) of Cambria Gordon Ltd. had reported to have observed an amphibian in the Nonacho Lake area at UTM 581000 6848500 on July 9, 2008. Photo documentation of the frog was not possible so the species identification has not been confirmed.

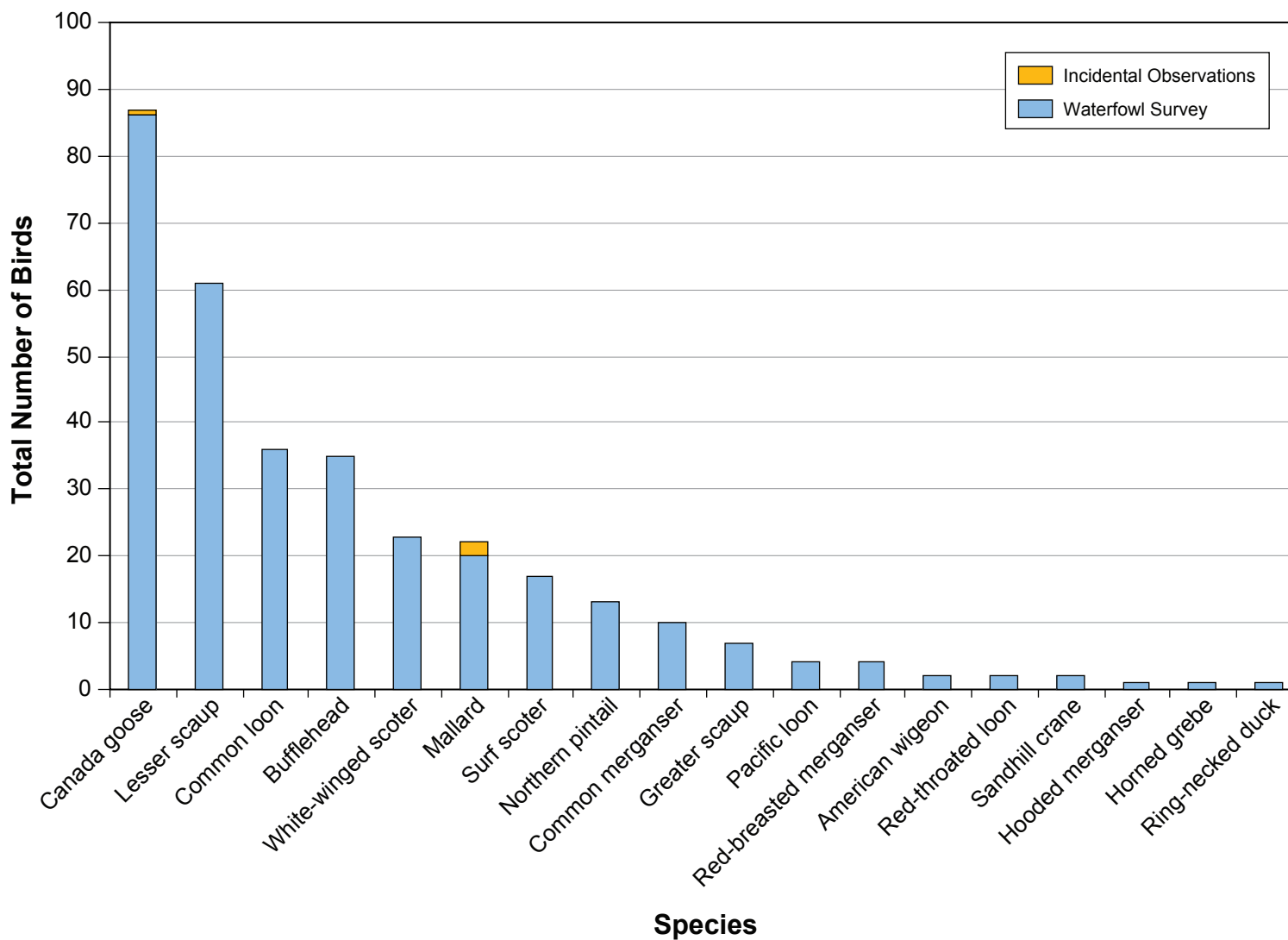
4.3.5 Incidental Wildlife Observations

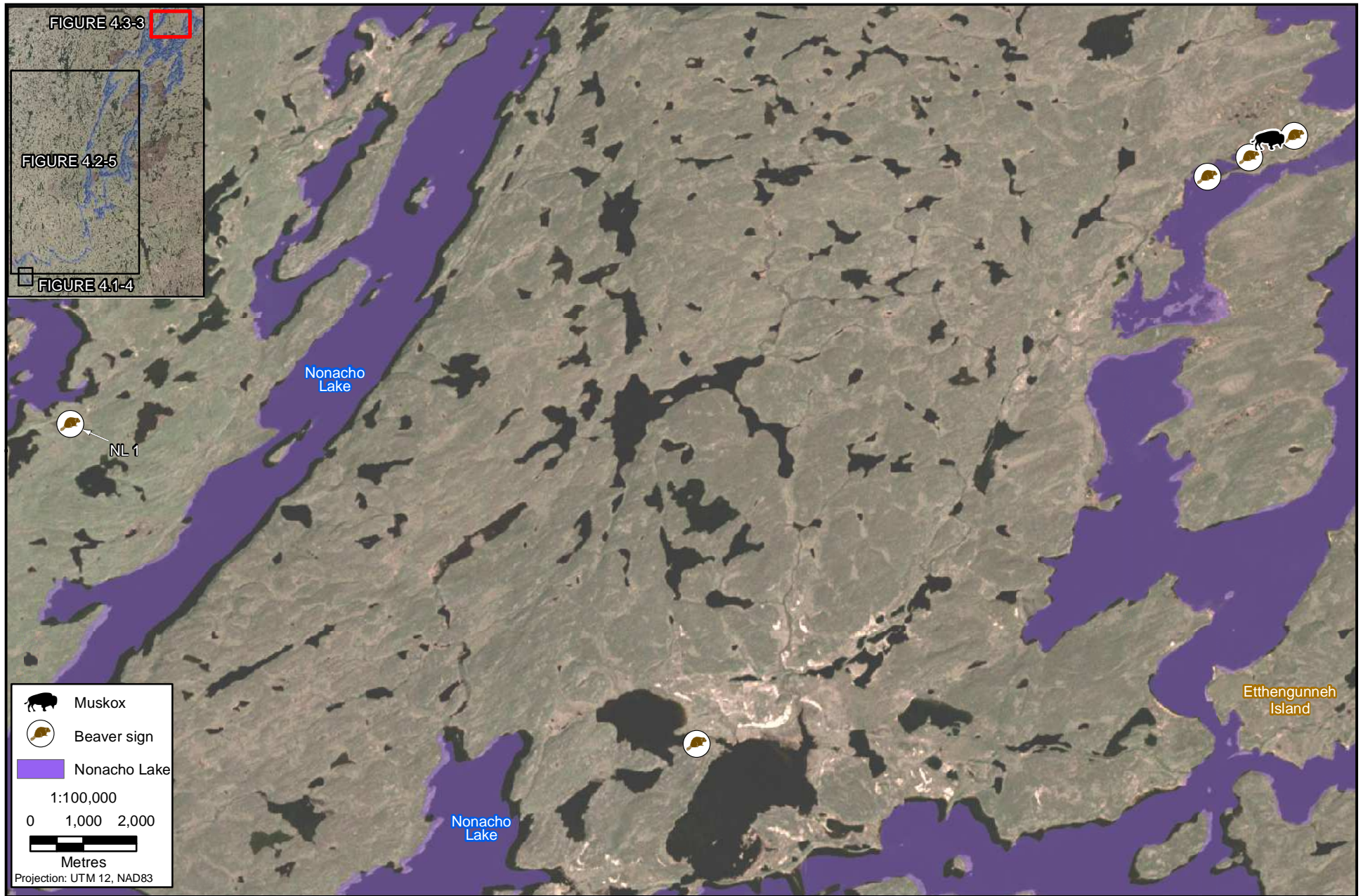
Incidental observations of mammals in Nonacho Lake included a muskox and beaver dams and lodges (Figure 4.3-3 and Appendix 4). A bull moose was also observed while conducting the waterfowl survey between the observation of beaver sign indicated towards the south on the map (UTM 580268 6851068) and the muskox observation (UTM 589882 6861759) in the northeast corner of the map but a GPS point was not recorded.

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5. Discussion

5.1 Trudel Creek (Zone 5)

5.1.1 Yellow Rails and Wetland-Associated Birds

The yellow rail is federally listed as a species of Special Concern partly due to its secretive nature and the chance of population declines occurring undetected as well as continuing habitat loss and a relatively small population (Alvo and Robert, 1999). No yellow rails were detected in Trudel Creek over the course of this study. However, a secondary target species according to the Canadian Wildlife Services protocol, the sora, was detected (Bazin and Baldwin, 2007). The observation of the sora increases the confidence level in the presence/not detected survey; observing the sora means that the yellow rail would likely have been detected if present at the survey locations. However, the observation may also indicate that the yellow rail surveys were conducted slightly too early as the sora is known to breed earlier in the season than the yellow rail (Bookhout, 1995; Melvin and Gibbs, 1996). Another indicator that the surveys may have been more successful if conducted later in the season is that the majority of the wetland vegetation present was senescent vegetation from the previous year. If the species is present in the area it may also be taking advantage of upland wetland areas where water levels would be more stable.

Other shorebirds that were observed in Trudel Creek include greater yellowlegs and sandpipers. Sandpiper hatchlings were observed at three sites in Zone 5 (SV9, SV10 and SV14) during the July, 2008 amphibian surveys. These species are ground nesters that use riparian habitat. Spotted sandpipers, whose breeding range occurs in the Project area, usually nest within 100 m of the water's edge (Oring et al., 1997). They could potentially be affected if water levels were altered during their nesting period in late May and June.

5.1.2 Waterfowl

Waterfowl detected included the common loon which is known to nest along shorelines in close proximity to the water's edge (Mcintyre and Barr, 1997). The majority of the waterfowl observed nest close to the shore line with the exception of buffleheads and common goldeneyes which are cavity nesters. Cavity-nesting waterfowl species may therefore breed in treed areas near the water, but may also breed up to 800 m from the water in forested habitat (Pierre et al., 2001). Based on range maps, most of the waterfowl species observed are likely to breed in the area with the exception of the ring-necked duck and the tundra swan (Cornell, 2008). Buffleheads were one of the most common species observed. They were seen in pairs and are probably breeding in the area. Flocks of young Canada geese were observed along Trudel Creek during the July, 2008 surveys indicating breeding was successful in the area for this species. Five whooping cranes were observed in June, 2008. This federally endangered species has a very restricted breeding range which only occurs within Wood Buffalo National Park (Waple, 2000). Nesting grounds are localized in wetland habitat such as marshes, bog and shallow lakes that are surrounded by a forested overstory. The whooping cranes that were observed were not thought to be breeding in the area but rather were probably young adults (personal communication Alyson McHugh, M.Sc.).

5.1.3 Northern Leopard Frogs

Northern leopard frogs were detected in Zones 3 and 5 in August, 2007 and earlier in July, 2008 by Jason Côté (B.Sc.). However, northern leopard frogs were not observed at these sites during July 18 to 21, 2008, and these sites did not provide breeding habitat. Northern leopard frogs are known to disperse along stream corridors and metamorphs have been found to disperse up to 2 km from natal sites prior to the onset of winter and up to 8 km within a year of metamorphosing (Seburn et al., 1997). Therefore, it is possible that the individual frogs seen in Zone 5 originated from breeding sites that may be several kilometres away.

Ponded areas along the Trudel Creek waterway often appeared to be connected with the creek. These areas may be less than ideal with regards to breeding since potential fish predators may be more able to access these areas as compared to isolated wetlands that are located in upland forested areas. It is possible that riparian areas along Trudel Creek may provide overwintering habitat as northern leopard frogs require oxygenated water that remains unfrozen during the winter (Seburn and Seburn, 1998). Alterations to water levels during the winter could potentially be detrimental to this species particularly if water levels were to drop once ice had already formed. During midwinter frogs are probably not metabolically active enough to follow dropping water levels and avoid freezing conditions.

5.1.4 Incidental Wildlife

Wildlife species observed in Zone 5 that may be impacted by potential changes to the hydrological regime in Trudel Creek include beavers, muskrats and otters. These species all create shelters or entrance ways to shelters close to the edge of rivers (Collen and Gibson, 2001). Negative effects of man-made dams have been found on both beaver and muskrat populations. Water draw downs can wash away food caches and expose entranceways making beavers more susceptible to starvation and wolf predation (Nolet and Rosell, 1998). Muskrat populations have been found to decline following dam creation because of loss of overwintering habitat in shallow marshes (Rosenberg et al., 1995; Rosenberg et al., 1997).

5.2 Taltson River (Zones 1 and 3)

5.2.1 Yellow Rails and Wetland-Associated Birds

No yellow rails were detected in Zones 1 and 3; however, the secondary target species, sora, was detected. Additional species at risk that were observed in this area included rusty blackbird, short-eared owl and olive-sided flycatcher. Rusty blackbirds have declined by approximately 90% over the past 3 decades, which has earned them a status as a COSEWIC species of Special Concern (Greenberg and Droege, 1999). Rusty blackbirds select riparian habitat with a relatively high density and diversity of plant species along creeks, rivers and lakes in order to breed (Larue et al., 1995). Nests are usually constructed close to the water, in trees or shrubs, at heights of 0.5-6 m above the ground (Avery, 1995). Short-eared owls are a ground nesting species that have experienced a 23% decline in the last decade. Habitat loss at wintering and breeding grounds is the major threat to this species (Environment Canada, 2008a). Nests are often constructed below shrubs and hidden within grasses and sedges near water (Environment Canada, 2008b). Breeding occurs in April and May for this species (Wiggins et al., 2006). The

olive-sided flycatcher has also declined by 29% since 1996 and experienced a 79% decline from 1968 to 2006 (Environment Canada, 2008a). Trees are used as nest sites often in coniferous trees but also in aspen and willow (Altman and Sallabanks, 2000). Observations of habitat surrounding sites surveyed for northern leopard frogs in Zone 1 included mixed and coniferous forest (Appendix 5). A shrub layer consisting of willows was also common in riparian areas. Suitable nesting habitat for the three species at risk is potentially available in Zone 1.

5.2.2 Waterfowl

All of the waterfowl species observed with the exception of the bufflehead nest along shorelines. All of the waterfowl species except for the Eurasian wigeon and surf scoter are likely to breed in the region. Two whooping cranes were observed in this zone, the third federally listed species observed in this region. The other three waterfowl species of concern are listed as sensitive by the Government of the Northwest Territories (NWT ENR, 2006).

The most bird species were observed in Zone 1, 39 out of a total of 54 for the three zones. This is most likely because more time was spent surveying this area compared to Trudel Creek and Nonacho Lake. Most of the additional bird species that were observed were songbirds that were detected incidentally during yellow rail surveys.

5.2.3 Northern Leopard Frogs

A single northern leopard frog breeding site was found within Zone 1 at site SV5. Tadpoles were observed with all four limbs and these were developmentally more advanced than wood frog tadpoles that were observed at a similar latitude (site SV13). Given that wood frog breeding occurs earlier in the spring than northern leopard frog breeding, this may indicate that northern leopard frogs are able to successfully overwinter as tadpoles and metamorphose the following season. This is known to occur for the similarly sized Columbia spotted frog which ranges as far north as the southern Yukon (CARCNET, 2008). The breeding pond habitat was isolated from regular inundation from the Taltson River but was within the floodplain area and might become flooded in high water years.

The breeding site and the four other summer habitat sites farther upstream along the Taltson River system are all newly documented areas for the presence of the northern leopard frog. Although northern leopard frogs have been observed at Deskenatlata Lake (Fournier, 1997) which is at approximately the same latitude as Lady Grey Lake, northern leopard frogs have not previously been documented farther upstream than Kozo Lake within the Taltson River system. The Taltson River system may provide important overwintering habitat for northern leopard frogs as water flow continues throughout the winter and would provide an aquatic environment that will not freeze solid.

Northern leopard frogs may be more abundant within the Northwest Territories than previously thought as they are purportedly used as fish bait by local guides (personal communication, Jason Côté, B.Sc.). However, it has not been confirmed if the amphibians used as bait are northern leopard frogs or wood frogs. Wood frogs are able to tolerate freezing conditions due to the use of glucose as a cryoprotectant in their blood (Costanzo et al., 1993) and they have a range that

extends farther north than the leopard frog. Wood frogs were also more common and abundant at the sites that were surveyed for amphibians (Appendix 5).

5.2.4 Incidental Wildlife

Evidence of beavers, muskrat and otters was also observed along the Taltson River although only beavers and muskrats were detected in Zone 1. Both of these species are susceptible to negative effects associated with changes to hydrological regimes (Rosenberg et al., 1995; Rosenberg et al., 1997; Nolet and Rosell, 1998). The caribou antlers that were observed at site SV29 were associated with other items such as rusted tin cans and a rotted either table or chair that the field assistant (Johnny Desjarlais, local knowledge holder) estimated to be from 60-80 years previous.

5.3 Nonacho Lake

5.3.1 Yellow Rails and Wetland-Associated Birds

No yellow rails were detected at site NL1 where a call playback survey was conducted. However, the secondary target species, sora, was detected. Seasonal and habitat conditions in this particular region were not suitable for detecting yellow rail as ice was still present in areas and wetland habitat consisted of bog-like areas. This region would also be on the very northern edge of the known species range (Bookhout, 1995).

5.3.2 Waterfowl

There were five waterfowl species observed in Nonacho Lake that were not observed within Zones 1 and 5. This included white-winged scoters which are listed as sensitive (NWT ENR, 2006). With the exception of the bufflehead and the hooded merganser, other species that were observed are shoreline nesters.

5.3.3 Northern Leopard Frogs

The incidental sighting of an amphibian at Nonacho Lake by Carmen Tattersfield (B.NRSc.) would be the most northerly observation of a northern leopard frog if the species identification is confirmed. Due to the habitat changes observed north of Lady Grey Lake it was thought by the field assistant (personal communication with Johnny Desjarlais, local knowledge holder) that overwintering by the northern leopard frog as far north as Nonacho Lake would not be possible due to wetland areas freezing solid and the contracted growing season. High incidences of mortality have been noted for this species, primarily related to overwintering sites with insufficient oxygen levels (Seburn and Seburn, 1998). Overwintering has been observed in spillways below dams (Seburn and Seburn, 1998) so it is possible that Nonacho Dam may provide overwintering habitat. Additional surveys for northern leopard frogs in this area would be appropriate particularly if changes to water levels will occur during the winter when northern leopard frogs may be using riparian areas along Nonacho Lake for hibernation.

5.3.4 Incidental Wildlife

Beaver lodges were seen in the Nonacho Lake area. Beavers are susceptible to changes in natural hydrological regimes (Nolet and Rosell, 1998).

5.4 Summary

No yellow rails were detected in Trudel Creek (Zone 5), Taltson River (Zones 1 and 3) or Nonacho Lake. Although they were not detected it is possible that the survey was too early and they were not yet present within the Project area or they may be using wetland habitat that is upland of the river system.

Bird species of conservation concern that were detected included:

Trudel Creek (Zone 5):

- common nighthawk
- whooping crane

Taltson River (Zones 1 and 3):

- common nighthawk
- lesser yellowlegs
- olive-sided flycatcher
- rusty blackbird
- short-eared owl
- white-throated sparrow
- lesser scaup
- northern pintail
- surf scoter
- whooping crane

Nonacho Lake:

- olive-sided flycatcher
- lesser scaup
- northern pintail
- surf scoter
- white-winged scoters.

Northern leopard frogs are present within both Trudel Creek (Zone 5) and along the Taltson River (Zones 1 and 3). Breeding habitat for northern leopard frogs was found at a pond within the riparian zone of the Taltson River (Zone 1). The majority of the riparian habitat within these areas appears appropriate as summer habitat for northern leopard frogs. The consequences of potential changes to the hydrological regime may be more detrimental to this species if it is using these waterways for overwintering habitat. Evidence of beavers was observed in all three study areas and evidence of muskrats and otters was detected along Trudel Creek and the Taltson River. These species may also be negatively effected by potential increased variability in water levels.

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APPENDIX 1
YELLOW RAIL CALL PLAYBACK SURVEY DATA

Appendix 1 **Yellow Rail Call Playback Surveys**

Site	Species	Ambient noise	Call before	Passive 1	Passive 2	Passive 3	Passive 4	Passive 5	Call 1	Call 2	Call 3	Passive 1a	Passive 2a	Call after	Call Type	Distance (m)	Comments
TC3	Le Conte's sparrow	3										1	1		buzz tisp	0-25	
TC3	SORA	2	1												perweep	25-50	
TC4	SORA	0	1								1						
TR2	Nelson's sharp-tailed sparrow	0			1	1	1					1	1		buzz	25-50	
TR2	Lesser yellowlegs	0							1								
TR1	SORA	0						1		1					perweet		
TR1	Le Conte's sparrow	0						1	1	1	1				buzz,tisp		
TR3	Lesser yellowlegs	0	1														
TR3	SORA	0			1							1					
TR4	no target species heard	0															
TR6	no target species heard	0															Water table at surface ground level
TR7	Le Conte's sparrow	1		1												25-50	2 ha wetland
TR7	Nelson's sharp-tailed sparrow	1		1												50-75	
TR8	Lesser yellowlegs	1				1				1	1						
TR8	Lesser yellowlegs	1										1					
TR9	Le Conte's sparrow	2	1	1	1	1			1	1					buzz, tisp		Large, expansive wetland approx. 50 ha, sample points 8-10
TR10	Le Conte's sparrow	1	1	1												0-25	
TR10	SORA	1				1										200	
TR10	Rusty blackbird	1							1							>200	
TR11	Le Conte's sparrow	1				1										>100	
TR11	unknown yellowlegs	1										1				75-125	
TR12	no target species detected	1															
TR13	SORA	1	2	1 (called twice)								1			perweet	75-125	
TR13	SORA	1									1	1			perweet	25-50	
TR14	no target species heard	1															
TR15	no target species heard																
TR16	Lesser yellowlegs	0		1												125-200	Adjacent to Pt. 11
NL 1	Le Conte's sparrow	1						1							buzz	50-75	

Ambient noise: background noise level - 0 (no noise), 1 (faint noise), 2 (moderate noise), 3 (loud noise), 4 (intense noise)

(continued)

Call before: bird call detected prior to timed passive listening period

Passive 1 to 5: five minute passive listening period prior to playing call recording, minute (1-5) recorded if bird heard calling during that time

Call 1-3: call broadcast period, three 1 minute intervals consisting of 30 seconds of yellow rail calls and 30 seconds of silence

Passive 1a, 2a: 2 minute passive listening period after call play period

Call after: bird calls detected after second timed passive listening period

Call type: species different call types may indicate various behaviours e.g., Le Conte's sparrow "buzz" is a male song versus "tisp" is alarm/location call

Distance: distance to bird when first detected

APPENDIX 2 YELLOW RAIL SURVEY HABITAT DATA

Appendix 2

Yellow Rail Survey Habitat Data

Site	UTM E	UTM N	Month	Day	Year	Start	Stop	Photos	Temp.	Precip	Moon visibility	Moon phase	Cloud cover	wetland permanency	water depth (cm)
TC1	485476	6694112	6	6	2008	na	na	2378 - 2379	na	na	na	na	na	semi- permanent	
TC2	485720	6694597	6	6	2008	na	na		na	na	na	na	na		
TC3	485967	6690695	6	6	2008	2340	2356	2383-2385	15	0	absent	<half	50	permanent	1
TC4	484320	6692773	6	8	2008	340	351	2430-2432	12	0		<half	15	permanent	0
TR1	497534	6705987	6	7	2008	304	316	2388-2392	17	0	absent	<half	100	permanent	0
TR2	514815	6701731	6	7	2008	220	229	See TR3	12-15	0	absent	<half		permanent	3
TR3	514638	6702108	6	7	2008	155		2396-2398	15	0	absent	<half	90	permanent	1
TR4	528639	6778470	6	7	2008	1140	1152	2401-2409	12-15	0		<half	20	permanent	0
TR5	528857	6778756	6	7	2008	na	na	2410-2412	na	na	na	na	na	permanent	
TR6	528381	6776555	6	7	2008	2308	2330	2417-2427	12-15	0	visible	<half	25	permanent	0-1
TR7	531712	6799826	6	8	2008	349	402	2439-2444	12-15	0	absent	<half	80	permanent	5
TR8	546933	6820110	6	9	2008	00:58	109	2445-2450	12-15	0	absent	<half	90	permanent	6
TR9	547261	6820148	6	8	2008	118	130	2453-2459	15	1-2	absent	<half	100	semi-permanent	0
TR10	546923	6820516	6	8	2008	229	241	2460-2465	12-15	0	absent	<half	100	semi-permanent	5
TR11	546415	6820559	6	8	2008	317	329	2466-2471	12-15	0	absent	<half	100	permanent	8
TR12	542583	6821303	6	8	2008	00:06	00:18	2472-2478	12-15	0	absent	<half	90	permanent	15
TR13	541783	682060	6	8	2008	2337	2351	2479-2484	15	0	absent	<half	70	semi-permanent	8.5
TR14	543513	6829262	6	8	2008	2306	2320	2492-2496	12-15	0	absent	<half	60	semi-permanent	10
TR15	547620	6821672	6	9	2008	2358	00:02	2515-2519	12-15	0		<half		permanent	4
TR16	545790	6820113	6	9	2008	00:32	00:44	2520-2522	12-15	0	absent	<half	15	permanent	1
NL 1	568501	6857103	6	9	2008	2306	2318	2497-2507	13	0	visible	less than 1/2	40	permanent	6
NL2	568008	6862745	6	9	2008	na	na	2503-2509	na	na	na	na	na	semi-permanent	
NL3	578441	6876836	6	9	2008	na	na	2510-2514	na	na	na	na	na	permanent	

(continued)

Habitat comments:

TC1 Site not surveyed for yellow rails due to bad weather as well as helicopter not flying in between 12:30 - 2:30am. Looks like an old beaver dam area...site seems to be drying out a bit.

TC2 Site not surveyed for yellow rails due to bad weather as well as helicopter not flying in between 12:30 - 2:30am.

TR4 sedges not up yet; however old sedges present. What we've been calling Reed Grass may be sedge grass but it's hard to tell because everything is dead and senescent. See photos 2406-2409

TR5 Did not sample due to darkness time constraints

TR6 mix 60:40 sedge grass.

TR7 2 ha wetland

TR8 Mix of sedges and grasses

TR9 mix of rushes and grasses

TR10 wetland expansive; all grasses dead and senescent; wetland looks semi-perment- mostly flooded at moment

NL 1 horsetail mixed with grasses

NL2 Not sampled, boggy shrubby, snags present (recently flooded- within the last 5 years or so?) not great habitat; mix of shrubs, grasses, moss, acidic

NL3 Not sampled, not too many good areas north, mostly too boggy, too wet, too shrubby, ice still underneath boggy area, acidic with grasses on top

Appendix 2

Yellow Rail Survey Habitat Data (completed)

Site	Sunset	Sunrise	wind	Habitat classes:						Wetland cover types:					
				cattail	sedge	bulrush	open water	bare ground	beaked sedge	other	stand emerg.	bare ground	open water	shrubs	trees
TC1	2244	408	na				30		30	30 (shrubs/trees)	55	0	30	10	5
TC2	2244	408	na												
TC3	2244	408	5	0	0	20	15		60		90		5	5	
TC4	2255	346	0	0	20		5		80		70		10	5	5
TR1	2244	358	1	10	0	0	20	0	70		70	0	20	5	4
TR2	2244	358	0	0	0	0	20	5	70	0	80	<5	20	<5	<5
TR3	2244	358	0	0	0	0	0	0	90		95	0	0	5	0
TR4	2244	358	1	0	0	0	10	0	90		80	0	10	10	
TR5	2244	358	na	0	30	0	0	0	70	0	100	0	0	<5	
TR6	2258	350	0	0	60	0	5	0	35		90	0	5	5	0
TR7	2255	346	0	0	50	0	0	0	45		80	0	10	5	5
TR8	2259	336	1	0		0	10	0	70	15 (shrub) <5 (horsetail)	70	0	10	5	0
TR9	2256	342	0	0	0	0	0		0	100(mix rushes/grass)	75	0	15	10	0
TR10	2256	342	1	0	0	0	0	0		10 (horsetail), 90 (grass)	70	0	20	10	0
TR11	2256	342	0	0	0	0	15	0		100 (grass)	70	0	20	10	0
TR12	2256	342	0	0	0	0	0	0	70	30(horsetail)	90	0	0	5	0
TR13	2256	342	0	0	0	0	0	0		horsetail and grass mix	95	0	0	5	0
TR14	2256	342		0	15	0	0	0	80	0	95	0	0	5	5
TR15	2259	336		0	0	0	0	0	95	5	80	0	0	0	20
TR16	2259	336	0	0	0	0	0	0	90	10 (shrubs)	80	0	10	10	0
NL 1	2259	336	0	0	0	0	15	0	5		80	0	15	5	0
NL2	2259	336	na	0	0	0	20	0	15		4	0	30	50	10
NL3	2259	336	na					90			90			5	5

APPENDIX 3 WATERFOWL SURVEY DATA

Appendix 3 Waterfowl Survey Data

Transect	Date	Easting Start	Northing Start	Easting End	Northing End	Time Start	Time End	Duration (m)
Trudel Creek 1	08-Jun-08	480316	6694698	482974	6687136	615	700	45
Trudel Creek 2	09-Jun-08	485186	6690224	484298	6701435	746	805	19
Taltson River 1	09-Jun-08	536274	6810053	540371	6824444	1925	1955	30
Nonacho Lake 1	10-Jun-08	562729	6830034	589694	6869472	1911	2053	102
Nonacho Lake 2	10-Jun-08	570957	6869085	562162	6852986	2152	2252	60

Species	Trudel Creek 1	Trudel Creek 2
american wigeon	20	11
bald eagle	3	0
blue-winged teal	2	2
bufflehead	18	14
canada goose	37	46
commom goldeneye	2	3
common loon	2	7
common merganser	1	10
green-winged teal	3	0
horned grebe	0	2
mallard	39	5
tundra swan	0	1
unknown merganser	1	
whooping crane	5	0
Species	Taltson River 1	
bufflehead	1	
canada goose	3	
common loon	4	
common merganser	11	
lesser scaup	4	
unknown scaup	6	
red-breasted merganser	4	
surf scoter	8	
whooping crane	2	
unknown loon	1	
Species	Nonacho Lake 1	Nonacho Lake 2
american wigeon	2	0
bald eagle	3	3
bufflehead	27	8
canada goose	73	13
common loon	7	17
common merganser	7	3
greater scaup	7	0
hooded merganser		1
horned grebe	0	1
Lesser scaup	0	3
mallard	19	1
northern pintail	11	2
pacific loon	1	3
red-breasted merganser	4	0
red-throated loon	2	0
ring-necked duck	0	1
sandhill crane	2	0
surf scoter	11	6
unknown loon	1	11
unknown scaup	34	24
white-winged scoter	11	12

APPENDIX 4 INCIDENTAL OBSERVATION DATA

Appendix 4

Incidental Observation Data

Species	Easting	Northing	Date	Time	Animal	Sign	#	Comments	Photo 1	Photo 2
Wood frog	514815	6701731	07/06/2008		amphibian	no	1	juvenile		
Bald eagle	562846	6854533	10/06/2008		bird	yes		nest		
Bald eagle	524015	6707903	18/07/2008	14:12	bird	no				
Bald eagle	491717	6699707	18/07/2008	9:08	bird	no		seen flying between SV1 and SV2		
Bald eagle	485598	6687093	19/07/2008	8:55	bird	no				
Bald eagle	482500	6688500	20/07/2008		bird	yes		nest, adults present two weeks previously		
Bald eagle	530798	6789065	21/07/2008	14:08	bird	no		nest, one adult, one chick	3117	3123
Bald eagle	538745	6822833	21/07/2008	14:57	bird	no		two seen		
Bald eagle	543483	6815505	21/07/2008	16:02	bird	no				
Bald eagle	527500	6784500	21/07/2008		bird	no		north of King Lake, south of SV28		
Bald eagle	522500	6278500	21/07/2008		bird	no				
Bufflehead	514070	6699529	18/07/2008	13:29	bird	no	2	females, white bar behind eye		
Bufflehead	485549	6689871	19/07/2008	11:44	bird	no	1	female diving/feeding in pond		
Canada goose	485971	6689397	17/07/2008	17:22	bird	no		flock of juveniles		
Canada goose	486638	6687467	17/07/2008	17:23	bird	no		flock of juveniles		
Canada goose	494398	6701497	18/07/2008	10:45	bird	yes		scat		
Canada goose	525575	6708958	18/07/2008	14:15	bird	no				
Canada goose	486090	6688446	19/07/2008	9:42	bird	yes		scat		
Canada goose	485941	6689552	19/07/2008	10:36	bird	yes		scat		
Canada goose	524851	6724983	21/07/2008	8:34	bird	yes		scat		
Common loon	478500	6698000	19/07/2008		bird	no	2	seen and heard in Twin Gorges Forebay area near docks and swimming area		
Common loon	482274	6690606	20/07/2008	11:49	bird	no		seen 60m from shore		
Common loon	524851	6724983	21/07/2008	8:34	bird	no		calling		
Common loon	518885	6739201	21/07/2008	11:26	bird	no		heard calling again		
Common loon	530798	6789065	21/07/2008	14:08	bird	no	2	two 100m from bald eagle nest in water		
Golden eagle	485980	6686961	19/07/2008	15:22	bird	no		seen in the morning prior to survey being conducted, left because of bear		
Gray jay	530798	6789065	21/07/2008	14:08	bird	no		heard chattering		
Gulls	491065	6701338	18/07/2008	8:10	bird	no	2			
Merganser	554418	6836625	21/07/2008	15:52	bird	no				
Northern harrier	486090	6688446	19/07/2008	9:42	bird	no	1	killed a yellowlegs		
Ptarmigan	480937	6693698	20/07/2008	8:42	bird	yes		scat		
Ptarmigan	480273	6692741	20/07/2008	8:55	bird	yes		scat, photo 2956		
Ptarmigan	518939	6739185	21/07/2008	11:52	bird	yes		scat		
Sandpiper	486090	6688446	19/07/2008	9:42	bird	no	4	female with three chicks		
Sandpiper	485941	6689552	19/07/2008	10:36	bird	no	5	female with four chicks		
Sandpiper	485980	6686961	19/07/2008	15:22	bird	no		two chicks		
Sandpiper	482500	6688500	20/07/2008		bird	no		three adults		
Sandpiper	524851	6724983	21/07/2008	8:34	bird	no		two adults		
Spotted sandpiper	530798	6789065	21/07/2008	14:08	bird	no				
Wilson's Snipe	514070	6699529	18/07/2008	13:29	bird	no				
Wilson's Snipe	484934	6690185	19/07/2008	12:49	bird	no				
Yellow legs	494398	6701497	18/07/2008	10:45	bird	no	4			
Yellow legs	503107	6706852	18/07/2008	12:28	bird	no	3	two feeding at shore, third agitated, crying, flying and landing at tops of trees		
Yellow legs	486090	6688446	19/07/2008	9:42	bird	no	4	one killed by a red-tailed hawk		
Yellow legs	518885	6739201	21/07/2008	11:26	bird	no		flying overhead		
Pike	526466	6718247	18/07/2008	14:29	fish	no	1			
Pike	485941	6689552	19/07/2008	10:36	fish	no		small dead pike, 5cm long		
Pike	484934	6690185	19/07/2008	12:49	fish	no	1	in channel out to creek		
Pike	524082	6728303	21/07/2008	9:54	fish	no		dead pike	3046	3047
Dragonfly	485549	6689871	19/07/2008	11:44	Insect	no	1	scooped dragonfly larva in dipnet		
Bear	482274	6690606	20/07/2008	11:49	mammal	yes		young bear track photo 2994	2994	
Bear	480273	6692741	20/07/2008	8:55	mammal	yes		tracks along shore		
Beaver	497534	6705987	07/06/2008		mammal	no				
Beaver	497534	6705987	07/06/2008		mammal	yes		lodge		
Beaver	568501	6857103	09/06/2008		mammal	yes	1	lodge		
Beaver	529311	6789066	09/06/2008		mammal	yes		lodge		
Beaver	568387	6857073	09/06/2008		mammal	yes		lodge		
Beaver	488536	6685553	09/06/2008		mammal	yes		dam and lodge		
Beaver	580268	6851068	10/06/2008		mammal	yes		lodge		
Beaver	589882	6861759	10/06/2008		mammal	yes		lodge		
Beaver	590667	6862118	10/06/2008		mammal	yes		lodge		
Beaver	591502	6862527	10/06/2008		mammal	yes		lodge		
Beaver	487500	6686000	17/07/2008		mammal	yes		dam and lodge on unnamed lake of Trudel Creek		
Beaver	485941	6689552	19/07/2008	10:36	mammal	yes		active beaver lodge		
Beaver	484934	6690185	19/07/2008	12:49	mammal	yes		sign		
Beaver	481674	6691121	20/07/2008	10:05	mammal	yes		beaver dam creating pond complex, photo 2981	2981	
Beaver	481674	6691121	20/07/2008	10:05	mammal	yes		second beaver dam creating pond complex, photo 2984	2984	
Beaver	480273	6692741	20/07/2008	8:55	mammal	no		beaver swimming nearby and slapped tail		
Beaver dam	488519	6685498	17/07/2008	17:25	mammal	yes				
Beaver lodge	495605	6718271	18/07/2008	16:04	mammal	yes				
Beaver lodge	480273	6692741	20/07/2008	8:55	mammal	yes		active last winter photo 2953	2953	
Beaver lodge	518885	6739201	21/07/2008	11:26	mammal	yes		beaver lodge in bay	3100	
Beaver lodge	523195	6722551	21/07/2008	8:27	mammal	yes				
Beaver lodge	494587	6723538	21/07/2008	16:47	mammal	yes				
Black bear	485980	6686961	19/07/2008	15:22	mammal	no		black bear on island		
Caribou	530798	6789065	21/07/2008	14:08	mammal	yes		antler	3132	3133
Lynx	480273	6692741	20/07/2008	8:55	mammal	yes		tracks along shore, photo 2946	2946	

(continued)

Appendix 4
Incidental Observation Data (completed)

Species	Easting	Northing	Date	Time	Animal	Sign	#	Comments	Photo1	Photo2
Moose	531712	6799826	09/06/2008		mammal	no		bull		
Moose	483648	6694801	09/06/2008		mammal	no	2	female with calf		
Moose	580268	6851068	10/06/2008		mammal	no		bull between two points 589882 6861759		
Moose	491065	6701338	18/07/2008	8:10	mammal	yes		tracks		
Moose	494398	6701497	18/07/2008	10:45	mammal	yes				
Moose	526466	6718247	18/07/2008	14:29	mammal	yes	2	tracks of sow and calf		
Moose	524295	6707398	18/07/2008	14:11	mammal	no				
Moose	485941	6689552	19/07/2008	10:36	mammal	yes		tracks		
Moose	484661	6690631	19/07/2008	13:52	mammal	yes		droppings		
Moose	480937	6693698	20/07/2008	8:42	mammal	yes		tracks		
Moose	481674	6691121	20/07/2008	10:05	mammal	yes		tracks		
Moose	530798	6789065	21/07/2008	14:08	mammal	yes		pellets		
Moose	524851	6724983	21/07/2008	8:34	mammal	yes		tracks		
Moose	524082	6728303	21/07/2008	9:54	mammal	yes		tracks		
Moose	538745	6822833	21/07/2008	14:57	mammal	no		female and calft on N side of bay		
Moose	524389	6774871	21/07/2008	13:49	mammal	no				
Moose	546135	6820016	21/07/2008	16:00	mammal	no				
Muskox	591014	6862441	10/06/2008		mammal	no				
Muskrat	514815	6701731	07/06/2008		mammal	yes	1	house		
Muskrat	546923	6820516	08/06/2008		mammal	yes	2	houses		
Muskrat	541783	682060	08/06/2008		mammal	yes	3	houses		
Muskrat	547054	6820284	09/06/2008		mammal	yes		pushup		
Muskrat	541768	6820578	09/06/2008		mammal	yes		pushups		
Muskrat	492076	6698416	18/07/2008	9:12	mammal	yes		muskrat house active last winter, S end of bay under willows	2769	2770
Muskrat	503107	6706852	18/07/2008	12:28	mammal	yes		muskrat pushup dug up by animals		
Muskrat	481674	6691121	20/07/2008	10:05	mammal	yes		muskrat holes at edge of bank, photos 2970, 2971	2970	2971
Muskrat	480937	6693698	20/07/2008	8:42	mammal	yes		pushup		
Muskrat	481674	6691121	20/07/2008	10:05	mammal	yes		muskrat house, larger and more substantial than pushup, photos 2962, 2963	2962	2963
Otter	484470	6700961	19/07/2008	14:26	mammal	yes		tracks in mud, took photos 2915, 2916	2915	2916
Otter	480273	6692741	20/07/2008	8:55	mammal	yes		broken clam shells, photo 2954, 2955	2954	2955
Snowshore hare	482274	6690606	20/07/2008	11:49	mammal	yes		winter scat photo 2993	2993	
Snowshore hare	524082	6728303	21/07/2008	9:54	mammal	yes		scat		
Wolf	485941	6689552	19/07/2008	10:36	mammal	yes		tracks		
Wolf	480273	6692741	20/07/2008	8:55	mammal	yes		tracks along shore		
Clam	485549	6689871	19/07/2008	11:44	mollusc	no		scooped fingernail clams in dipnet		

APPENDIX 5
NORTHERN LEOPARD FROG SURVEY DATA

Appendix 5

Northern Leopard Frog Survey Data - Amphibian Surveys

Date	Time	Easting	Northing	SITE	Waypoint	Wood Frog Adult	Wood Frog Juv.	Wood Frog Tad- pole	Wood Frog Way- point	Northern Leopard Frog Adult	Northern Leopard Frog Juvenile	Leopard Frog Way- point	Northern Leopard Frog Tadpole	Northern Leopard Frog Incidental Observations by JC, JD	Photo1	Photo2	Photo3	Photo4
18/07/2008	8:10	491065	6701338	SV1	SV1	2	12			0								
18/07/2008	9:12	492076	6698416	SV2	SV2	0	0			0								
18/07/2008	10:45	494398	6701497	SV3	SV3	2	1			0								
18/07/2008	12:28	503107	6706852	SV4	SV4A	0	0			1		LF1						
18/07/2008	13:29	514070	6699529	SV5	LF2					6		LF2	10					
18/07/2008	13:29	514070	6699529	SV5	LF2					1		LF3						
18/07/2008	14:29	526466	6718247	SV6	SV6					1		LF4						
19/07/2008	8:35	484852	6685648	SV7	TADSSV7	1		2										
19/07/2008	9:36	487497	6686366	SV8	SV8	1	0	0	WFSV8	0			0					
19/07/2008	9:42	486090	6688446	SV9	SV9	2												
19/07/2008	10:36	485941	6689552	SV10	SV10	2			WF2									
19/07/2008	11:44	485549	6689871	SV11	SV11	2	1		WF3									
19/07/2008	12:49	484934	6690185	SV12	SV12	2			WF4									
19/07/2008	12:49	484934	6690185	SV12	SV12				WF5									
19/07/2008	14:26	484470	6700961	SV13	SV13	1	1	2							2913	2914		
19/07/2008	15:22	485980	6686961	SV14	SV14									1				
20/07/2008	8:42	480937	6693698	SV15	SV15A	4												
20/07/2008	8:55	480273	6692741	SV16	SV16		8											
20/07/2008	10:05	481674	6691121	SV17	SV17	1	8											
20/07/2008	11:49	482274	6690606	SV18	SV18	10												
20/07/2008		482500	6688500	SV19	SV19	1												
20/07/2008	13:55	482222	6689637	SV20	SV20	2	10											
20/07/2008	14:27	480318	6694326	SV21	SV21													
20/07/2008	15:06	477867	6697848	SV22	SV22		2							1				
21/07/2008	8:34	524851	6724983	SV23	SV23	3	1			1	1	LF5						
21/07/2008	8:34	524851	6724983	SV23	SV23							LF6						
21/07/2008	9:54	524082	6728303	SV24	SV24		1											
21/07/2008	10:36	523175	6726690	SV25	SV25		10			1					3057	3058	3059	
21/07/2008	10:36	523175	6726690	SV25	SV25							LF7			3060	3067	3070	3090
21/07/2008	10:36	523175	6726690	SV25	SV25						1	LF8						
21/07/2008	11:26	518885	6739201	SV26	SV26	1	3											
21/07/2008	13:14	521344	6766956	SV27	SV27													
21/07/2008	14:08	530798	6789065	SV28	SV28													
21/07/2008	14:57	538745	6822833	SV29	SV29													

Comment

SITE

SV1	Wood frog summer habitat
SV4	subadult or female as thumbs not swollen
SV5	tadpoles have 4 legs
SV5	closer to river
SV6	jumping through tall sedges, >50cm
SV7	tadpoles have hind feet
SV9	wood frog hopped out of tall sedges into sandier area
SV10	edge of tall sedges and sand, second in tall sedges
SV13	tadpoles in small open water area, with hind legs
SV14	Jason Cote saw northern leopard frog here August 2007
SV16	three in pond, 5 in stream going down to lake photos 2947-2950
SV18	10 juveniles and adults combined
SV19	northern leopard frog observed here in July 2008 by Jason Cote and Johnny Desjarlais
SV20	one wood frog missing hind limb, photos 3005- 3007
SV22	northern leopard frog observed here in July 2008 by Jason Cote and Johnny Desjarlais
SV23	subadult at water's edge in area with sparse tall sedges (60cm+), sparse equisetum and sparse shorter sedges
SV23	sitting amidst stones at edge of water
SV25	metamorph, breeding habitat for wood frogs
SV25	at edge of pond in area with short emergent sedges and submerged vegetation
SV25	hopped out of sedges on land into water at same spot as LF7

Appendix 5

Northern Leopard Frog Survey Data - Amphibian Survey Habitat Information

Site	Habitat	Observers*	Photo		Site Name	Site Location Description	Habitat Type	Weather
			Start	End				
SV1	summer	LB, JD	2756	2763	Methleka Lake	edge of lake in Taltson River system	lake edge	sunny
SV2		LB, JD	2764	2770	Methleka Lake	edge of lake, bay at SE end of Lake	lake edge	sunny
SV3	summer	LB, JD	2773	2778	Taltson River	between Methleka and Kozo Lakes	lake edge	sunny
SV4	summer	LB, JD	2783	2800	Kozo Lake	edge of lake	lake edge	sunny, scattered clouds
SV5	breeding	LB, JD	2801	2814	Taltson River	pond along river, upstream from Kozo Lake	pond	partly cloudy
SV6	summer	LB, JD	2825	2831	Taltson River	inlet area south of Benna Thy Lake	lake edge	scattered clouds
SV7	breeding	LB, JD	2845	2858	Unnamed Lake	bay in lake along Trudel Creek	lake edge	sunny
SV8		LB, JD	2859	2864	Unnamed Lake	SE bay of lake along Trudel Creek	lake edge	sunny
SV9	summer	LB, JD	2865	2872	Unnamed Lake	sand bar at edge of lake	lake edge	sunny
SV10	summer	LB, JD	2873	2890	Unnamed Lake	sand/silt bar at edge of lake along Trudel Creek	river edge and ponds	sunny
SV11	summer	LB, JD	2891	2894	Taltson River	pond along river, upstream from Unnamed Lake	pond	sunny
SV12	summer	LB, JD	2895	2910	Trudel Creek	north/upstream from Unnamed Lake	pond complex	sunny
SV13	breeding	LB, JD	2911	2920	South Valley Spillway	Trudel Creek	river edge	sunny, scattered clouds
SV14	summer	LB, JD	2921	2927	Unnamed Lake	Trudel Creek, low lying land bridge between island and mainland	lake edge	sunny, scattered clouds
SV15	summer	LB, JD	2928	2934	Gertrude Lake	edge of lake	lake edge	partly cloudy
SV16	summer, possibly breeding	LB, JD	2934	2956	Gertrude Lake	bay on land	lake edge and ponds	partly cloudy
SV17	summer	LB, JD	2957	2985	Trudel Lake	edge of lake along Trudel Creek and pond complex	lake edge	scattered clouds
SV18	summer	LB, JD	2986	2994	Trudel Lake	shore of lake	lake edge	overcast
SV19	summer	LB, JD	2995	2999	Trudel Lake	upstream end of lake	lake edge	overcast
SV20	summer	LB, JD	3000	3007	Trudel Creek	ponds along creek near Trudel Lake	lake edge and ponds	overcast
SV21		LB, JD	3008	3012	Gertrude Lake	boat launch at edge of lake	lake edge	scattered clouds
SV22	summer	LB, JD	3013	3023	Elsie Falls	near to falls, two ponds	ponds	scattered clouds
SV23	summer	LB, JD	3028	3041	Benna Thy Lake	shoreline	lake edge	overcast
SV24	summer	LB, JD	3042	3052	Benna Thy Lake	north end of lake, east side of bay	lake edge	raining
SV25	summer, breeding	LB, JD	3053	3091	Benna Thy Lake	pond alongside edge of lake	lake edge and pond	light rain
SV26	summer, possibly breeding	LB, JD	3091	3102	Lady Grey Lake	ponds in bay at south edge of lake	ponds	overcast
SV27		LB, JD	3103	3116	King Lake	bay in King Lake, NW of Lady Grey Lake	lake edge	overcast
SV28		LB, JD	3117	3139	Taltson River	edge of river, north and upstream of King Lake	lake edge	overcast
SV29		LB, JD	3142	3147	Taltson Lake	bay of lake	lake edge	overcast

* LB = Leslie Bol, JD = Johnny Desjarlais

(continued)

Comments

Site

SV2	Wood frog summer habitat
SV3	sedges too thick for frogs,
SV6	surveyed only a quarter of area in order to continue to other potential habitat
SV8	tadpoles in fen area
SV13	vegetation/muck up to surface of ponds
SV14	floating bog-like vegetation, open water area 3 x 1 m
SV17	pond with 3 juvenile wood frogs 8x60m, stream going to lake with 5 juveniles
	two beaver dams creating pond complex, deep pond 30x40m with submerged vegetation
SV20	small shoreline, water levels lower here than 2 weeks previously but higher in forebay, open mud flats
SV21	pond 8 x 60 m, veg height for equisetum
SV22	leopard frog observed here, tall grasses grown 20cm in past two weeks (JD)
SV23	one pond 8 x 40 m, other 8 x 12 m, leopard frog seen nearby on rocks
SV23	sandy shore, sweet gale and willows, rainstorm at end of survey
SV27	ponded area 60 x 40 m, boggy area with larch, labrador tea, sphagnum moss
SV28	general habitat changes, shores along Lady Grey rockier, moving into Canadian shield, habitat bog like with labrador tea, water deep up to shore
	vegetation tall and sparse, shore line of sand/silt and boulders

Appendix 5
Northern Leopard Frog Survey Data - Amphibian Survey Habitat Information (continued)

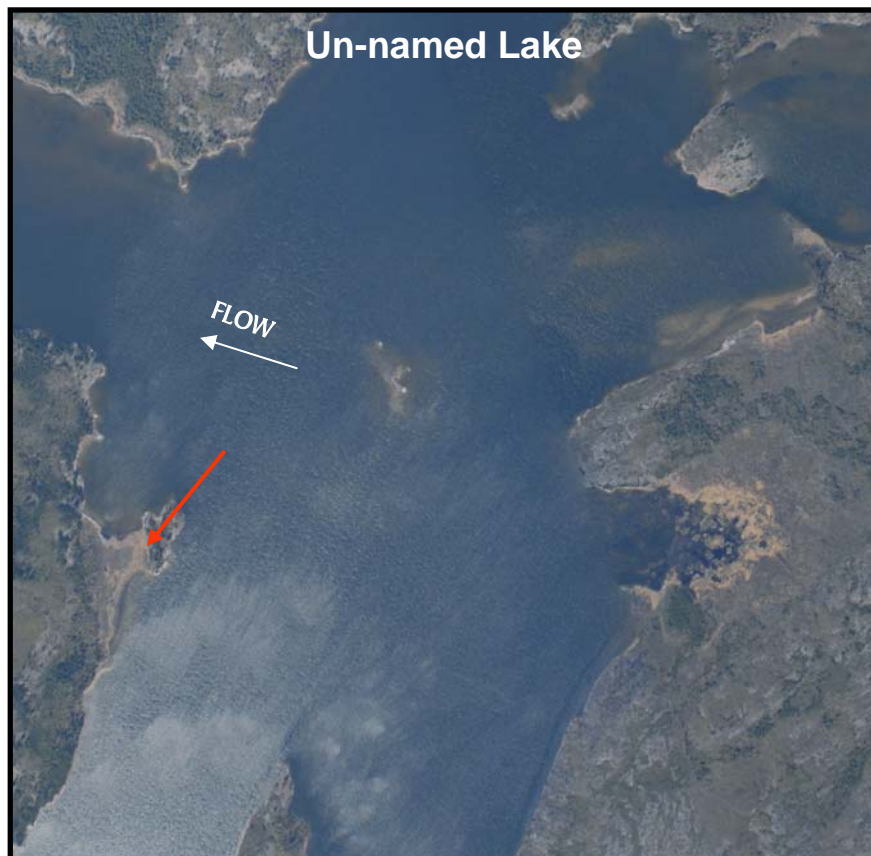
Site	Wind (Beaufort Scale)	Air temp	Water temp	Water colour	Water depth (cm)	Substrate1	Substrate 2	Surrounding Forest Type	Start Time	End Time	Total Search Time (min)	Total Person Time (min)
SV1	2	22		clear		sand	bedrock	mixed, primarily conifer	08:15	08:52	37	74
SV2	2	25		clear				mixed, shrubs present too	09:20	10:18	58	116
SV3	3	24		clear		sand		conifer, shrubs back from shore	10:55	11:13	18	36
SV4	3	26	25	clear	15	mud	sand	mixed, shrubs present too	12:05	12:45	40	80
SV5	3	25	28	clear	60	mud		burnt a few years previously	13:25	13:45	20	40
SV6	3	26		clear				mixed forest	14:35	15:05	40	80
SV7	2	20	26	clear	10			mixed forest	08:25	08:50	25	50
SV8	2			clear		mud		mixed forest, shrubs present too	09:15	09:35	20	40
SV9	2			clear		sand	rock	deciduous primarily	09:45	10:25	40	80
SV10	3	23	23			sand	silt	mixed forest	10:40	11:30	50	100
SV11								conifer primarily	12:07	12:36	29	58
SV12	3	28	23					mixed forest	12:55	13:45	50	100
SV13	3	28	25	tea like				conifers	14:35	15:00	25	50
SV14	3							mixed forest, shrubs (willow)	15:30	15:50	20	40
SV15	3	22						mixed forest	08:20	08:45	25	50
SV16	2					sand	silt	mixed forest	09:00	09:45	45	90
SV17	3					mud (15%)		mixed forest	10:10	11:25	75	150
SV18	2	27				mud (10%)		mixed forest	12:05	12:45	40	80
SV19	1	28		clear				mixed forest	13:10	13:20	10	20
SV20	2							mixed forest, willows	13:55	14:10	15	30
SV21	3							deciduous primarily	14:25	14:40	15	30
SV22	2			tea like	30			deciduous primarily	15:10	14:25	15	30
SV23	2	20	18.5	clear	5	sand	cobble	mixed forest	08:42	09:25	43	86
SV24	2					sand			09:55	10:15	20	40
SV25	0	19	18.5		8	sand	silt	coniferous forest	10:35	11:00	25	50
SV26	1							coniferous forest	11:25	12:00	35	79
SV27	1							coniferous forest	13:25	13:35	10	20
SV28	0					gravel		mixed forest	14:05	14:25	20	40
SV29	2					sand	silt	mixed forest	15:00	15:20	20	40

(continued)

Appendix 5
Northern Leopard Frog Survey Data - Amphibian Survey Habitat Information (completed)

Site	Emergent Vegetation present?	Type of emergent vegetation (i)	Type of emergent vegetation (ii)	Emerg Veg %	Veg Height (cm)	Veg Height Class	Submerged Vegetation?	Submerged Veg type	Bank Slope
SV1	yes	sedges	equisetum	80					
SV2	yes	sedges	equisetum	100	30-60				
SV3	yes	sedges		60	20-30				
SV4	yes	sedges			20-30	short			
SV5	yes	equisetum					yes	yellow pond lilies	gently sloping
SV6	yes	sedges			50	tall	yes	yellow pond lilies	steep drop off from vegetation
SV7	yes	sedges					yes		
SV8	yes	sedges			50-60				
SV9	yes	sedges			50-60	tall			
SV10	yes	sedges	equisetum		75	tall	yes		
SV11	yes	equisetum					yes	yellow pond lilies	
SV12	yes	sedges	equisetum				yes		
SV13	yes	sedges							
SV14	yes	sedges				tall	yes		
SV15	yes	sedges	equisetum; (iii) sedges	(i) 10; (ii) 60; (iii) 40	(i) 20-30; (ii) 60-75; (iii) 30-40				
SV16	yes	sedges	equisetum		30-40		yes		
SV17	yes	sedges	sedges	(i) 30; (ii) 55	(i) 30-40; (ii) 60-75		yes		
SV18	yes	sedges	equisetum	(i) 15; (ii) 75	(i) 30-40; (ii) 60-75				
SV19	yes	equisetum			60-75				
SV20	yes	sedges	equisetum		60-75		yes		
SV21	yes	sedges				tall			
SV22		equisetum							
SV23	yes	sedges	sedges	(i) 80; (ii) 20	(i) 30-40; (ii) 60				gently sloping
SV24	yes	sedges	sedges	(i) 80; (ii) 20	(i) 30-40; (ii) 50				
SV25	yes	sedges				short	yes		gently sloping
SV26	yes	equisetum					yes	waterlilies	steep
SV27	yes	sedges			60				steep
SV28	yes	sedges		30-40					
SV29	yes	sedges			tall				

APPENDIX 6
NORTHERN LEOPARD FROG OBSERVATIONS BY JASON
CÔTÉ (B.SC.) AND NONACHO LAKE AMPHIBIAN
OBSERVATION BY CARMEN TATTERSFIELD (B. NRSC.)



Reference Page 05 of Trudel Creek Photomosaics 1:14000

General Comments

A frog (Figure 1) was sighted in the upper riparian zone on a small vegetated point in Un-named Lake.

The frog was observed sitting on a downed tree on August 19, 2007 at approximately 1500 hours along the fringe area of the tree line (Figure 2). The frog was observed for ~10 minutes and made no movements during that period.



Figure 1



Figure 2

Un-named Lake Frog Sighting



Figure 1

Reference Page 1 of Trudel Photomosaics (10,000 feet)

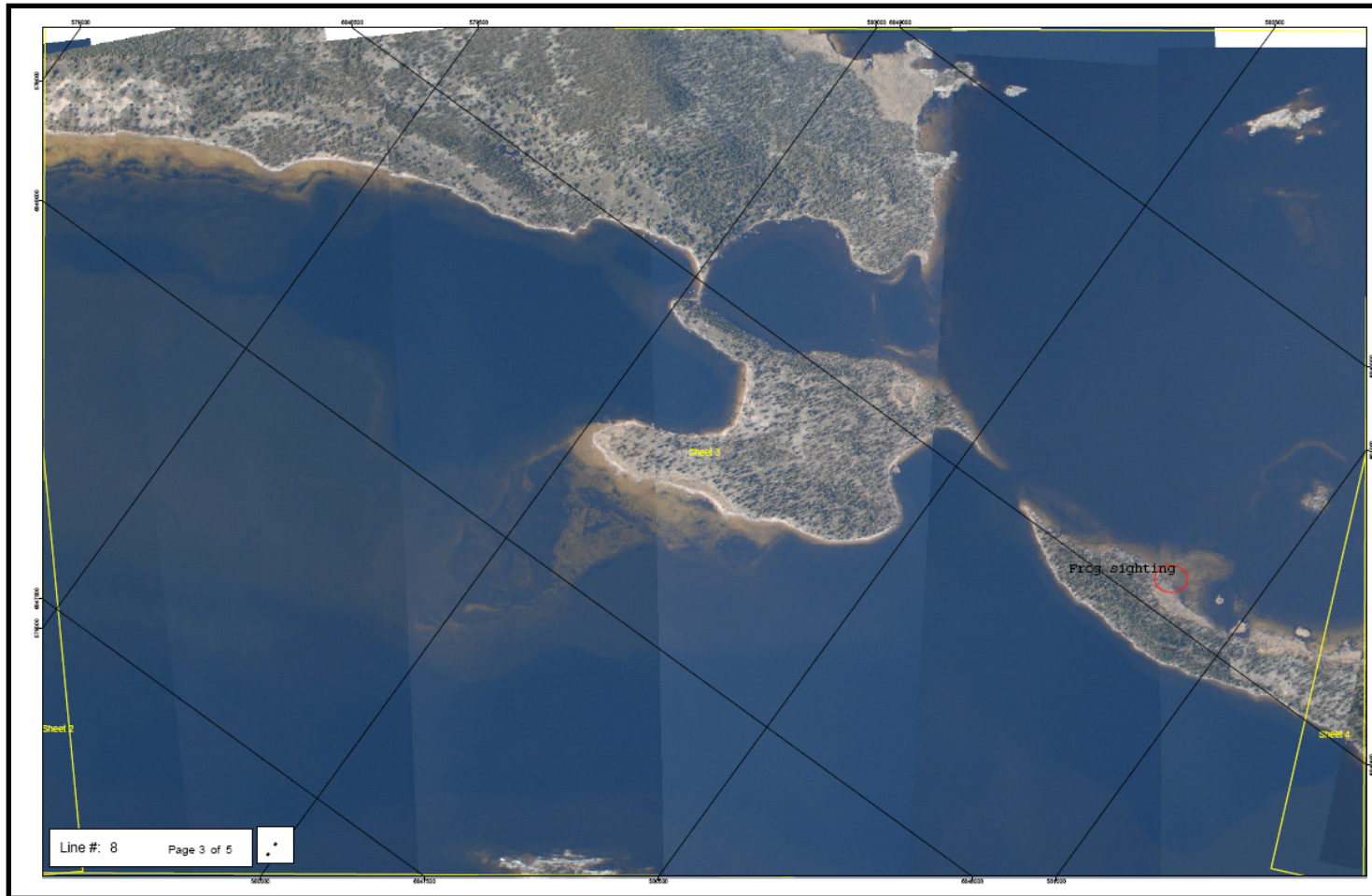
Comments

July 1, 2008: Northern leopard frog seen within the tailrace of the existing plant immediately downstream of the riffle habitat.

The frog was found in a residual pool on the bedrock bank. Water temperatures within the pool were well above 20°C and the water depth was around 0.3 metres.



Elsie Falls Frog Sighting



Reference Page 1 of Trudel Photomosaics (10,000 feet)

Comments

July 9, 2008: Incidental amphibian observation at Nonacho Lake by Carmen Tattersfield. Photo documentation was not possible.

Nonacho Lake Frog Sighting

APPENDIX 7
NORTHERN LEOPARD FROG OBSERVATIONS BY WADE
BRUNHAM (B.SC.)

Comments

Two incidental amphibian observations were recorded in Zone 1, along the Taltson River by Wade Brunham of Rescan Environmental Services Ltd.

August 5, 2008: Northern leopard frog sighted in wetland TW19 (Figure 1) at UTM E 513968, N 6699616.



Figure 1

August 6, 2008 : Northern leopard frog sighted in wetland TW21 (Figure 2) at UTM E 526181, N 6707845.



Figure 2

Taltson River Frog Sightings