

**ALDERON IRON ORE CORP.**

AMENDMENT TO THE ENVIRONMENTAL IMPACT STATEMENT  
VOLUME 3 APPENDICES – INFORMATION REQUEST RESPONSES



## **Appendix D**

Waterfowl Survey Report





## **Waterfowl Survey**

### **Kami Iron Ore Mine and Rail Infrastructure Project**

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Final Report

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## **EXECUTIVE SUMMARY**

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Stassinu Stantec Limited Partnership (Stassinu Stantec) was retained by Alderon Iron Ore Corp. (Alderon) to complete environmental investigations in support of an environmental assessment of the Kamistiatusset (Kami) Iron Ore Mine and Rail Infrastructure Project (the Project) in western Labrador. Based on the amount of suitable habitat and knowledge of their distribution, a survey was completed for waterfowl. In 2011, nine aerial surveys of waterfowl during spring staging and breeding pairs (May 20, May 31, and June 8 and 9), brood rearing (July 12 and July 27) and fall staging (August 17, August 24 and 25, September 8 and September 14 and 15) were conducted throughout an area of approximately 400 km<sup>2</sup>. This area encompassed the proposed Project footprint, its alternatives, and elsewhere south of the communities of Labrador City and Wabush. This report provides spatial and temporal information on the use of this area by waterfowl. The principal species of waterfowl observed include Common Merganser, Common Goldeneye, Canada Goose, American Black Duck, and Ring-necked Duck. Although not a true waterfowl species, Common Loon were also frequently observed and were included in this report due to their similar ecology and use of wetland habitat. Other species of wildlife were noted during all surveys and are presented here for additional information on the existing environment.

Throughout the surveys, there was evidence of waterfowl use wherever potential habitat, such as open water in spring or wetland habitat for breeding, existed throughout the Study Area. For staging in fall, such areas were not as important because of the extensive area of open water available to these migratory birds. Considerations for how temporal and spatial results varied from the expected are also discussed.

**STASSINU STANTEC LIMITED PARTNERSHIP**

WATERFOWL SURVEY | KAMI IRON ORE MINE AND RAIL INFRASTRUCTURE PROJECT

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## 1.0 INTRODUCTION

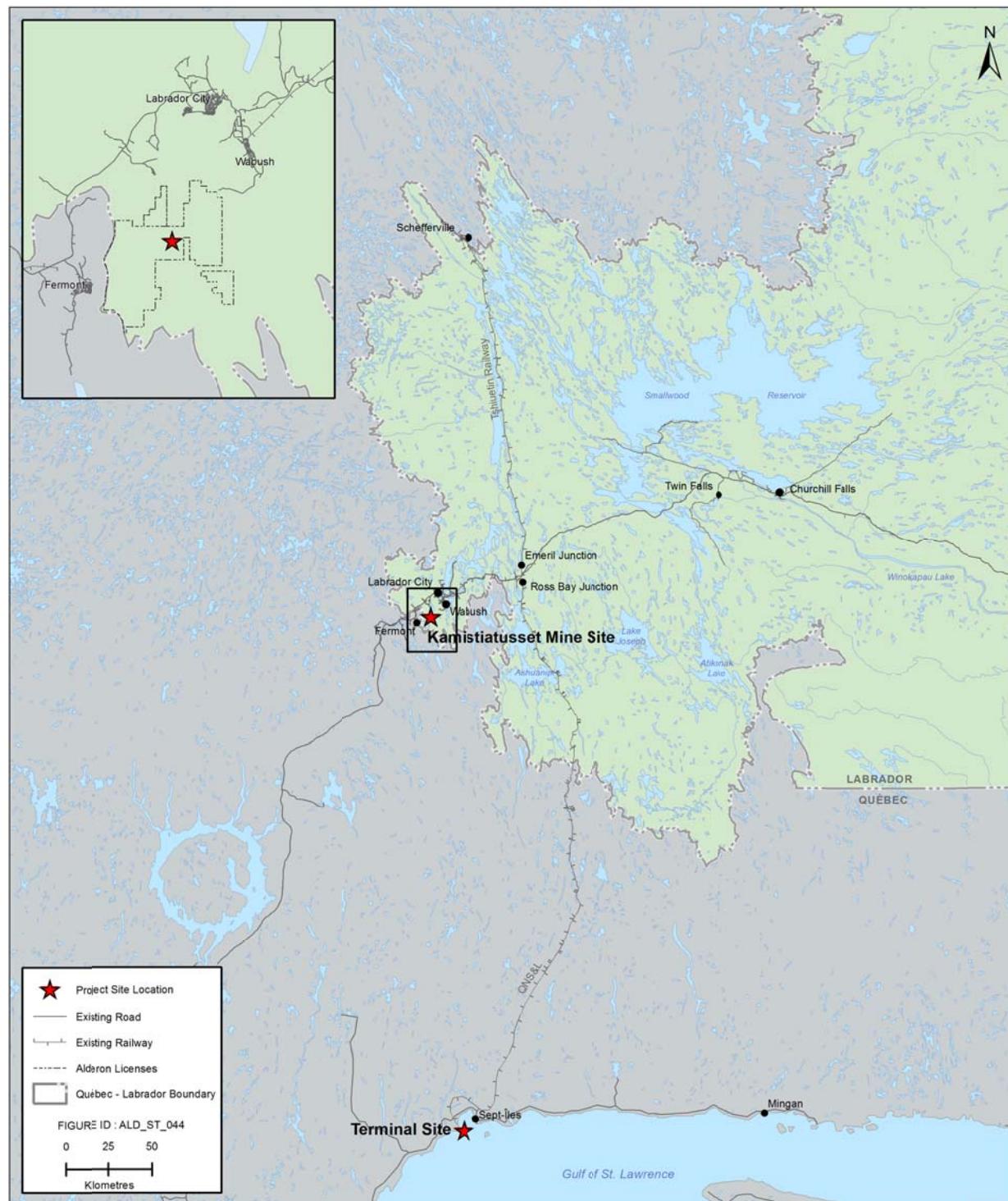
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Alderon Iron Ore Corp. (Alderon) is proposing to develop an iron ore mine in western Labrador, and build associated infrastructure at the Pointe-Noire Terminal in the Port of Sept-Îles, Québec. The mine property is located south of the towns of Wabush and Labrador City in Newfoundland and Labrador and east of Fermont, Québec (Figure 1.1). The Kami Iron Ore Mine and Rail Infrastructure (the “Project”) is located entirely within Labrador, and includes construction, operation, and rehabilitation and closure of an open pit, waste rock disposal areas, processing infrastructure, a tailings management facility (TMF), ancillary infrastructure to support the mine and process plant, and a rail transportation component. The mine will have a nominal capacity of 16 million metric tonnes of iron ore concentrate per year. Concentrate will be transported by existing rail to the Pointe-Noire Terminal at the Port of Sept-Îles, where Project-related components will be located on land within the jurisdiction of the Port Authority of Sept-Îles.

The Labrador Project components will require approvals from the Government of Newfoundland and Labrador and are subject to environmental assessment (EA) under the *Environmental Protection Act* (NLEPA) and associated *Environmental Assessment Regulations*. Federal approvals will also be required, which trigger the requirement for a federal EA under the *Canadian Environment Assessment Act* (CEAA), at the comprehensive study level. The Project was registered in accordance with the NLEPA and CEAA in October 2011. This environmental study was conducted in support of the EA process for the Kami Iron Ore Mine and Rail Infrastructure.

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**Figure 1.1 Project Location for the Kami Iron Ore Mine and Rail Infrastructure Project**



## 1.1 Kami Iron Ore Project Overview

The Kami Iron Ore Project in Labrador includes construction, operation, and closure / decommissioning of the following primary components.

- Open pit (Rose Pit);
- Waste rock disposal areas (Rose North and Rose South);
- Processing infrastructure includes crushing, grinding, spiral concentration, magnetic separation, and tailings thickening areas;
- Tailings management facility (TMF);
- Effluent treatment facility;
- Ancillary infrastructure to support the mine and process plant (gate and guardhouse, reclaim water pumphouse, truck wash bay and shop, electrical substation, explosives magazine storage, administration / office buildings, maintenance offices, warehouse area and employee facilities, conveyors, load-out silo, stockpiles, sewage and water treatment units, mobile equipment, access road and transmission lines);
- A rail transportation component to connect the mine site to the Québec North Shore & Labrador (QNS&L) Railway; and
- Electrical transmission line to be located by Nalcor Energy.

## 1.2 Waterfowl in Western Labrador

Western Labrador is part of the Atlantic Flyway (the eastern most of several continent-wide corridors for migratory waterfowl). There are two groups of migratory waterfowl associated with the timing of their arrival at breeding locations in this region. The early-nesting group (i.e., dabbling ducks and geese) and late-nesting group (i.e., sea ducks and diving ducks) may vary in their annual life-cycle stages by several weeks. Some waterfowl (e.g., American Black Duck and Canada Goose) and sea ducks are currently of international concern because of continental declines in populations and are the focus of international joint ventures under the North American Waterfowl Management Plan (Environment Canada and United States Department of the Interior 1986). The eastern population of Harlequin Duck is listed under the *Species at Risk Act* (SARA) and the Newfoundland and Labrador *Endangered Species Act* as special concern and vulnerable, respectively. Many species of sea ducks and diving ducks nest later in the season than the dabbling ducks (e.g., American Black Duck) and Canada Goose that are surveyed in spring-early summer.

Consistent with the abundance of suitable habitat and use by migratory waterfowl, habitat conservation plans were completed both municipalities in Labrador West (Town of Wabush 2009; Town of Labrador City 2010) in co-operation with the Government of Newfoundland and Labrador through the Eastern Habitat Joint Venture (EHJV). These plans identified Stewardship Zones and subsequently, Management Units, which encompassed wetland and other habitats within the respective municipal boundaries that would be set aside for conservation and education purposes (the Study Area).

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### 1.3 Study Team

The Waterfowl Survey includes a project manager, a technical advisor, field observers, and data analysts (Table 1.1). All team members have in-depth knowledge and experience in their fields of expertise and a broad general knowledge of the work conducted by other experts in related fields. Brief biographical statements, highlighting project roles and responsibilities and relevant education and employment experience, are provided below.

**Table 1.1 Waterfowl Survey Study Team**

Role	Personnel
Study Manager	Perry Trimper
Technical Advisor	Roger Titman
Field Observers (Survey Team)	Mary Ann Aylward, Sean Bennett, Kelly Hopkins, Richard LaPaix, Tina Newbury, Rodger Titman, Perry Trimper
Data Management and Analysis	Roger Titman, Tina Newbury, Mary Ann Aylward, Zach Bartlett, Chris Shupe
Report Preparation	Roger Titman, Perry Trimper
GIS	Zach Bartlett, Amber Frickleton

**Perry Trimper, B.Sc.F.**, served as the Project Manager for the Waterfowl Survey and participated as observer during some of the 2011 surveys. He is a Principal with Stassinu Stantec based in the Goose Bay office in Labrador. His 28 years of experience is primarily in northern environments of both Canada and Russia, and his areas of specialization include boreal and Arctic wildlife research, northern indigenous peoples, environmental assessment, and sustainable resource development.

**Rodger Titman, Ph.D.**, is a wildlife biologist (formerly with the Department of Natural Resource Sciences at McGill University) with over 40 years of experience studying the ecology and behaviour of birds. Dr. Titman is based in Montreal, QC, and supports Stassinu Stantec on various projects in eastern Canada. He served as an advisor, observer and senior reviewer during the waterfowl program.

**Mary Ann Aylward** is the President of Stassinu Services Inc. and works for Stassinu Stantec in Goose Bay, Labrador. Her background is in environmental sciences including wildlife and geological studies and management of Innu field assistants, while working in remote sites throughout Labrador. Ms. Aylward coordinated the logistics and participated in most of the aerial surveys as an observer.

**Sean Bennett, B.Sc., P.Biol., R.P.F.**, is based in Stantec's St. John's, NL office, with over 15 years' experience in the area of environmental consulting. He has been involved in wildlife and wildlife habitat data collection, and environmental assessments in support of projects in Labrador, the Yukon, and Nunavut. Mr. Bennett participated as observer on one of the aerial surveys for this study.

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**Kelly Hopkins** is a student studying Northern Natural Resources. In addition to working with Stassini Stantec in Labrador during 2011, she has worked with the Conservation Corps since 2006. Her experience has included: aerial and ground-based wildlife surveys as well as various forestry and conservation initiatives. Ms. Hopkins participated as a field observer during some of the waterfowl surveys for this Project.

**Richard LaPaix, M.Sc.**, is a terrestrial ecologist based in Stantec's office in Dartmouth, NS. His expertise as a wildlife ecologist relates primarily to avifauna surveys throughout Atlantic Canada. He is also an experienced botanist and vegetation (including wetland) ecologist, having conducted numerous botanical surveys and plant community studies in a wide range of ecotypes within both eastern and western North America. Mr. LaPaix was a field observer during the aerial surveys.

**Tina Newbury, M.Sc.**, is a terrestrial ecologist with Stantec in Corner Brook, NL. Her responsibilities include wildlife surveys, data analysis, and report-writing for various projects. Ms. Newbury has 18 years of experience, including her involvement on various wildlife projects associated with mining, hydroelectric development and other activities. Her work in Labrador includes investigations of various wildlife species in the region, as well as habitat characterization studies. She was a field observer for the aerial surveys, serving as field navigator for most of the surveys.

**Zachary Bartlett, M.Sc., DGIS**, is a Geographic Information Systems (GIS) technician with the Information Management team at Stantec in Ottawa, ON (formerly in the St. John's office). Mr. Bartlett has experience with spatial analysis, remote sensing, cartography, data management, and report writing for the Lower Churchill generation and transmission projects, and other projects in Labrador. He assisted with map production for the 2011 waterfowl program.

**Amber L. Frickleton, B.A., Ad. Dip GIS**, is GIS Coordinator with Stantec in St. John's, NL. She manages and maintains geographic and related attribute data for the creation of maps and datasets for internal staff and clients to support the implementation of environmental assessments. Her role on this Project included map design and production, data manipulation and analysis, and the maintenance of databases in accordance with standard formats and procedures.

## **2.0 SUMMARY OF STUDY OBJECTIVES AND RATIONALE**

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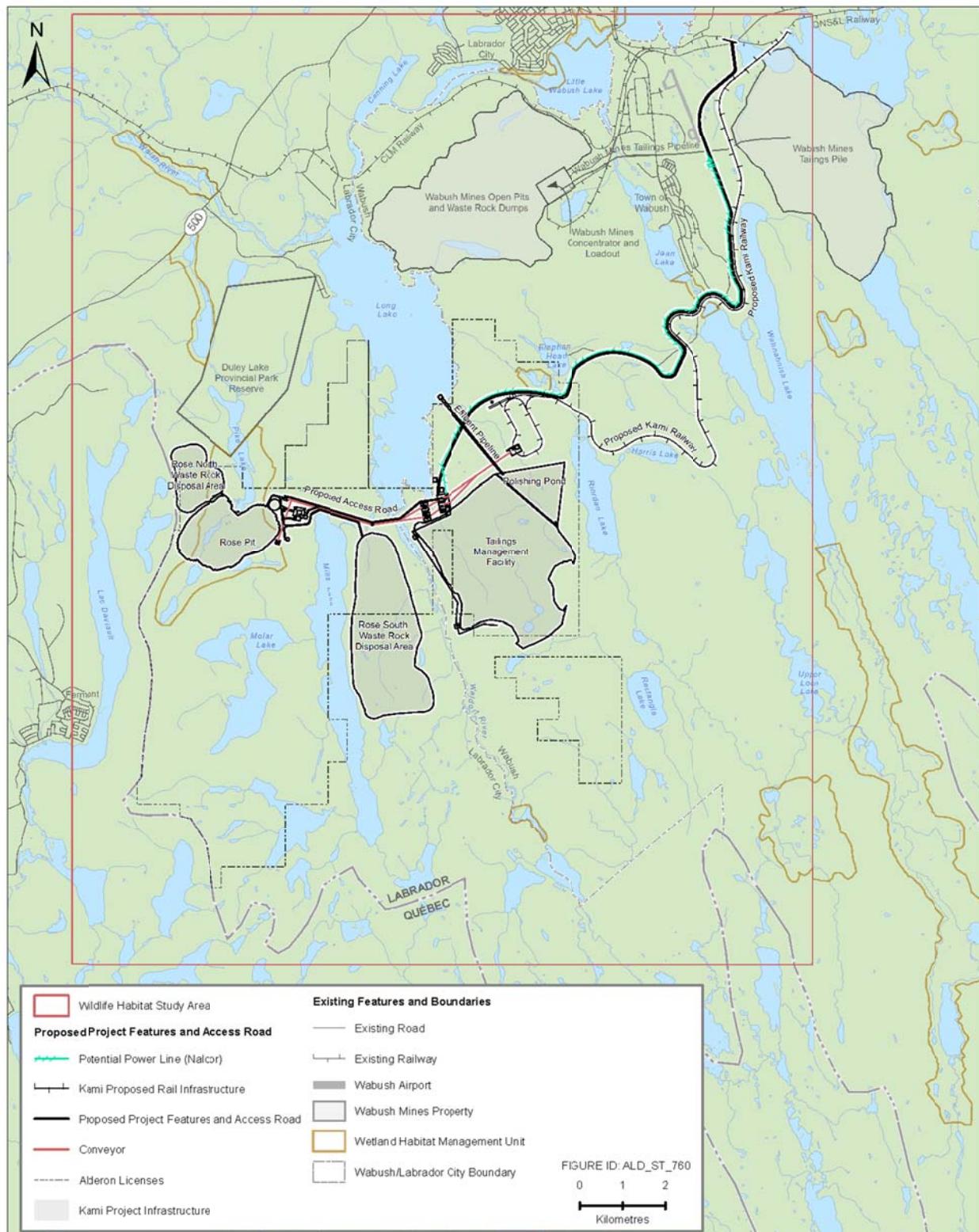
The purpose of the Waterfowl Survey was to gather and present information on key aspects of waterfowl in the vicinity of the Project.

The primary objectives of the Waterfowl Survey were to:

- Complete a series of aerial surveys during spring staging and breeding, brood rearing, and fall staging by waterfowl in the vicinity of the Project
- Record all sightings to species, with a focus on species of special conservation status, such as the Harlequin Duck
- Examine a Study Area of approximately 400 km<sup>2</sup> that encompasses the Project footprint and surrounding area (Figure 2.1)
- Describe the relative temporal and spatial importance of various habitats and locations for waterfowl use
- Record observations of other wildlife to support the description of the existing environment.

Results of the waterfowl and other wildlife surveys were incorporated into the EIS and used to support and inform the EA for the Project.

## Figure 2.1 Study Area for the Kami Iron Ore Mine Waterfowl Surveys



### **3.0 STUDY AREA**

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The Kami Property is located entirely within the municipal boundaries of Labrador City and Wabush, within the province of Newfoundland and Labrador. To examine the use of the Project footprint (including the proposed locations of the Rose Pit, the waste rock disposal areas, the tailings impoundment, the access road, railway, conveyor belt and other infrastructure), and surrounding area by waterfowl, the Study Team identified an approximately 400 km<sup>2</sup> area of interest.

The Study Area contains relatively rugged physiography (elevation ranges from 580 to over 700 m, with slopes that are 2 to 15 percent) within the Mid-Subarctic Forest Ecoregion (Michikamau), encompassing the upland plateaus of central and western Labrador. Wetlands occur throughout the region, particularly in areas of low local relief. String bogs and string fens bordered by black spruce-sphagnum forest stands occur over large areas, with eskers and drumlins also common. The region has a continental, subarctic climate with cool, short summers and long, severe, cold winters (Meades 1990). Black spruce is the dominant trees species, except in the most northern areas, where white spruce dominates. Trembling aspen reach their northern limit here and the only native population of jack pine occurs in this ecoregion. Open lichen woodlands are characteristic.

Freshwater habitat available for waterfowl consists of lakes, ponds, rivers, and smaller streams, all of which are abundant throughout the Study Area (Stassino Stantec 2012b). Two wetland classes were identified within the Study Area: fen and marsh. Fens occupy the large majority of wetland habitat whereas marshes are found in limited abundance, being restricted to the shorelines of certain waterbodies and watercourses. The size of individual wetlands varied considerably, and ranged from less than 0.05 ha to greater than 500 ha (average of approximately 5.5 ha). These features and wetland areas were of particular importance in terms of searching potential habitat.

## 4.0 METHODS

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### 4.1 Field Surveys

Nine aerial surveys for waterfowl were conducted from late May through mid-September 2011. Surveys were designed to assess the distribution and abundance of these migratory avifauna as they moved through or remained during three periods of activity:

- Spring staging and breeding pairs – three surveys completed on May 20, May 31, and June 8-9
- Brood rearing – two surveys completed on July 12 and July 27
- Fall staging – four surveys completed on August 17, August 24-25, September 8 and September 14-15

Field maps were prepared from GIS data showing wetlands and proposed Project features and were used in combination with 1:50,000 National Topographic Series map. The Study Team attempted to search all areas of open water and/or potential habitat within the 400 km<sup>2</sup> Study Area.

Prior to departure by helicopter, the Survey Team reviewed Stantec's Health and Safety Checklist and discussed related issues and contingencies in the event of an incident. Similarly, the pilot reviewed safety procedures prior to the commencement of each survey. Each survey team comprised three observers and a helicopter pilot who would assist with observations (Table 4.1). Field observations were keyed to American Ornithological Union (AOU) abbreviations for consistency. Although not taxonomically considered a species of waterfowl (i.e., not belonging to the Order Anseriformes), Common Loon were included as such in this report due to their similar ecology and use of wetland habitats.

**Table 4.1 Aerial Surveys for Waterfowl in 2011**

Date	Aircraft	Pilot	Navigator	Port	Starboard	Duration	Conditions
20 May	Bell 206	G.Goodyear	TN	MAA	RDT	2hr 20m	O4NEN6°
31 May	Bell 206	P. Jefford	TN	MAA	RDT	3hr 8m	C2NN10°
8–9 June	Bell 206	K .Cashin	TN	MAA	RDT	3hr 36m	O4SWN18° O4NED6°
12July	EC-120	E. Caron	TN	KH	RLaP	3hr 45m	O4EF12°
27 July	A-Star	V. Forgues	TN	RLaP	SB	4hr 10m	S3WN20°
17 August	A-Star	V. Forgues	TN	MAA	RDT	4hr 25m	S4NWS12°
24-25 August	EC-120	E. Caron	RDT	KH	MAA	4hr 18m	O3SWD16°
8 September	EC-120	V. Forgues	PGT	MAA	RDT	3hr 55m	O5WN10°

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Date	Aircraft	Pilot	Navigator	Port	Starboard	Duration	Conditions
14-15 September	EC-120	V. Forgues	PGT	MAA	RDT	4hr 27m	S2NWN12° O3SWS11°

Observers: P. Trimper (PGT), T. Newbury (TN), M. Aylward (MAA), R. Titman (RDT), K. Hopkins (KH), R. LaPaix (RLaP), and S. Bennett (SB). Conditions: 1<sup>st</sup> letter=sky - O=Overcast, C=Clear, S=Scattered cloud; Number=Beaufort scale – 0=calm, 1=wind 1-2 knots, 2=3-6 knots, 3=7-10 knots, 4=11-15 knots, 5=16-20 knots; 2<sup>nd</sup> and/or 3<sup>rd</sup> letter=Wind direction; 3<sup>rd</sup> or 4<sup>th</sup> letter=Precipitation-N=None, R=Rain, F=Fog, D=Drizzle, S>Showers; Maximum temperature in °C.

Aerial surveys were usually conducted during a single day when visibility and wind conditions were suitable (i.e., near sunrise or sunset with light winds and no precipitation). Aircraft speed did not exceed 130 km/h (70 knots) and altitude was maintained below 60 m (200 ft) above ground level (agl). While techniques were similar throughout the nine surveys, logistical considerations (e.g., availability of helicopter, accommodations) influenced the model of helicopter employed, and consequently the pilot and crew member availability (Table 4.1). Three different helicopters were used during the course of nine surveys, including Bell 206 Long Ranger equipped with bubble windows, A-Star, and Eurocopter EC-120.

### 4.2 Data Analysis

During spring surveys, observations were also described in terms of 'indicated pairs' (calculated as observed pairs plus calculated pairs, which equals lone males plus males in groups of four or less) (Dzubin 1969) to distinguish individuals that likely breed in a given area. Spacing between individuals, group size, and behaviour were used in making this determination.

A spreadsheet was compiled with all sightings coded to GPS locations for entry into a GIS. Data were organized by survey and by species over the nine surveys indicating presence, activity, and habitat use over the course of the study. Abundance was derived from summaries of aerial surveys (Appendix A). Observations of other wildlife were also recorded on each survey and are presented in a series of maps (Appendix B).

### 4.3 Quality Assurance / Quality Control Procedures

To ensure consistent delivery of high quality products and services, Stassino Stantec has developed and implemented a Quality Management System (QMS) within its operations. Observations in particular were checked against field data to ensure accuracy. The QMS is registered to International Organization for Standardization 9001:2000 (QMS - Requirements) by QMI Management Systems Registration (CERT-0011312:026332).

An in-house technical review process was conducted by senior technical reviewers to confirm this report and the data within it adequately addresses the work scope and conforms to the quality requirements stipulated by Stassino Stantec. In addition, the report was reviewed by Gord Parsons, a local naturalist with extensive knowledge of the area and its species.

## 5.0 RESULTS

Fifteen species of waterfowl were recorded during the nine aerial surveys completed in 2011 (Table 5.1). The most abundant species in the Study Area included Common Merganser, Common Goldeneye, Canada Goose, American Black Duck, Ring-necked Duck, and Common Loon. Most waterfowl using the Study Area are migrants, although American Black Duck are known to occupy areas of open water in Wabush (Town of Wabush 2009).

**Table 5.1 Codes and Names of Waterfowl Observed During 2011 Surveys**

AOU Abbreviation	Species	Scientific name
ABDU	American Black Duck	<i>Anas rubripes</i>
BLSC	Black Scoter	<i>Melanitta Americana</i>
CAGO	Canada Goose	<i>Branta Canadensis</i>
COGO	Common Goldeneye	<i>Bucephala clangula</i>
COLO	Common Loon	<i>Gavia immer</i>
COME	Common Merganser	<i>Mergus merganser</i>
GRSC	Greater Scaup	<i>Aythya marila</i>
GWTE	Green-winged Teal	<i>Anas crecca</i>
HOME	Hooded Merganser	<i>Lophodytes cucullatus</i>
LESC	Lesser Scaup	<i>Aythya affinis</i>
MALL	Mallard	<i>Anas platyrhynchos</i>
MERG	Common or Red-Breasted Merganser species	<i>Mergus spp.</i>
NOPI	Northern Pintail	<i>Anas acuta</i>
RBME	Red-breasted Merganser	<i>Mergus serrator</i>
RNDU	Ring-necked Duck	<i>Aythya collaris</i>
SUSC	Surf Scoter	<i>Melanitta perspicillata</i>

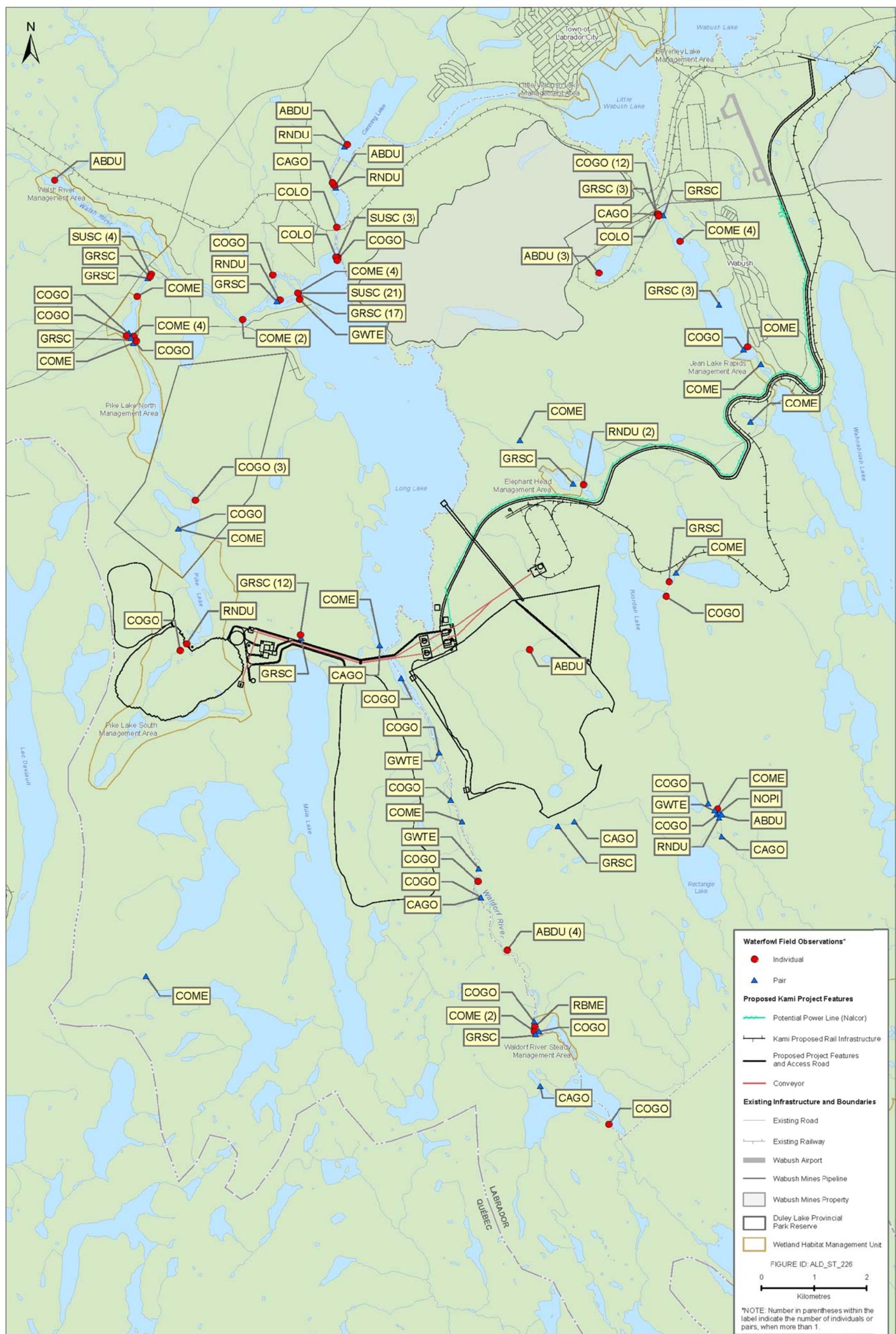
Although Harlequin Duck occur in fast-water streams, and has been observed in the Study Area (at the Jean Lake Rapids Management Unit [Wabush 2009]) on at least one occasion in recent years (C. Porter, pers. comm.), this species of special concern was not observed during any of the surveys.

Canada Goose, Common Goldeneye, and Common Loon were all observed incidentally in 2012 during songbird surveys conducted in support of the project.

### 5.1 Spatial and Temporal Observations

At the time of the first aerial survey (20 May 2011), several species of early-nesting waterfowl (including Canada Goose, American Black Duck, Green-winged Teal, and Northern Pintail) appeared to be at breeding locations based on their isolation from others and the occurrence of pairs or single males (indicating that the female was at a nearby nest) (Figure 5.1; Table 5.2).

## Figure 5.1 Waterfowl Field Observations, Survey 1



**Table 5.2 Summary of Results by Survey for the 2011 Waterfowl Surveys**

Species	Spring Breeding Pairs Surveys						Summer Brood Surveys						Fall Staging Surveys					
	20 May		31 May		8-9 June		12 July		27 July		17 August		24-25 August		8-September		14-15 September	
	Pr	Total	Pr	Total	Pr	Total	Br	Total	Br	Total	Br	Total	Pr	Total	Br	Total	Pr	Total
COME	21	37	25	53	27	44	-	-	-	-	51	(40)	42	(31)	37	(13)	87	(25)
MERG	-	-	-	-	-	3	34	(8)	4	51	(30)	-	-	-	-	-	-	
COGO	21	46	20	48	16	31	-	-	3	29	(24)	7	(6)	21	(12)	12	27	(5)
CAGO	7	12	7	7	6	9	-	4	-	13	20	-	7	-	15	(3)	17	
ABDU	10	13	3	6	9	13	3	24	4	20	(15)	9	-	3	-	3	18	
RNDU	7	10	11	15	6	16	-	-	1	5	(4)	12	(2)	8	(1)	4	(1)	27
GRSC	8	56	2	3	1	12	-	-	-	-	-	1	10	(4)	4	-	-	
LESC	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	3	
Scaup sp	-	-	-	-	-	-	-	10	-	-	-	-	-	-	-	-	-	
GWTE	4	7	1	2	1	1	-	-	1	7	(6)	6	(5)	2	7	(5)	3	
NOPI	1	2	0	1	-	-	-	-	-	-	-	-	-	-	-	-	-	
MALL	-	-	-	1	3	-	-	-	-	-	-	-	3	-	-	-	-	
SUSC	2	28	2	26	4	6	-	-	-	-	-	-	-	-	-	-	4	
BLSC	-	-	7	1	4	-	-	-	-	-	-	-	-	-	-	-	1	
HOME	-	-	-	1	2	-	-	-	-	-	-	-	-	-	7	-	-	
RBME	1	1	1	8	4	8	-	-	-	-	-	-	-	-	-	-	-	
COLO	-	3	24	34	27	44	-	28	-	26	20	(2)	49	(4)	18	(2)	45	(3)

Notes: 'Indicated breeding pairs (Pr) estimated from tallies of pairs and single males (plus males in groups of four or less) observed early in the breeding season after Dzubin (1969)  
- Broods (Br) identified during July - Summer brood surveys. Total birds included all birds of given species (including young-of-the-year) observed in a given survey. The numbers of young recorded by species are given in parentheses for waterfowl only for surveys beginning from July 12.

Late-nesting waterfowl (e.g., Common Goldeneye, Common Merganser, Greater Scaup, Surf Scoter, and Red-breasted Merganser) were in larger groups at the few locations of open water and appeared to be staging preparatory to their breeding effort. The most common species were Common Goldeneye (46 birds at 20 sites) and Common Merganser (37 birds at 16 sites), with Greater Scaup (56 birds at 11 sites) observed on larger waterbodies. Isolated pairs of American Black Duck (seven sites) and Ring-necked Duck (six sites) were found in small wetlands, and Canada Goose (eight sites) and Green-winged Teal (four sites) at fens. Most of the Study Area remained covered in ice at this time and was not being used by waterfowl, although 80 separate sightings were recorded (Table 5.3).

**Table 5.3      Sightings of Waterfowl per Survey during Nine Aerial Surveys**

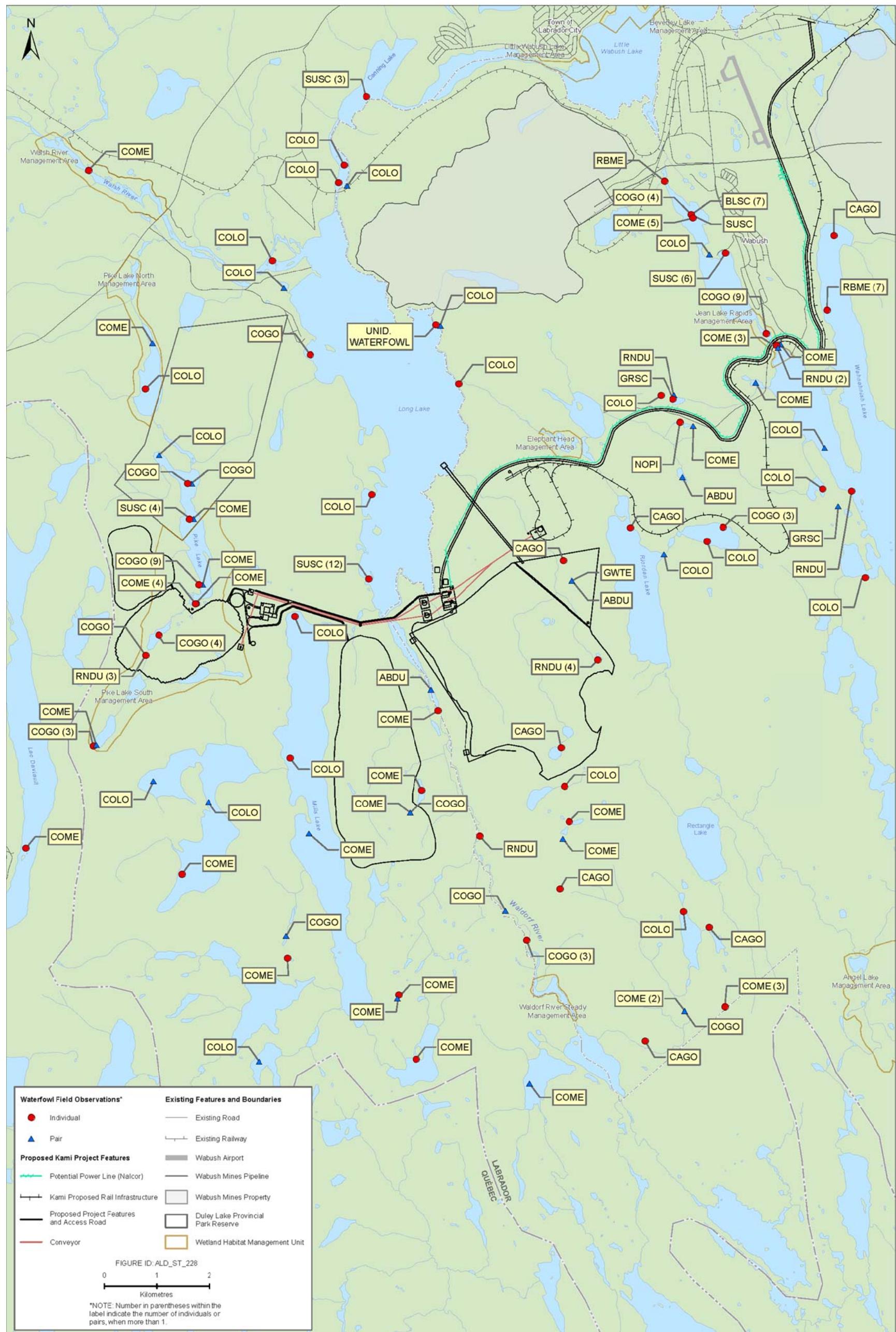
Survey dates	Number of Sightings*
20 May 2011	80
31 May 2011	93
8-9 June 2011	100
12 July 2011	44
27 July 2011	54
17 August 2011	36
24-25 August 2011	59
8 September 2011	33
14-15 September 2011	84

\* Includes Common Loon  
Note: Compiled from Tables A1 to A9. Tables A1 to A9 include Common Loon as 'other wildlife'

Lakes were predominantly ice-covered (greater than 95 percent), with open water occurring only along shorelines. Most observations were made in streams and rivers (e.g., Walsh River and Waldorf River), which were predominantly ice-free. Bogs and fens were also open. Dryer upland habitat was approximately 85 percent covered by snow in eastern sections of the Study Area but there was more snow (greater than 90 percent) and ice at higher elevations in the western portion of the Study Area.

In subsequent surveys, these birds were dispersed, in pairs, and in more appropriate breeding habitat. By May 31, there were fewer groups of waterfowl and more sightings overall (Table 5.3), with a greater proportion of the observations occurring as pairs or as single males, indicative of settling to breed (Table 5.2, Figure 5.2). This was especially apparent among late-nesting species such as Common Merganser and Ring-necked Duck. Groups of other late-nesting species, such as Common Goldeneye and the scoters (i.e., Surf Scoter, Black Scoter), were still apparent. During the second survey on May 31, ice remained on the larger lakes but was beginning to break up and there were scattered openings. Ice coverage ranged from 75 to almost 100 percent on these waterbodies. Elephant Head Lake had 40 percent ice coverage. The smaller lakes (e.g., Jean Lake) and ponds, as well as all streams with running water and bogs, had open water. Snow coverage in upland areas throughout the Study Area was approximately 10 percent.

## Figure 5.2 Waterfowl Field Observations, Survey 2



Ice was gone from all lakes except those at higher elevation (which had only small patches remaining) by June 8-9. Snow cover was present only in forested locations, covering approximately 1 to 2 percent of upland portion of the Study Area. The greatest number of waterfowl sightings in 2011 (i.e., 100 sightings) occurred during this survey (Table 5.3). Most sightings were of pairs or singles birds distributed throughout most areas of potential habitat (Figure 5.3).

The first waterfowl broods were observed on the fourth survey during July 12 (Table 5.2, Figure 5.4). Three broods of American Black Duck at Rectangle Lake and near Jean Lake Rapids, and three broods of Merganser, near Mills Lake and Pike Lake South, were recorded at this time. On July 27, four broods of American Black Duck, four broods of Merganser, three broods of Common Goldeneye, and single broods of Green-wing Teal and Ring-necked Duck were observed (Table 5.2, Figure 5.5). From June through August, birds that were observed were either breeders, individuals that had failed in a breeding effort, or immature birds prospecting for the future. Young Common Loon were not observed during the July 12 or July 27 summer brood surveys (Table 5.2, Figures 5.4 and 5.5), but were suspected to be present based on the behaviour on adults throughout most of the larger waterbodies.

During the fall surveys (Table 5.2, Figures 5.6 to 5.9), diving duck species such as Merganser and Ring-necked Duck, and Common Loon, tended to be more prominent than dabbling duck species. In September, an influx of new birds was apparent from increased numbers as waterfowl were staging and beginning their migration south. Birds were often in groups and occupying larger waterbodies, particularly on the last survey completed on September 14-15 (Figure 5.9). The number of waterfowl sightings increased through the fall staging surveys (Table 5.3).

## **5.2 Summary of Key Species of Waterfowl**

### **5.2.1 Common Merganser**

Common Merganser were the most frequently observed waterfowl species in the Study Area, with 21 to 27 indicated breeding pairs estimated from the spring breeding surveys (Table 5.2). A maximum of four Common Merganser broods were recorded during the summer brood surveys, including one crèche containing young from at least two broods (Figure 5.10). At least seven broods were estimated to have been produced within the Study Area (Figure 5.10). Observations of potential breeding pairs resulting in the later presence of broods were recorded on Wahnanish Lake, Lower Loon Lake, Long Lake, Mills Lake, and another lake just to its southwest (all are large waterbodies), as well as in the Walsh and Waldorf Rivers. Observations made during the July surveys were not confirmed as Common Merganser (i.e., distinguished from Red-breasted Mergansers); however, based on the few Red-Breasted Merganser identified in spring, and none noted in fall surveys, these sightings are considered as Common Merganser.

### Figure 5.3 Waterfowl Field Observations, Survey 3

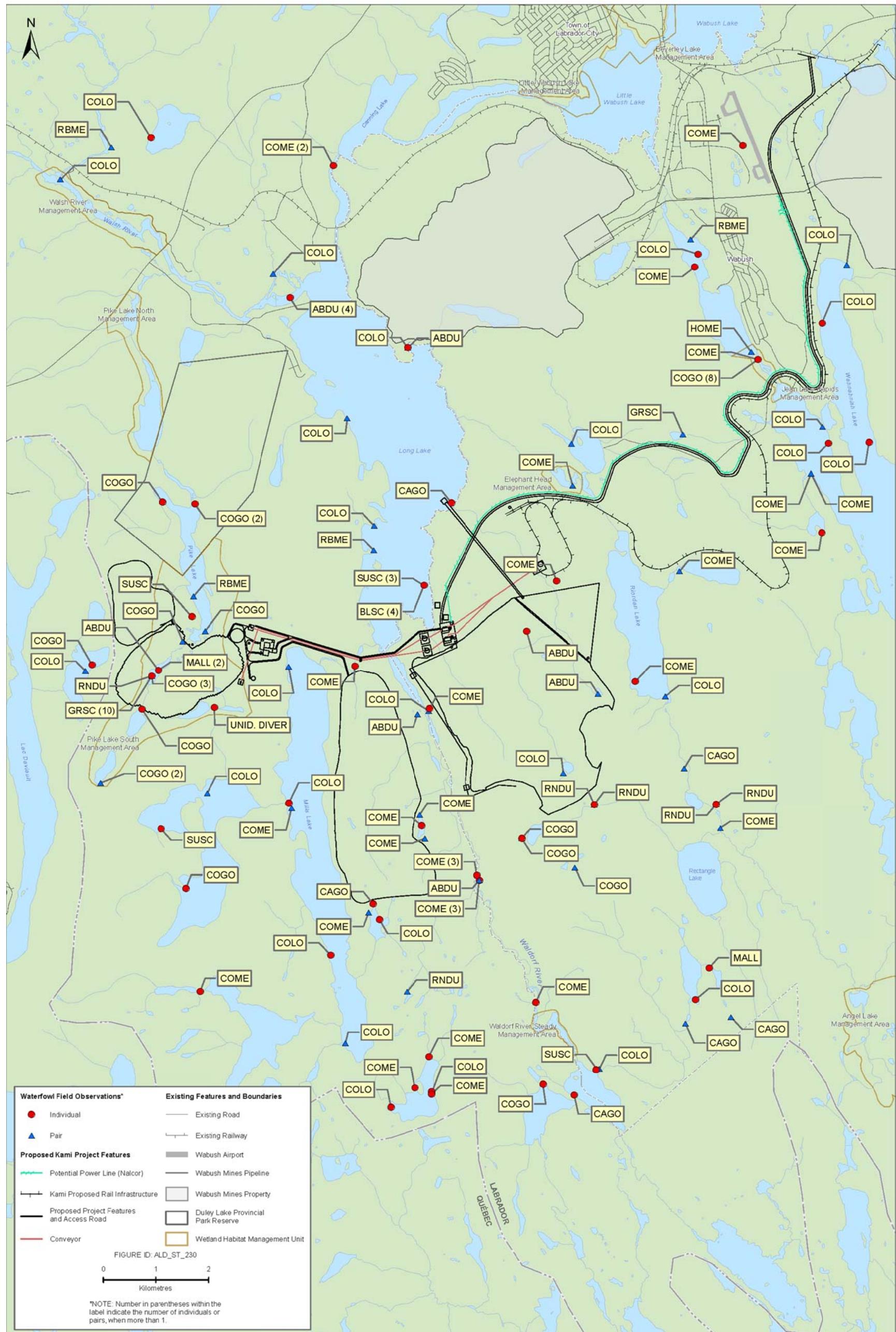


Figure 5.4 Waterfowl Field Observations, Survey 4

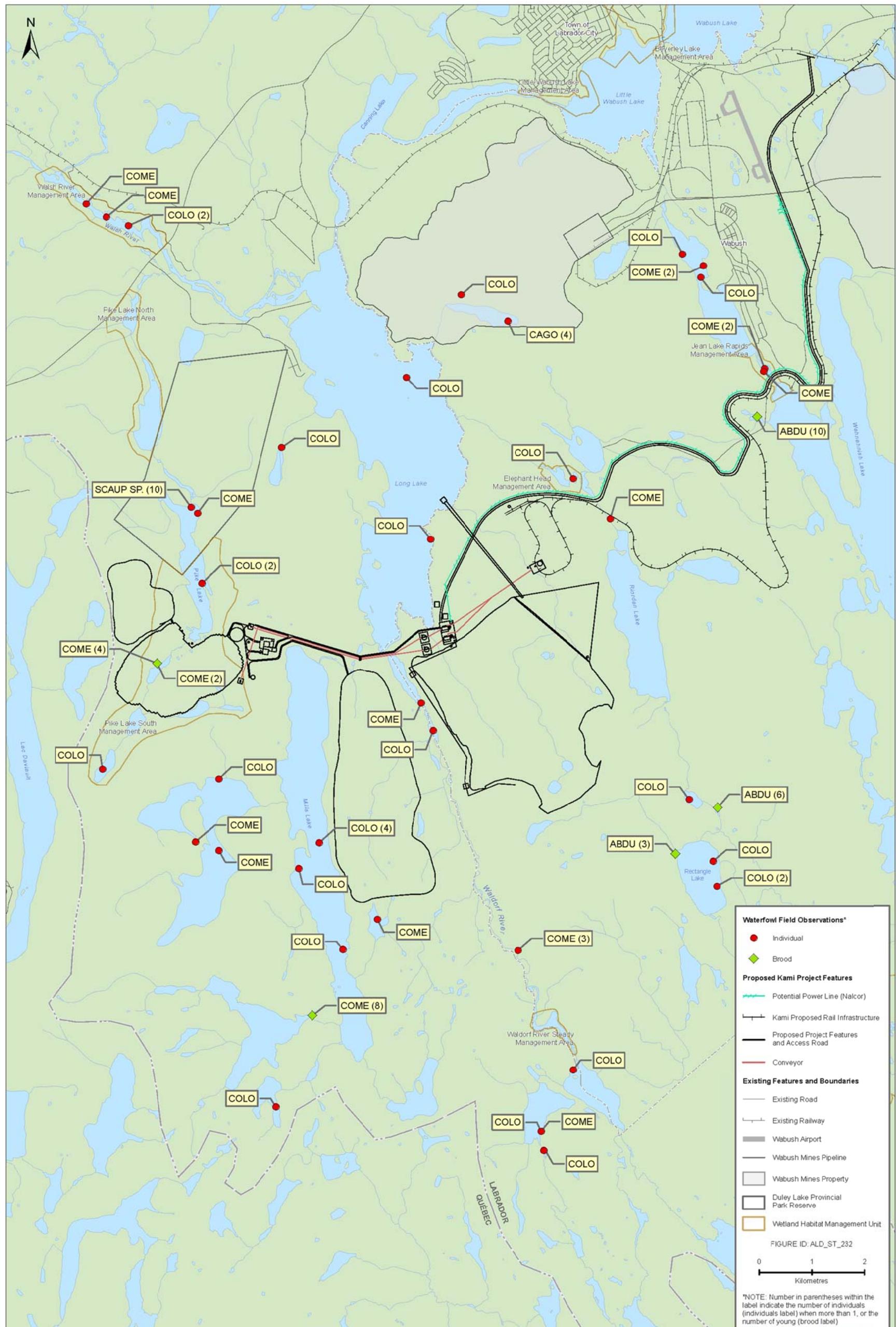
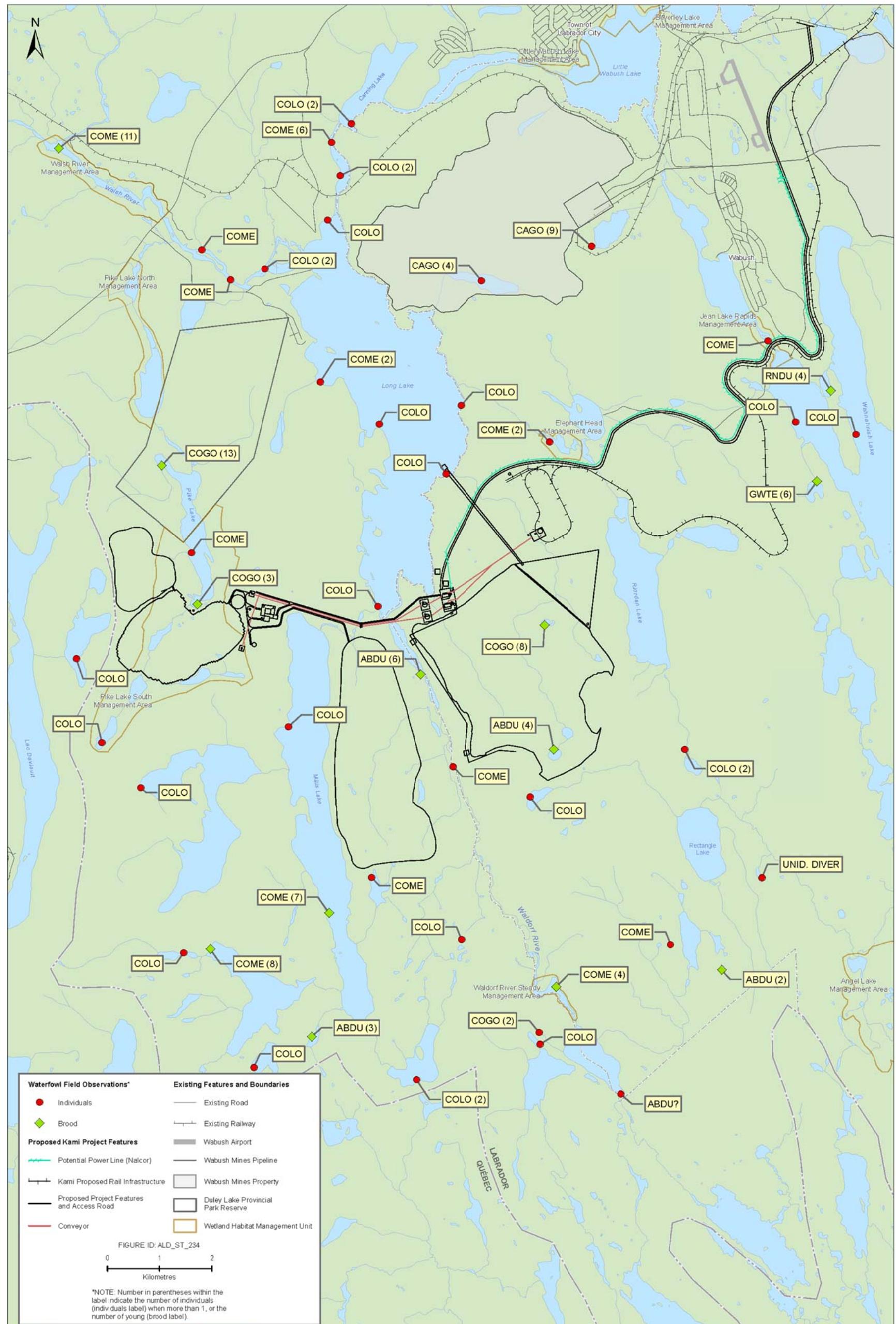


Figure 5.5 Waterfowl Field Observations, Survey 5



## Figure 5.6 Waterfowl Field Observations, Survey 6

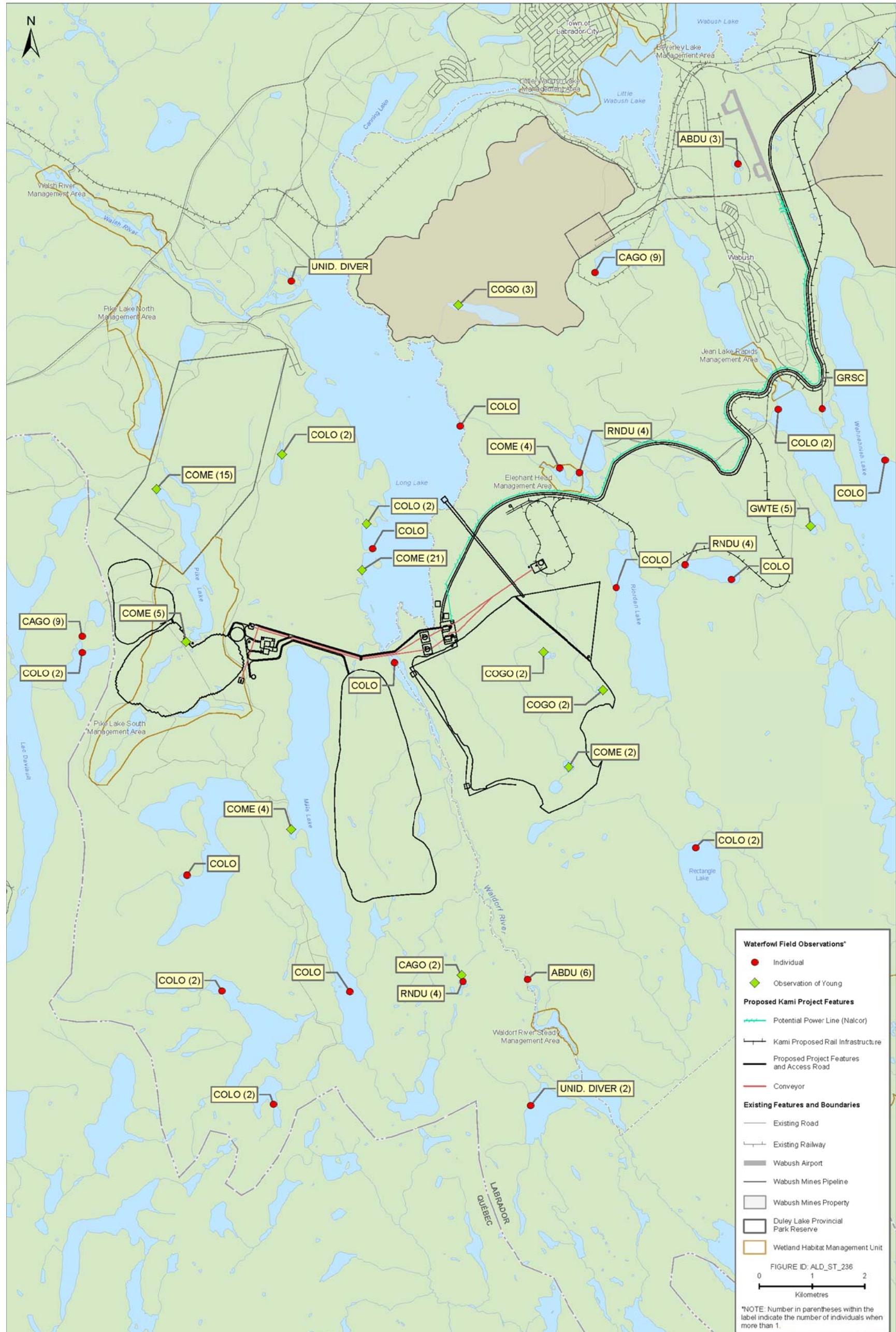


Figure 5.7 Waterfowl Field Observations, Survey 7

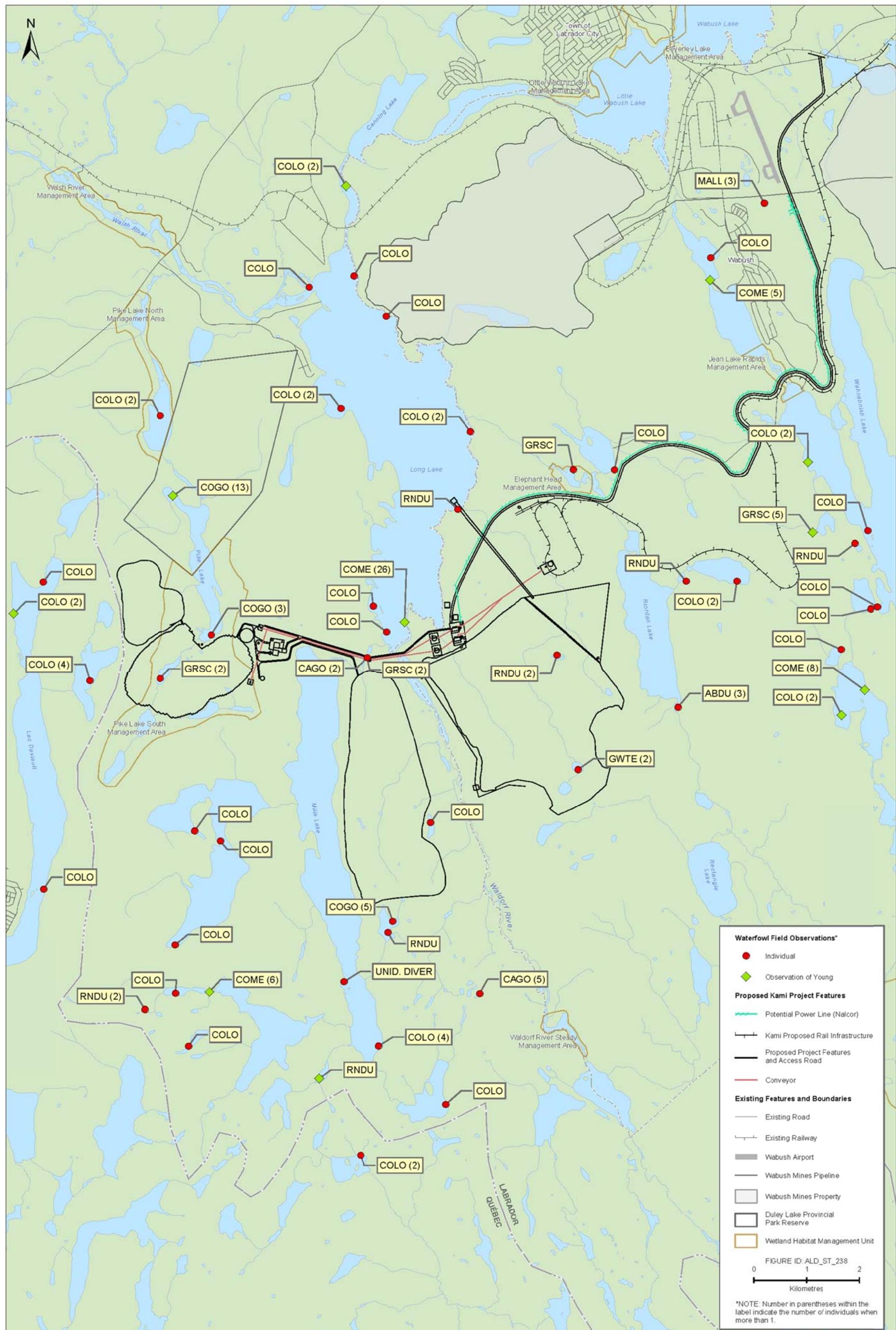
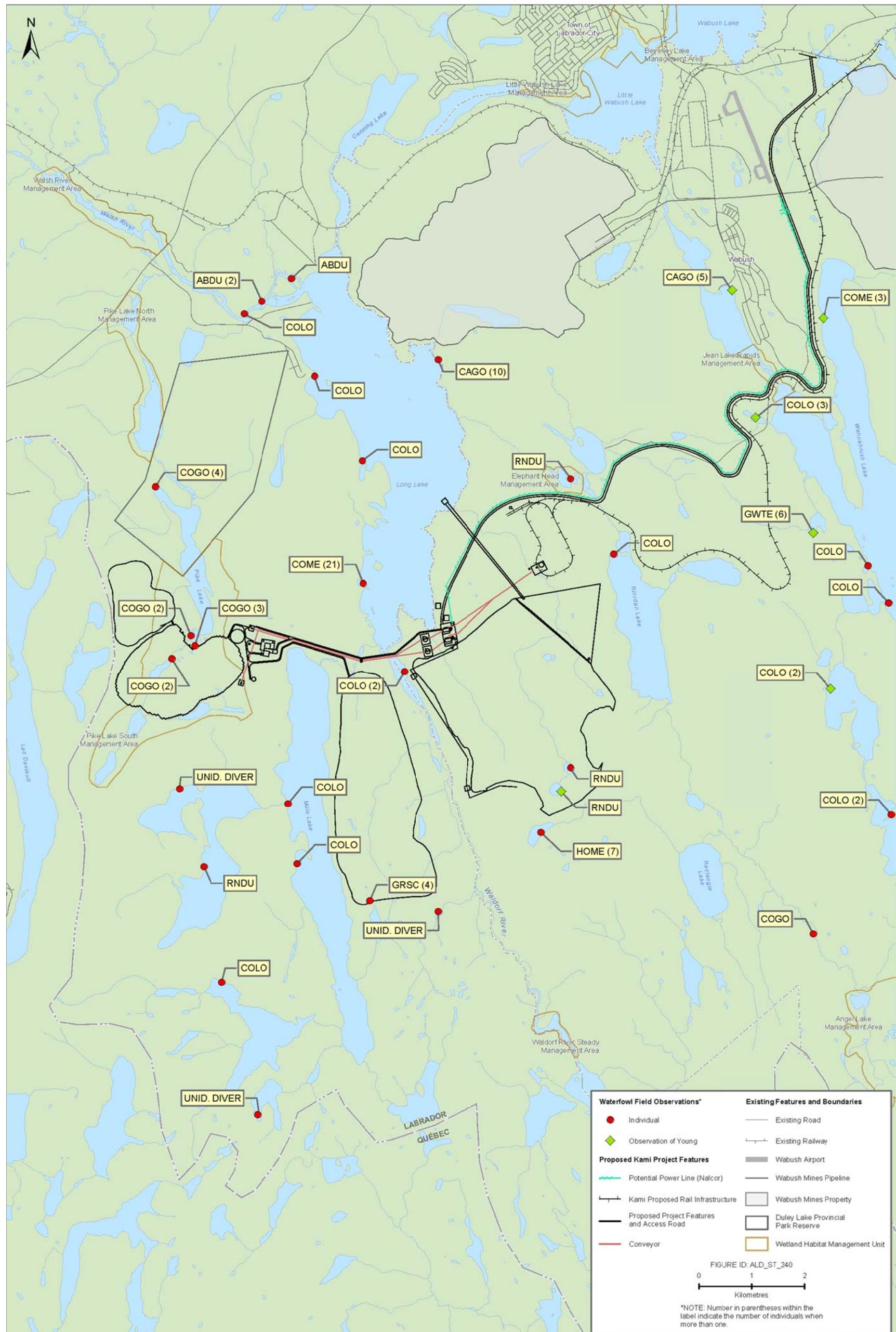
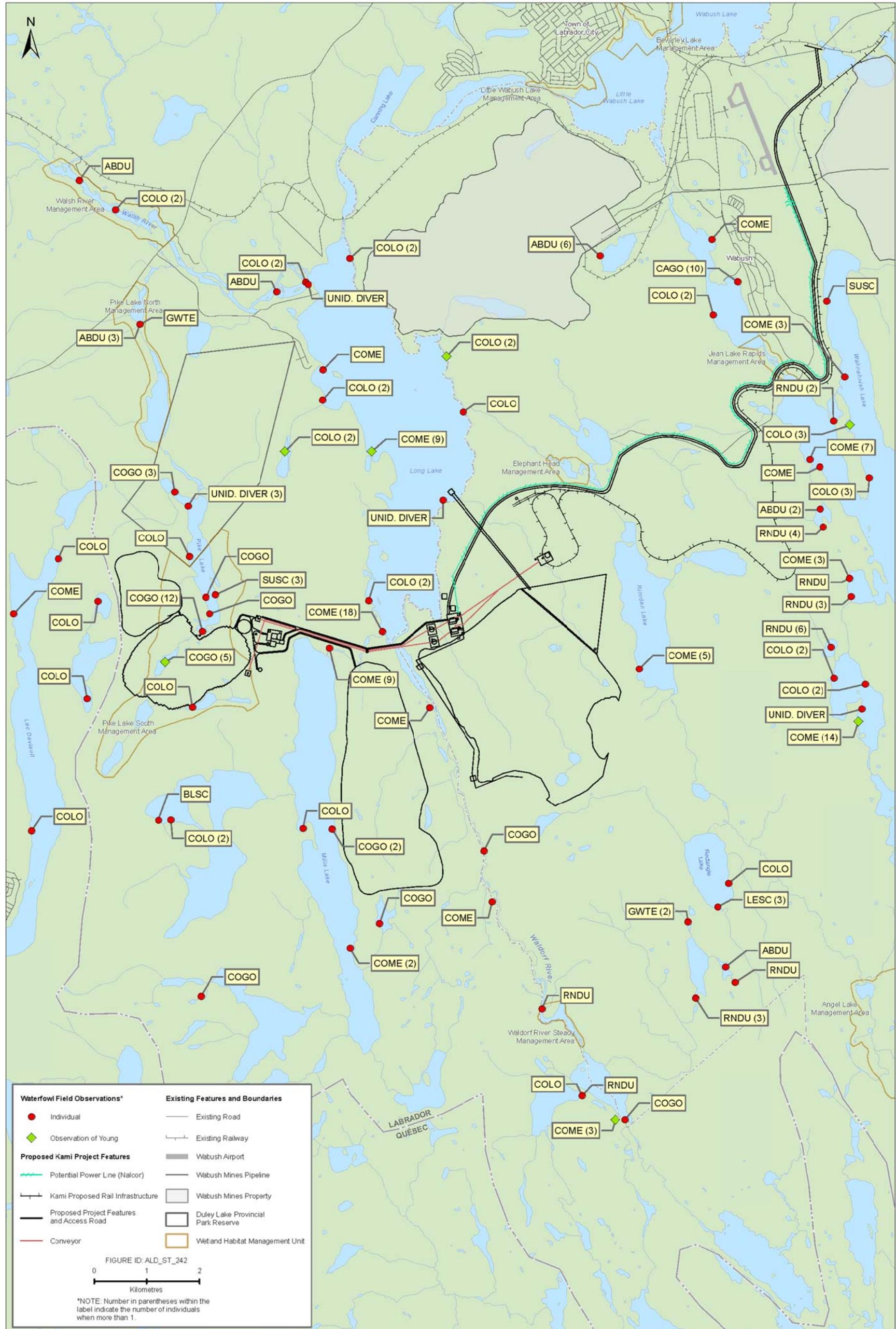


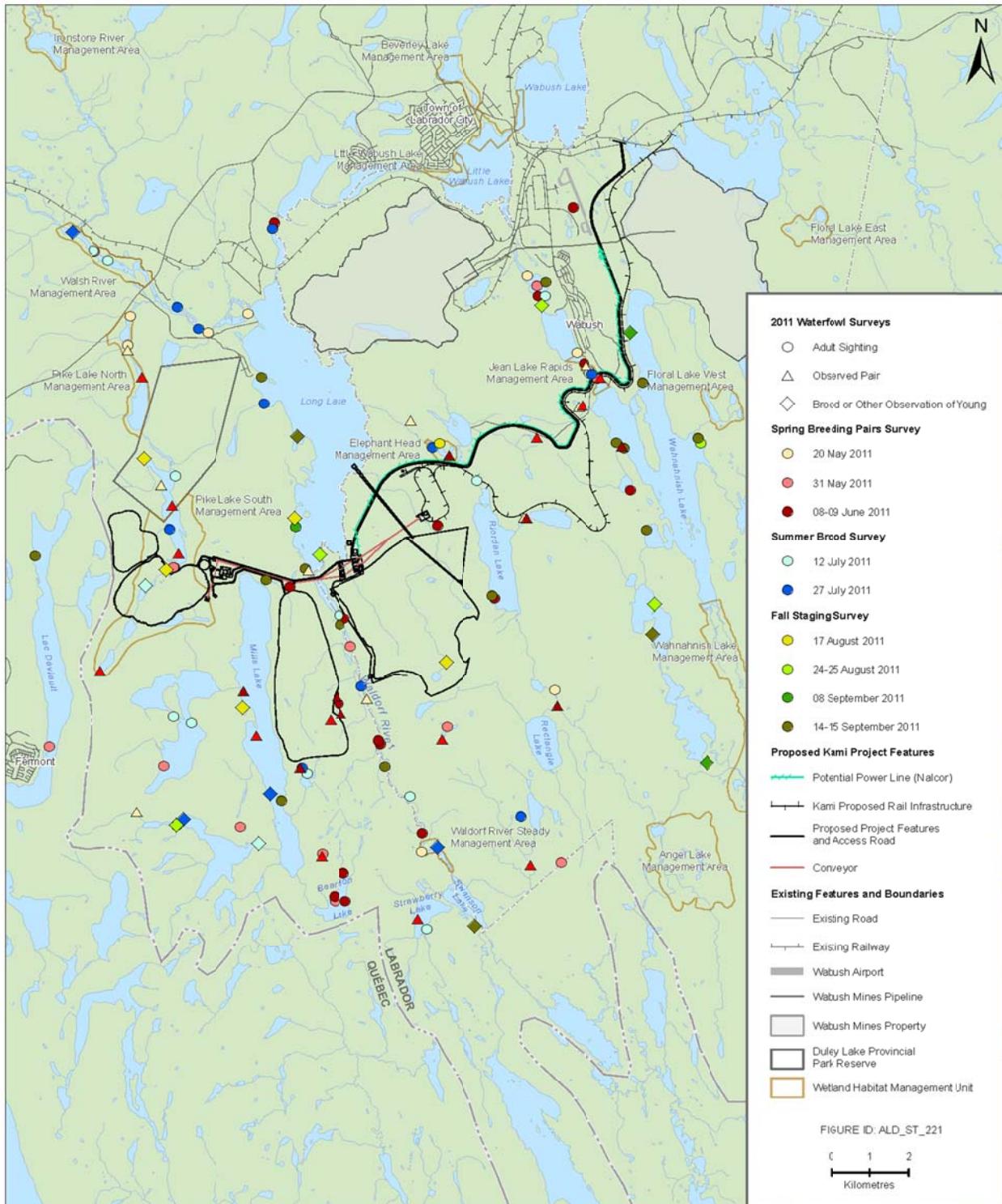
Figure 5.8 Waterfowl Field Observations, Survey 8



## Figure 5.9 Waterfowl Field Observations, Survey 9



**Figure 5.10 Observations of Common Merganser during 2011 Surveys**



Common Merganser are distributed throughout the Northern Hemisphere in lakes and rivers adjacent to forested habitats (Mallory and Metz 1999). The Wabush Habitat Conservation Plan identifies Wahnanish Lake River Management Unit as an important area for mergansers (and other diving duck species) (Town of Wabush 2009). Common Merganser prefer large waterbodies with plentiful fish, surrounded by conifers or mixed forest. It is a top predator in aquatic food chains, eating mainly small fish (10 to 30 cm long) and aquatic invertebrates. Its behaviour is diurnal, hunting by visual pursuit. It nests on the ground under vegetative cover or in tree cavities or crevices. Upon hatching, broods typically travel downstream to larger waterbodies. Population trends in the region tend to be stable or increasing (Mallory and Metz 1999).

### **5.2.2 Common Goldeneye**

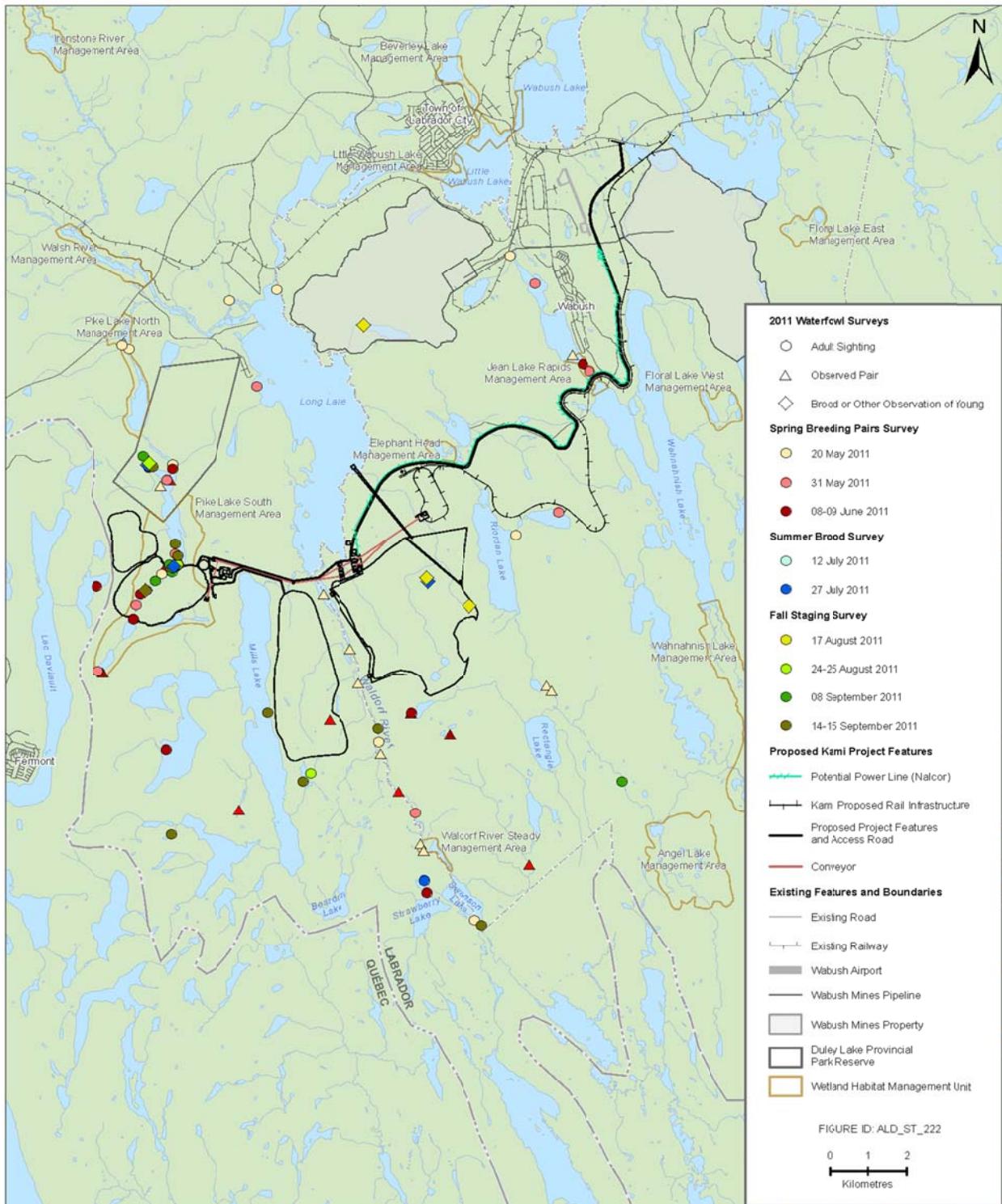
The second most abundant species during spring was Common Goldeneye, with 21 indicated breeding pairs estimated during the first survey on May 20 (Table 5.2, Figure 5.11), with a maximum of three broods recorded during the July 27 survey (Figure 5.11). The first survey most likely counted a number of pairs migrating farther north. Records of Common Goldeneye were relatively scattered during the majority of the surveys; however, observations were regularly recorded within the Pike Lake South Management Unit.

Common Goldeneye occur in the Northern Hemisphere in the boreal forest zone. Influenced by its preference to nest in tree cavities, it is associated with mixed and coniferous forest across Canada (Eadie et al. 1995). It inhabits shallow wetlands, lakes, rivers, and streams bordered by forests mature enough to provide suitable tree cavities, although rock crevices accommodate nests at northern portions of their range. Common Goldeneye prefer clear water offering good visibility as they hunt for invertebrates. Common Goldeneye do use oligotrophic lakes, but prefer shallows with low levels of shoreline emergent or submerged vegetation. In the breeding season, Common Goldeneye are primarily insectivorous and prefer fishless lakes with abundant aquatic invertebrates. They tend to avoid wetlands with fish, which compete with them for prey. Common Goldeneye in North America are considered relatively stable to declining (Eadie et al. 1995).

### **5.2.3 Canada Goose**

Canada Goose are the most widely distributed goose species in North America, breeding from the mid-United States into the Arctic. At more northerly portions of their range, Canada Goose can occur in tundra and are associated with the boreal forest (Mowbray et al. 2002). They were found in early surveys associated with bogs and fens or shallow wetlands within the Study Area. Pairs prefer to nest on hummocks or small islands with a clear view in all directions and permanent water not too far away (Mowbray et al. 2002). Canada Goose forage primarily on grasses, sedges, and berries within their breeding grounds. Canada Goose numbers are increasing and management efforts frequently aim to limit further population growth.

**Figure 5.11 Observations of Common Goldeneye During 2011 Surveys**



Canada Goose are generally early arrivals in northern nesting areas. The spring breeding surveys indicate that as many as seven pairs may have nested in the Study Area (Table 5.2, Figure 5.12). Young were only observed September 8 survey on Jean Lake, near urban development. Potential nesting sites in fens were observed; however, there was no confirmation of breeding success. Early surveys detected nesting activity in sedge habitats within fens. Numbers of Canada Goose were relatively low and observations were sparsely distributed.

#### **5.2.4 American Black Duck**

American Black Duck are an early arrival to breeding grounds, which range widely in eastern North America from the Great Lakes and New England north to the Ungava Peninsula, principally east of Hudson Bay (Longcore et al. 2000). American Black Duck use a variety of wetlands, including lakes, ponds, bogs, and salt marshes associated with mixed and boreal forest, and they are often linked with beaver impoundments lined with alders. American Black Duck feed on seeds, foliage, tubers of aquatic plants, invertebrates, grains, and occasionally on fish and amphibians. American Black Duck nests are well concealed in shrubs or other standing vegetation on the ground, often in uplands away from water, but also in edges or breaks of thicker cover. The current population level is approximately 50 percent of historical size and undergoing decline, some of which can be attributed to hybridization with the Mallard (Longcore et al. 2000).

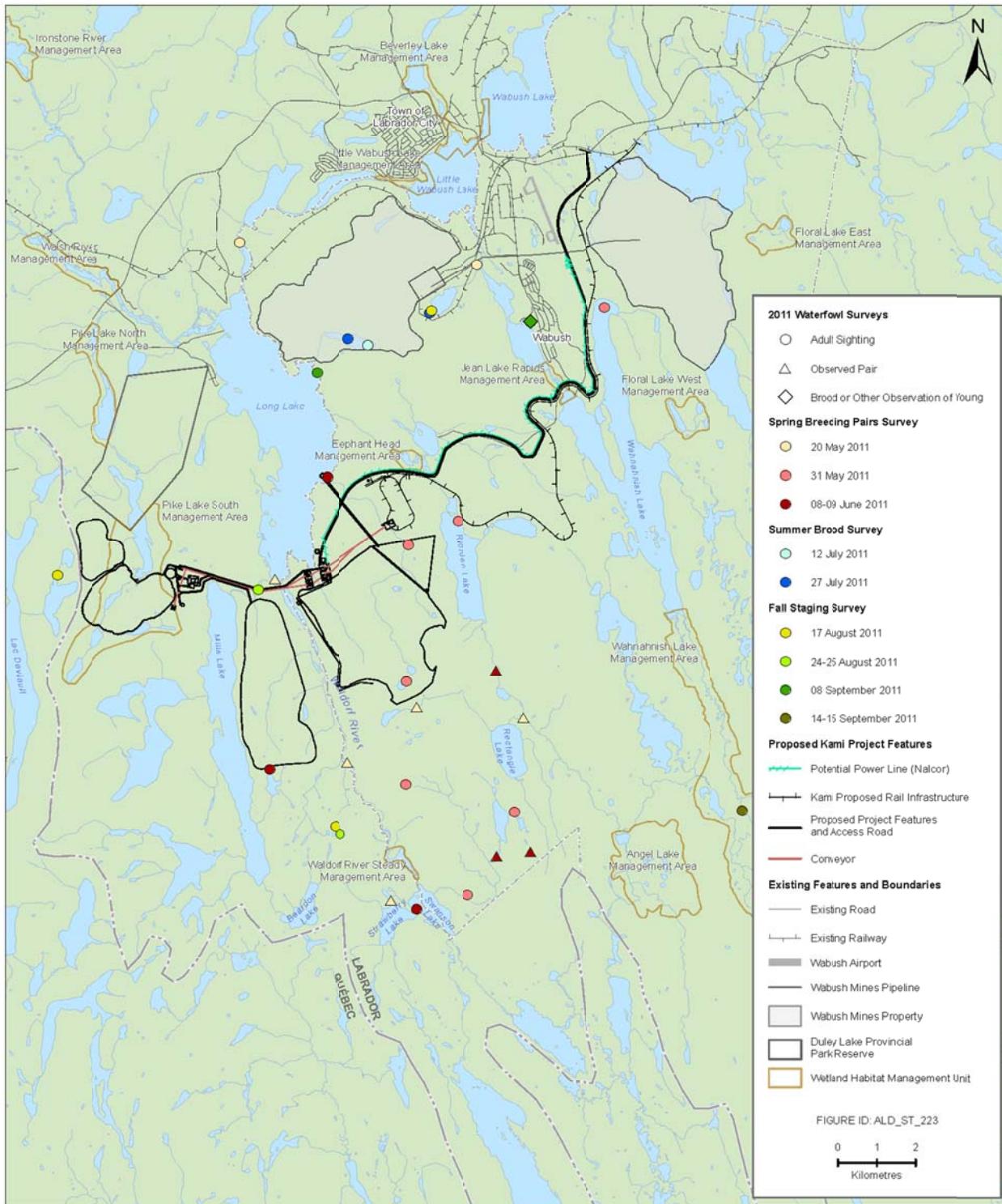
American Black Duck arrived early and used a variety of habitat types within the Study Area. American Black Duck are noted as occurring year round at the Little Wabush Lake Management Unit (i.e., inlet from Harrie Lake at Indian Point) (Town of Labrador City 2010). There were three to ten indicated breeding pairs estimated in the Study Area during the spring surveys (Table 5.2); a maximum of four broods were observed at different sites during the July surveys (Figure 5.13).

#### **5.2.5 Ring-necked Duck**

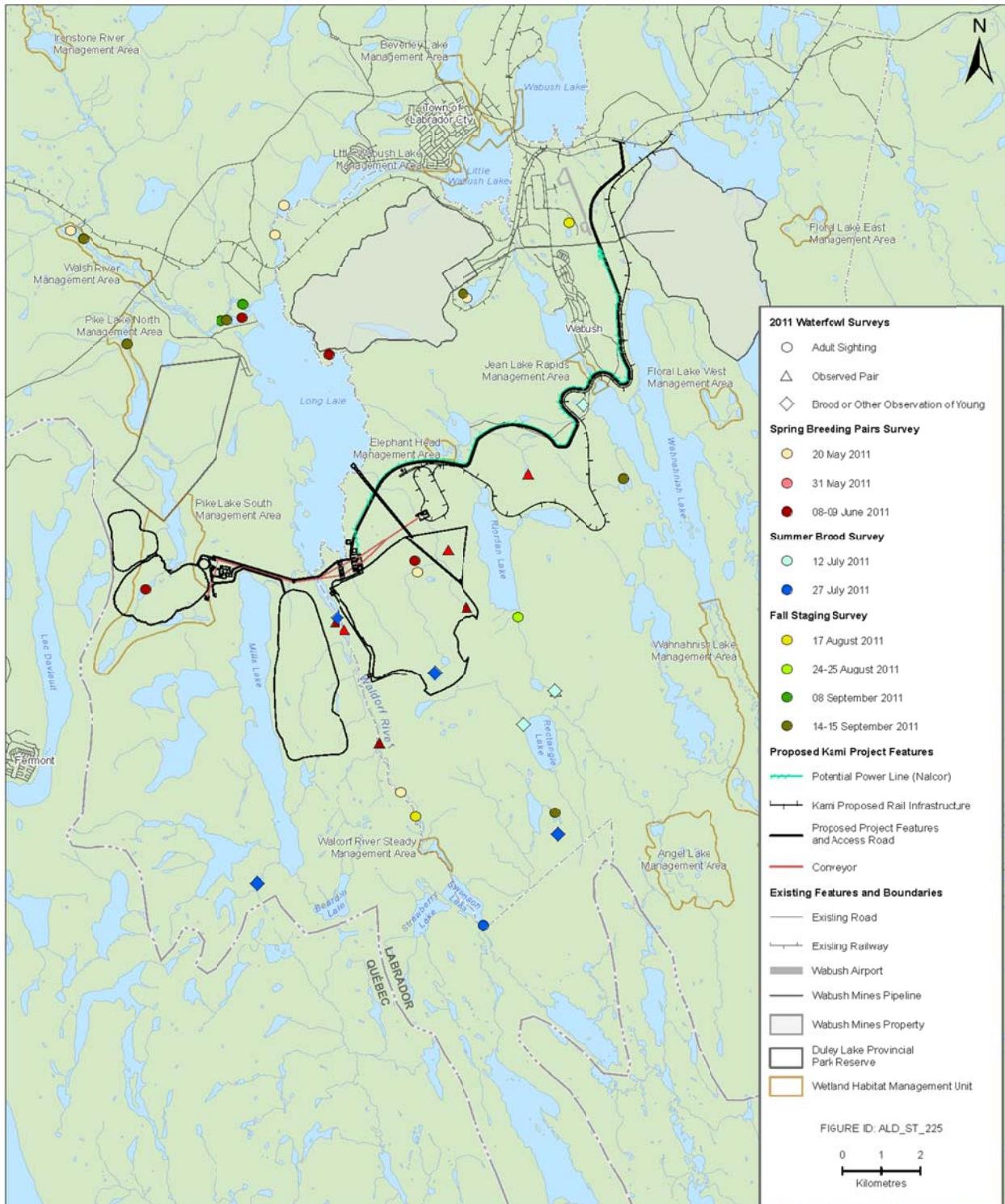
Ring-necked Duck have not been recorded as far north as Labrador, although they do occupy similar habitat just to the south (Hohman and Eberhardt 1998) and have been observed frequently by the Study Team elsewhere in Labrador (Stassino Stantec, unpublished data). Ring-necked Duck are found in low densities in subarctic deltas and in the boreal forest. They breed in shallow freshwater wetlands such as marshes, fens, and bogs with stable water levels, where open water has abundant submerged and floating aquatic plants and fringes consist of emergent sedges interspersed with other herbs and shrubs. Nests are built in floating emergent vegetation within 200 m of open water. Ring-necked Duck feed upon moist soil, aquatic plant seeds and tubers, and aquatic invertebrates. Overall numbers appear to be stable, but since Ring-necked Duck breed in remote and isolated northern wetlands, population status is poorly understood.

Ring-necked Duck arrive in the Study Area late and it is difficult to estimate the number of potential breeding pairs in the Study Area (Table 5.2); only one brood was observed at Wahnanish Lake during the spring surveys, although young were observed near the southern end of Waldorf River and Mills Lake during fall surveys (Figure 5.14).

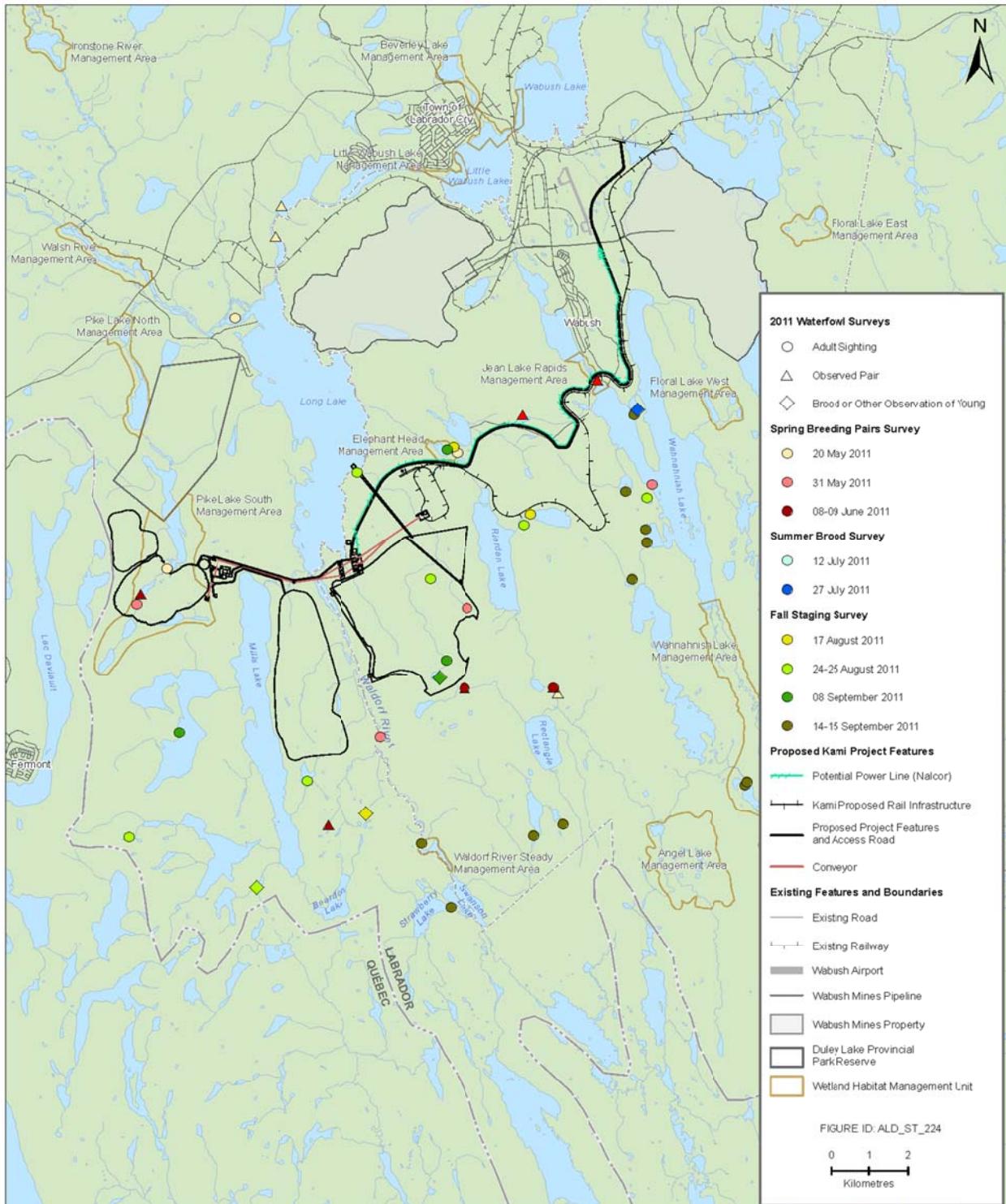
**Figure 5.12 Observations of Canada Goose During 2011 Surveys**



**Figure 5.13 Observations of American Black Duck During 2011 Surveys**



**Figure 5.14 Observations of Ring-necked Duck During 2011 Surveys**



### **5.2.6 Common Loon**

Common Loon are important waterbirds distributed through the Northern Hemisphere in taiga and adjacent southerly tundra habitats. This species is associated with large waterbodies, breeding throughout the boreal forest. They are known to occur in large oligotrophic lakes or wide streams containing fish and surrounded by conifers or mixed forest and rocky shores (McIntyre and Barr 1997). They are opportunistic foragers, feeding mainly on a wide range of live fish (McIntyre and Barr 1997). They nest on the ground on sheltered sides of islands, on rocky outcrops or hummocks, or occasionally on the lee side of lakes or ponds without islands, hidden in vegetative cover. Nest sites are typically found where there is a drop-off in water depth, allowing an underwater approach. Knowledge about Common Loon population status is diffuse and lacking, but their numbers appear to be stable.

Common Loon were widely distributed throughout the Study Area on larger waterbodies, with 24 to 27 indicated breeding pairs estimated during spring surveys (Table 5.2, Figure 5.15). Breeding birds had likely arrived by the June 8 survey, although broods were not observed during July surveys. Young were observed during the fall surveys at Lac Daviault, and around Long Lake, Wahnahnish Lake and Lower Loon Lake (Figure 5.15).

### **5.3 Other Wildlife Observations**

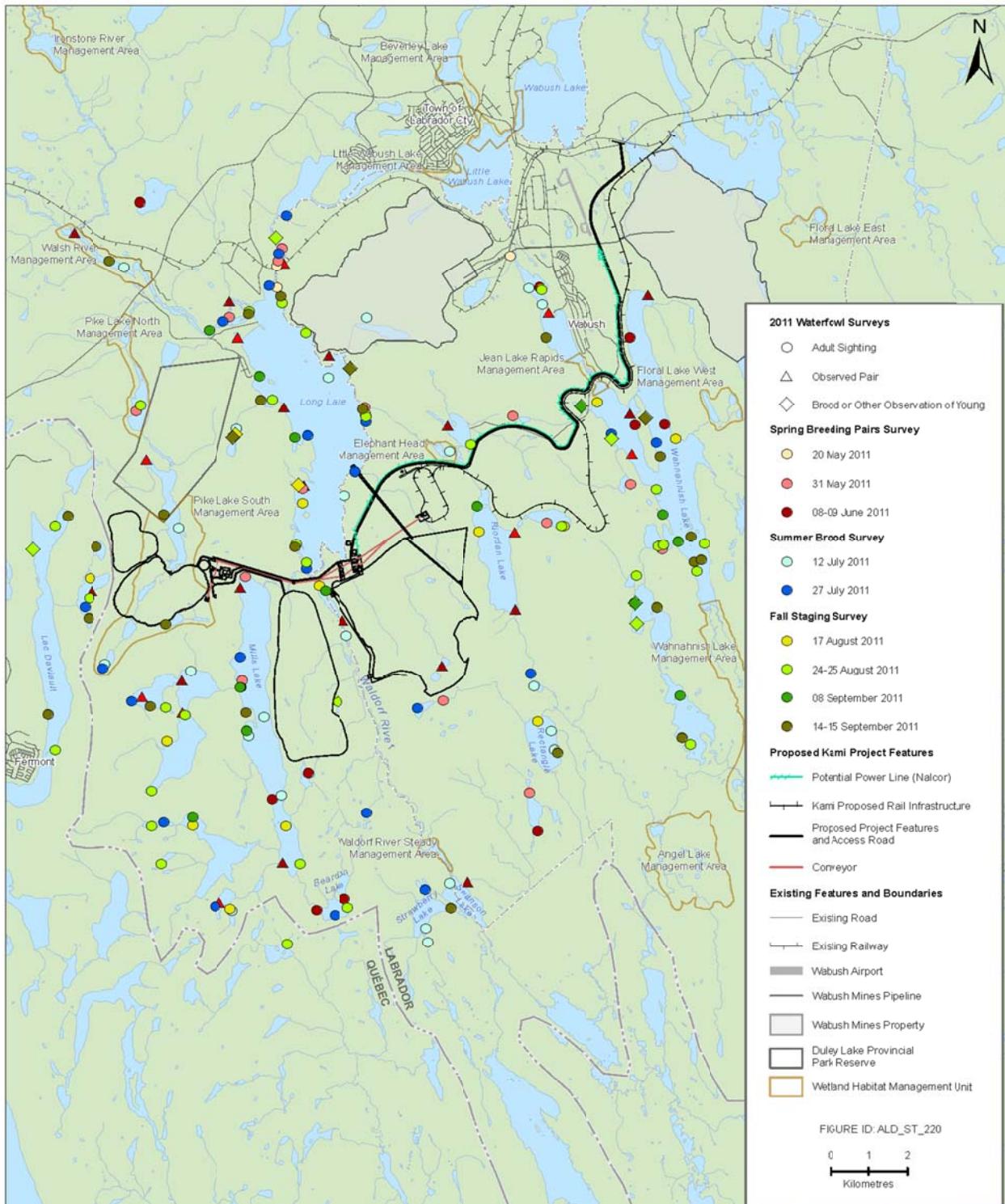
Non-waterfowl species were observed during all nine surveys (Table 5.4; Appendix B). The most abundant shorebird around ponds and lakes was the Spotted Sandpiper. This species arrived and departed late in the Study Area. Spotted Sandpiper are a widespread generalist occurring over most of Canada, including the remote north (Oring et al. 1997). They occupy all habitats near water and feed on a wide variety of terrestrial and aquatic invertebrate animal material. The nest site is on the ground within 300 m of water under or next to herbaceous vegetation. There are no data on population size but numbers appear to be stable.

Greater Yellowlegs were frequently sighted on fens or string bogs on the first survey (May 20) but less so in subsequent surveys, as they likely continued farther north to breed. Wilson's Snipe were seen in similar habitat.

Larger waterbodies accommodated Herring Gull, terns and one record of Great Black-backed Gull. Raptor observations included potential breeding pairs of Bald Eagle and Osprey (Table 5.5) and observations of Red-tailed Hawk, Rough-Legged Hawk, American Kestrel, Northern Harrier, and a Great Horned Owl. Resident Spruce Grouse, Gray Jay, and Common Raven were occasionally seen from the air, as well as migrants including American Robin, other passerines, Northern Flicker, Tree Swallow, Belted Kingfisher, and American Bittern.

Evidence of beaver activity was widespread (e.g., Walsh River, Pike Lake North, Pike Lake South, Waldorf River) in the form of lodges, dams, and observations of animals. Moose were sighted on three occasions (i.e., 31 May survey east of Waldorf River, September 8 survey at Pike Lake South, September 14-15 survey south of Rectangle Lake) over the nine surveys, including one female and calf.

**Figure 5.15 Observations of Common Loon During 2011 Surveys**



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**Table 5.4 Codes and Names of Other Wildlife observed during 2011 Surveys**

AOU Abbreviation	Species	Scientific name
<b>Birds</b>		
AMBI	American Bittern	<i>Botaurus lentiginosus</i>
AMKE	American Kestrel	<i>Falco sparverius</i>
AMRO	American Robin	<i>Turdus migratorius</i>
BAEA	Bald Eagle	<i>Haliaeetus leucocephalus</i>
BEKI	Belted Kingfisher	<i>Megaceryle alcyon</i>
CORA	Common Raven	<i>Corvus corax</i>
COTE	Common Tern	<i>Sterna hirundo</i>
GBBG	Great Black-backed Gull	<i>Larus marinus</i>
GHOW	Great Horned Owl	<i>Bubo virginianus</i>
GRAJ	Gray Jay	<i>Perisoreus canadensis</i>
GRYE	Greater Yellowlegs	<i>Tringa melanoleuca</i>
HERG	Herring Gull	<i>Larus argentatus</i>
NOHA	Northern Harrier	<i>Circus cyaneus</i>
NOFL	Northern Flicker	<i>Colaptes auratus</i>
OSPR	Osprey	<i>Pandion haliaetus</i>
RLHA	Rough-legged Hawk	<i>Buteo lagopus</i>
RTHA	Red-tailed Hawk	<i>Buteo jamaicensis</i>
SPGR	Spruce Grouse	<i>Falculipennis canadensis</i>
SPSA	Spotted Sandpiper	<i>Actitis macularia</i>
TERN	either of Common or Arctic Tern species	
TRES	Tree Swallow	<i>Tachycineta bicolor</i>
WISN	Wilson's Snipe	<i>Gallinago delicata</i>
<b>Mammals</b>		
	Beaver	<i>Castor canadensis</i>
	Moose	<i>Alces alces</i>

**Table 5.5 Summary of Other Avifauna Observation by Survey during 2011**

Survey Date	20 May	31 May	8-9 June	12 July	27 July	17 August	24-25 August	8 September	14-15 September
SPSA	-	11	3	-		13	14	6	9
Sandpipers			27	18	13				
GRYE	16	1	4	1	3	9	2	1	-
HERG	47	108	14	3	11	22	19	6	3
OSPR	-	4	2	2	5	4	4	2	8
BAEA	2	1	1	-	-	1	2	3	3

Notes: Other incidental species observed less consistently included Great Horned Owl, terns, Rough-legged Hawk, Northern Harrier, American Kestrel, Spruce Grouse, and Wilson's Snipe.

## **6.0 SUMMARY**

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### **6.1 Spatial and Temporal Abundance and Distribution of Waterfowl**

The spring staging and breeding pair surveys documented the arrival of migratory waterfowl preparing to breed, as well as several early breeders. On May 20, birds were concentrated in the few areas of open water (or ashkui) that were important for early migrants. The greatest waterfowl activity (number of observations) during the first survey occurred along the Waldorf River, at Walsh River, and in shallow wetland areas east of Rectangle Lake. The most common species in May were Common Goldeneye and Common Merganser, with Greater Scaup observed on the periphery of larger waterbodies. Isolated pairs of American Black Duck and Ring-necked Duck were found in small wetlands, and Canada Goose and Green-winged Teal at fens. Most of the Study Area remained covered in ice at this time and was not being used by waterfowl. The Habitat Conservation Plan for Labrador City indicates that the Wabush Narrows Management Unit may have several hundred waterfowl in late April given its open water status at that time (Town of Labrador City 2010).

Once all waterways, waterbodies and wetlands were free of ice, waterfowl were observed throughout the Study Area in their respective preferred habitats. The number of waterfowl sightings increased (during the three spring staging and breeding pair surveys) as these birds dispersed on the landscape. There were no specific areas that had a particularly high frequency of use for breeding or fall staging. Importance of the wetland habitats to waterfowl breeding activity became evident as the migrants found their final breeding locations.

Beginning in July, there was ample evidence of breeding activity among waterfowl in the Study Area. Breeding activity became apparent as groups broke up into male-female pairs, which behaved territorially as the pairs isolated themselves in the vicinity of a nest site selected by the female. Meaningful occupation of habitat in the Study Area occurred as the waterfowl attempted to breed there.

As a female lays her eggs, and particularly when she begins to incubate them, she spends less time with her mate, who may provide the only evidence that they are present in an area. The ultimate indication of breeding success is the appearance of young with the territorial female. Waterfowl at this time are dependent on a site for the food, water, and cover.

Estimates of numbers of breeding birds occupying the Study Area are provided in Table 5.2, and the sites where brood and young were later observed are mapped in Figures 5.4 to 5.9. Breeding species included Common Merganser, Common Goldeneye, Canada Goose, Ring-necked Duck, American Black Duck, Green-winged Teal, Greater Scaup, Osprey, and Common Loon. Common Merganser were apparently the most productive, seen in large broods (crêches) staying well into September.

Throughout the surveys, there was evidence of waterfowl use wherever potential habitat (whether open water in spring or wetland habitat for breeding) existed throughout the Study Area. For staging in fall, such areas were not as important because of the extensive area of

open water available to migrants. As waters froze, this often became the final push sending birds south for the winter.

## **6.2 Other Considerations**

The discrepancy in numbers of total observations per survey may have been influenced by weather conditions differing between the surveys, especially high winds, which reduce helicopter maneuverability and produce waves on the lakes, reducing visibility of the waterfowl. There was an apparent relationship between the windy conditions associated with surveys of July 12, August 17, and September 8 and the low numbers of sightings on these dates.

The difference between the estimate of 22 breeding pairs of Common Loon (Table 5.2) and the number of successful broods (four to six young) may be a result of either an overestimation of breeders with prospecting immature birds, or a product of pairs withholding egg laying for an unknown reason, or their having lost eggs or young to predation. For Common Loon, the delay before maturity when females first lay eggs is poorly understood and may be as long as seven years (McIntyre and Barr 1997). Canada Goose, Common Merganser, Red-breasted Merganser, scoters, and Common Loon do not begin to breed until they are at least two years of age (year 3) (McIntyre and Barr 1997; Mallory and Metz 1999; Titman 1999; Mowbray et al. 2002).

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## **APPENDIX A**

Table Summaries of Observations by Survey

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**STASSINU STANTEC LIMITED PARTNERSHIP**  
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**Table A1 Summary of Waterfowl and Other Wildlife Observations - 20 May 2011**

Species	# of Sightings	Single Male	Female	Pairs	Number in Flocks	# of Animals
<b>Waterfowl</b>						
COGO	20	6	-	12	18	46
COME	16	2	1	9	18	37
CAGO	8	2	-	5	-	12
ABDU	7	4	-	1	7	13
RNDU	6	2	-	3	2	10
GRSC	11	1	-	5	45	56
GWTE	4	1	-	3	-	7
NOPI	1	-	-	1	-	2
SUSC	3	-	-	-	28	28
RBME	1	1	-	-	-	1
<b>Total</b>	<b>77</b>	<b>19</b>	<b>1</b>	<b>44</b>	<b>106</b>	<b>212</b>
<b>Other Wildlife</b>						
GRYE	11	6	-	5	-	16
COLO	3	3	-	-	-	3
HERG	5	3	-	-	44	47
GBBG	1	1	-	-	-	1
AMRO	5	4	-	-	3	7
WISN	2	2	-	-	-	2
CORA	2	-	-	1	-	3
BAEA	1	-	-	1	-	2
RTHA	2	-	-	-	-	2
Passerines	3	-	-	-	40	40
Beaver sign	4	-	-	-	-	-
Old Stick Nest	1	-	-	-	-	-
<b>Total</b>	<b>40</b>	<b>19</b>	<b>2</b>	<b>7</b>	<b>87</b>	<b>123</b>

**STASSINU STANTEC LIMITED PARTNERSHIP**

WATERFOWL SURVEY | KAMI IRON ORE MINE AND RAIL INFRASTRUCTURE PROJECT

**Table A2      Summary of Waterfowl and Other Wildlife Observations - 31 May 2011**

Species	# of Sightings	Single Male	Female	Pairs	Number in Flocks	# of Animals
<b>Waterfowl</b>						
COGO	14	2	-	4	38	48
COME	26	9	1	11	21	53
CAGO	7	3	4 on nests	-	-	7
ABDU	3	-	-	3	-	6
RNDU	6	2	-	1	11	15
GRSC	2	1	-	1	-	3
GWTE	1	-	-	1	-	2
NOPI	1	-	1	-	-	1
SUSC	5	1	-	-	25	26
BLSC	1	-	-	-	7	7
RBME	2	1	-	-	7	8
Unidentified	1	-	-	-	-	1
<b>Total</b>	<b>69</b>	<b>19</b>	<b>5</b>	<b>21</b>	<b>109</b>	<b>177</b>
<b>Other Wildlife</b>						
GRYE	1	1	-	-	-	1
COLO	24	13	1	10	-	34
HERG	7	2	-	2	100	108
CORA	1	-	-	-	-	1
AMRO	1	1	-	-	-	1
OSPR	3	1	1 on nest	1 at nest	-	4
BAEA	1	1 immature	-	-	-	1
SPSA	10	1	-	1	-	11
Passerines	2	-	-	-	-	2
Beaver sign	18	-	-	-	-	-
Muskrat Lodges	1	-	-	-	-	-
Moose	1	1	-	-	-	1
Wolf	Den, tracks	-	-	-	-	-
Red Fox	1	-	-	-	-	-
<b>Total</b>	<b>71</b>	<b>21</b>	<b>2</b>	<b>14</b>	<b>100</b>	<b>164</b>

**STASSINU STANTEC LIMITED PARTNERSHIP**  
WATERFOWL SURVEY | KAMI IRON ORE MINE AND RAIL INFRASTRUCTURE PROJECT

**Table A3 Summary of Waterfowl and Other Wildlife Observations - 8-9 June 2011**

Species	# of Sightings	Single Male	Female	Pairs	Number in Flocks	# of Animals
<b>Waterfowl</b>						
COGO	13	4	1	3	20	31
COME	26	11	3	8	14	44
CAGO	6	2	-	3	-	9
ABDU	7	2	1	3	4	13
RNDU	5	-	-	2	12	16
GRSC	2	-	-	1	10	12
GWTE	1	1	-	-	-	1
SUSC	4	3	-	-	3	6
BLSC	1	-	-	-	4	4
RBME	4	-	-	4	-	8
HOME	1	-	-	1	-	2
MALL	2	1	-	-	2	3
Unidentified	1		-	-	-	1
<b>Total</b>	<b>73</b>	<b>24</b>	<b>5</b>	<b>25</b>	<b>69</b>	<b>150</b>
<b>Other Wildlife</b>						
GRYE	3	1	-	1	-	4
COLO	27	10	-	17	-	44
HERG	8	3	1 on nest	2	6	14
COTE	3	3	-	-	-	3
WISN	1	-	-	1	-	2
RTHA	2	2	-	-	-	2
OSPR	3	1	1 on nest 1 inactive nest	-	-	2
BAEA	1	1	-	-	-	1
SPSA	2	1		1		3
Sandpiper <sup>1</sup>	12	1	-	2	18	27
Passerines	1	-	-	-	3	3
Beaver sign	7 plus 1 animal	-	-	-	-	-
<b>Total</b>	<b>71</b>	<b>24</b>	<b>2</b>	<b>24</b>	<b>27</b>	<b>105</b>

**STASSINU STANTEC LIMITED PARTNERSHIP**  
WATERFOWL SURVEY | KAMI IRON ORE MINE AND RAIL INFRASTRUCTURE PROJECT

**Table A4 Summary of Waterfowl and Other Wildlife Observations - 12 July 2011**

Species	# of Sightings	Broods Observed	Pairs	Young	Number in Flocks	# of Animals
<b>Waterfowl</b>						
MERG <sup>1</sup>	16	3	2	8	11	34
CAGO	1	-	-	-	4	4
ABDU	3	3	-	21	-	24
Scaup sp.	1	-	-	-	10	10
Unidentified	1	-	-	-	-	1
<b>Total</b>	<b>22</b>	<b>6</b>	<b>2</b>	<b>29</b>	<b>25</b>	<b>74</b>
<b>Other Wildlife</b>						
GRYE	1	1	-	-	-	1
COLO	22	-	3	-	4	28
Sandpiper <sup>2</sup>	14	-	2	-	3	18
HERG	2	1	-	2	-	3
gull sp.	13	-	3	-	8	22
TERN	1	-	-	-	2	2
RLHA	1	-	-	-	-	1
OSPR	2	-	-	-	-	2
TRES	5	-	-	-	3	7
Beaver sign	6	-	-	-	-	-
<b>Total</b>	<b>67</b>	<b>2</b>	<b>8</b>	<b>2</b>	<b>20</b>	<b>84</b>

<sup>1</sup> Likely COME   <sup>2</sup> Likely SPSA

**Table A5 Summary of Waterfowl and Other Wildlife Observations - 27 July 2011**

Species	# of Sightings	Broods Observed	Pairs	Young	Number in Flocks	# of Animals
<b>Waterfowl</b>						
COGO	4	3	-	24	-	29
MERG <sup>1</sup>	14	4	2	30	6	51
CAGO	2	-	-	-	13	13
ABDU	5	4	-	15	-	20
RNDU	1	1	-	4	-	5
GWTE	1	1	-	6	-	7
Unidentified	1	-	-	-	-	1
<b>Total</b>	<b>33</b>	<b>13</b>	<b>2</b>	<b>79</b>	<b>19</b>	<b>126</b>
<b>Other Wildlife</b>						
AMBI	1	-	-	-	-	1
GRYE	2	-	1	-	-	3
COLO	21	-	5	-	-	26
Sandpiper <sup>2</sup>	12	11	1	-	-	13
HERG	5	1	-	2	6	11
COTE	4	-	-	-	10	11
OSPR	4	1	-	1 on nest	-	5
SPGR	1	-	-	-	-	1
TRES	2	1	1	-	-	3
NOFL	1	-	-	-	-	1
CORA	1	-	-	-	-	1
Beaver sign	10	-	-	-	-	-
<b>Total</b>	<b>64</b>	<b>14</b>	<b>8</b>	<b>3</b>	<b>16</b>	<b>76</b>

<sup>1</sup> Likely COME   <sup>2</sup> Likely SPSA

**STASSINU STANTEC LIMITED PARTNERSHIP**

WATERFOWL SURVEY | KAMI IRON ORE MINE AND RAIL INFRASTRUCTURE PROJECT

**Table A6 Summary of Waterfowl and Other Wildlife Observations - 17 August 2011**

Species	# of Sightings	Female	Male	Pairs	Young	Number in Flocks	# of Animals
<b>Waterfowl</b>							
COGO	3	1	-	-	6	-	7
COME	6	7	-	-	40	4	51
CAGO	3	-	-	1	-	18	20
ABDU	2	-	-	-	-	9	9
RNDU	3	-	-	1	2	8	12
GRSC	1	1	-	-	-	-	1
GWTE	1	1	-	-	5	-	6
Unidentified	2	-	-	-	-	2	3
<b>Total</b>	<b>21</b>	<b>10</b>	<b>-</b>	<b>2</b>	<b>53</b>	<b>41</b>	<b>109</b>
<b>Other Wildlife</b>							
GRYE	6	4	-	1	-	3	9
COLO	15	8	3	4	2	-	20
SPSA	12	9	2	1	-	-	13
HERG	10	3	4	5	-	8	22
TERN	2	1	-	-	-	3	4
OSPR	3	1	1	1	-	-	4
BAEA	1	1	-	-	-	-	1
AMBI	1	1	-	-	-	-	1
GHOW	1	1	-	-	-	-	1
Beaver sign	9	-	-	-	-	-	-
<b>Total</b>	<b>60</b>	<b>29</b>	<b>10</b>	<b>11</b>	<b>2</b>	<b>14</b>	<b>75</b>

**STASSINU STANTEC LIMITED PARTNERSHIP**  
 WATERFOWL SURVEY | KAMI IRON ORE MINE AND RAIL INFRASTRUCTURE PROJECT

**Table A7      Summary of Waterfowl and Other Wildlife Observations -  
 24-25 August 2011**

Species	# of Sightings	Female	Male	Pairs	Young	Number in Flocks	# of Animals
<b>Waterfowl</b>							
COGO	3	-	-	-	12	9	21
COME	5	2	-	-	31	9	42
CAGO	2	-	-	1	-	5	7
ABDU	1	-	-	-	-	3	3
RNDU	7	1	-	1	1	4	8
GRSC	4	1	1	1	4	2	10
GWTE	1	-	-	1	-	-	2
MALL	1	-	-	-	-	3	3
Unidentified	1	-	-	-	-	-	1
<b>Total</b>	<b>25</b>	<b>4</b>	<b>1</b>	<b>4</b>	<b>48</b>	<b>35</b>	<b>97</b>
<b>Other Wildlife</b>							
GRYE	2	-	-	-	-	-	2
COLO	34	2	1	9	4	23	49
SPSA	13	-	3	-	-	11	14
HERG	11	-	3	-	-	14	18
TERN	2	-	-	-	-	6	6
OSPR	4	-	-	-	-	-	4
BAEA	2		1	-	-	-	2
BEKI	1	-	1	-	-	-	1
<b>Total</b>	<b>69</b>	<b>2</b>	<b>9</b>	<b>9</b>	<b>4</b>	<b>54</b>	<b>96</b>

**STASSINU STANTEC LIMITED PARTNERSHIP**

WATERFOWL SURVEY | KAMI IRON ORE MINE AND RAIL INFRASTRUCTURE PROJECT

**Table A8 Summary of Waterfowl and Other Wildlife Observations - 8 September 2011**

Species	# of Sightings	Female	Male	Pairs	Young	Number in Flocks	# of Animals
<b>Waterfowl</b>							
COGO	5	-	-	2	-	8	12
COME	3	2	1	-	13	21	37
CAGO	2	-	-	-	3	12	15
ABDU	2	-	1	-	-	2	3
RNDU	4	-	3	-	1	-	4
GRSC	1	-	-	-	-	4	4
GWTE	1	-	-	1	5	-	7
HOME	1	-	-	-	-	7	7
Unidentified	3	-	-	-	-	-	3
<b>Total</b>	<b>20</b>	<b>2</b>	<b>5</b>	<b>3</b>	<b>22</b>	<b>54</b>	<b>92</b>
<b>Other Wildlife</b>							
GRYE	1	-	1	-	-	-	1
COLO	13	-	10	3	2	-	18
SPSA	5	-	4	-	-	2	6
HERG	4	3	-	-	-	3	6
OSPR	3	1	1	-	-	-	2
BAEA	3	2	-	-	1	-	3
RTHA	1	-	1	-	-	-	1
BEKI	1	-	-	-	-	-	1
GRAJ	1	-	-	-	-	-	1
CORA	1	-	1	-	-	-	1
Moose	1 in water	-	-	-	-	-	-
Beaver sign	4	-	-	-	-	-	-
<b>Total</b>	<b>38</b>	<b>6</b>	<b>18</b>	<b>3</b>	<b>3</b>	<b>5</b>	<b>40</b>

**STASSINU STANTEC LIMITED PARTNERSHIP**

WATERFOWL SURVEY | KAMI IRON ORE MINE AND RAIL INFRASTRUCTURE PROJECT

**Table A9 Summary of Waterfowl and Other Wildlife Observations - 14-15 September 2011**

Species	# of Sightings	Female	Male	Pairs	Young	Number in Flocks	# of Animals
<b>Waterfowl</b>							
COGO	10	2	3	-	5	17	27
COME	17	1	5	-	25	55	87
CAGO	2	-	-	-	-	17	17
ABDU	6	-	2	1	-	14	18
RNDU	11	-	3	2	-	20	27
LESC	1	-	-	-	-	3	3
GWTE	2	-	1	-	-	2	3
SUSC	2	-	1	-	-	3	4
BLSC	1	-	1	-	-	-	1
Unidentified	5	-	-	-	-	3	7
<b>Total</b>	<b>57</b>	<b>3</b>	<b>16</b>	<b>3</b>	<b>30</b>	<b>134</b>	<b>194</b>
<b>Other Wildlife</b>							
COLO	27	13	-	13	3	3	45
SPSA	8	-	-	-	-	-	9
HERG	2	-	1	-	-	2	3
OSPR	7	-	-	-	2	-	8
BAEA	2	-	3	-	-	-	3
RTHA	2	-	2	-	-	-	2
NOHA	1	-	1	-	-	-	1
AMKE	2	-	-	-	-	-	2
WISN	1	-	-	1	-	-	2
SPGR	1	1	-	-	-	-	1
Woodpecker <sup>1</sup>	1	-	-	-	-	-	1
Beaver	8	-	-	-	-	-	-
Beaver sign	3	-	-	-	-	-	-
Moose	1 adult female with calf	1	-	-	1	-	-
<b>Total</b>	<b>65</b>	<b>15</b>	<b>7</b>	<b>14</b>	<b>6</b>	<b>5</b>	<b>76</b>

<sup>1</sup> Likely NOFL

**STASSINU STANTEC LIMITED PARTNERSHIP**

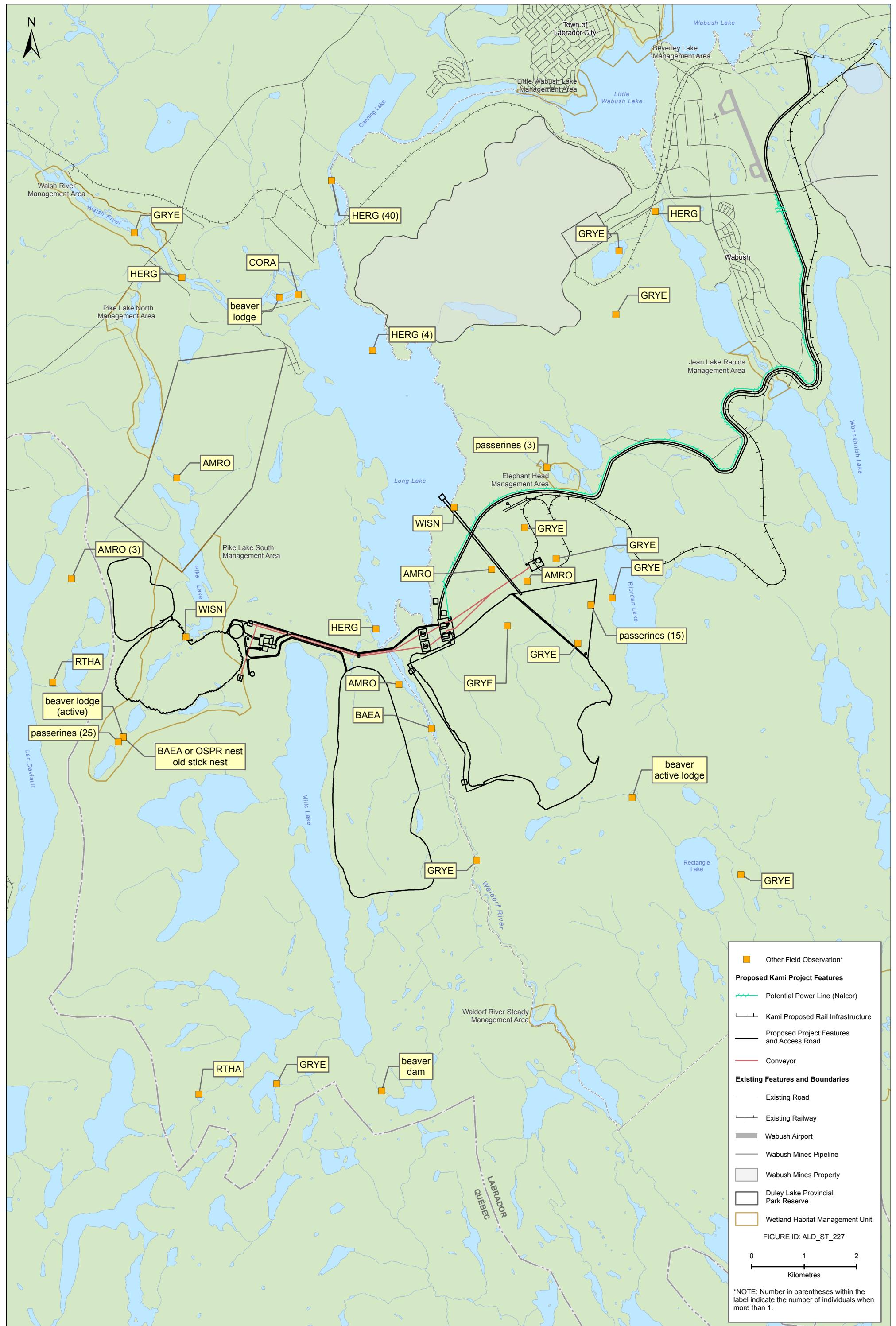
WATERFOWL SURVEY | KAMI IRON ORE MINE AND RAIL INFRASTRUCTURE PROJECT

## **APPENDIX B**

Figure Summaries of Other Wildlife Observations by Survey

**STASSINU STANTEC LIMITED PARTNERSHIP**

WATERFOWL SURVEY | KAMI IRON ORE MINE AND RAIL INFRASTRUCTURE PROJECT

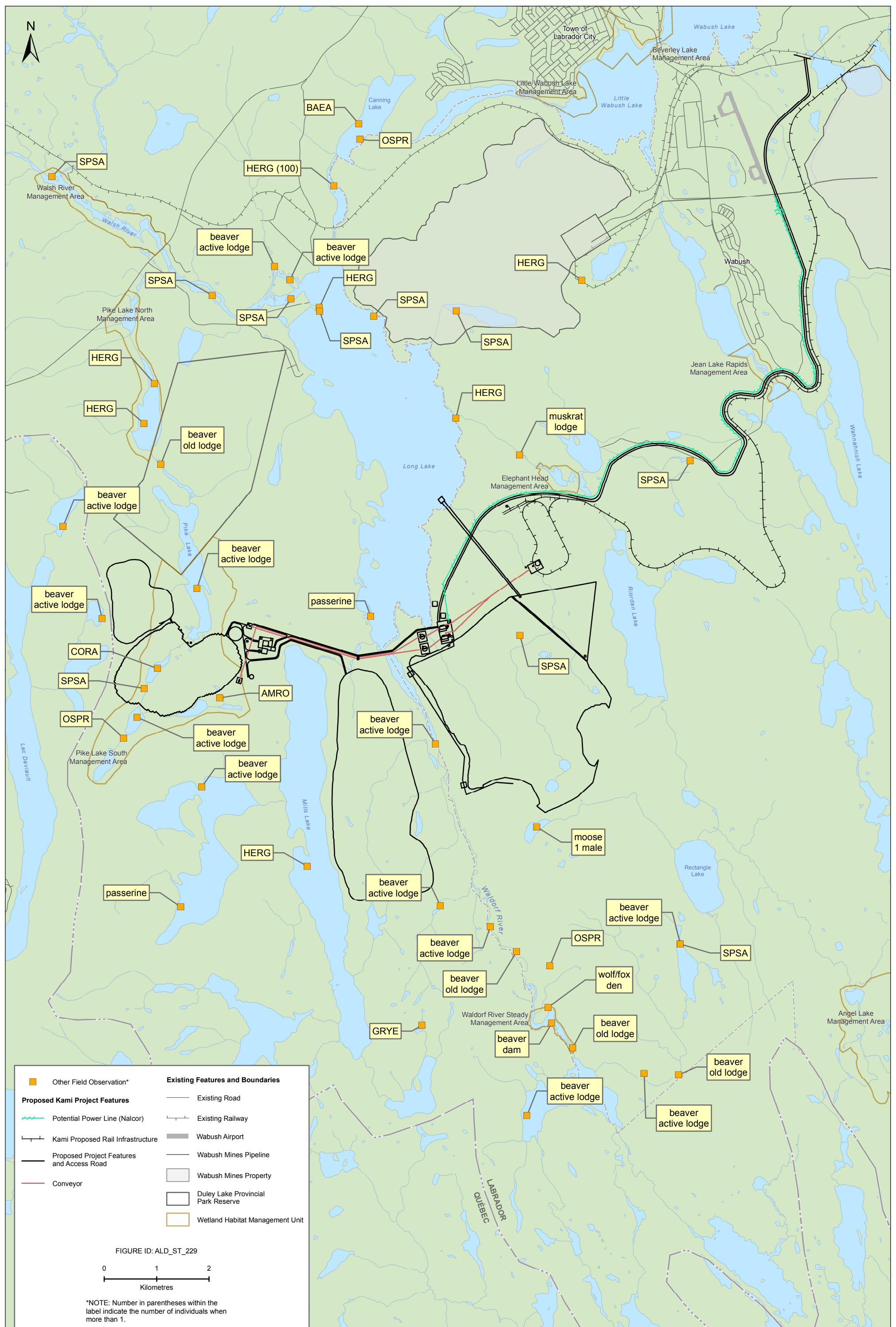


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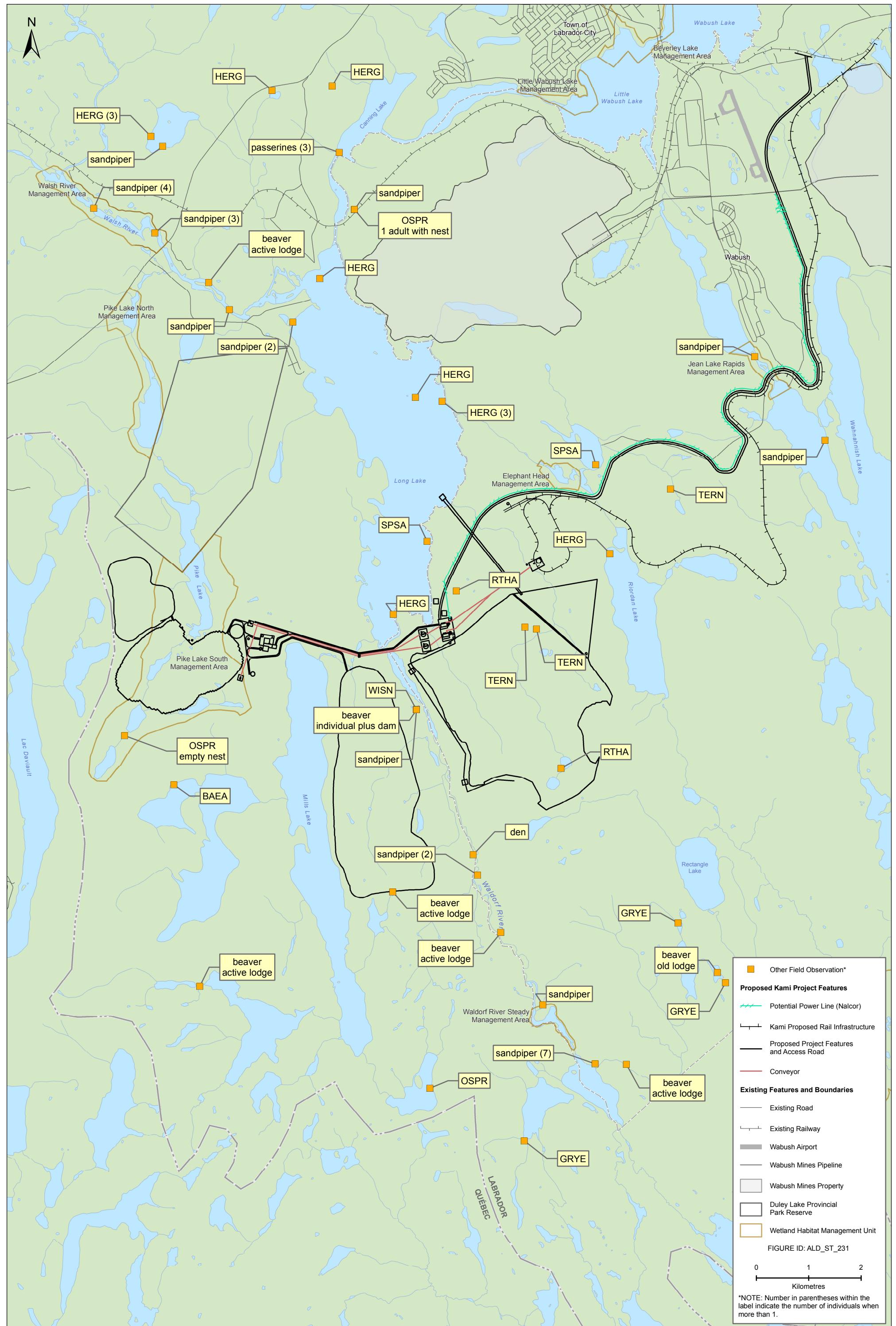
ALBERON IRON ORE CORP.

OTHER FIELD OBSERVATIONS SURVEY 1 20 MAY 2011



ALDERON IRON ORE CORP.

OTHER FIELD OBSERVATIONS - SURVEY 2 - 31 MAY 2011

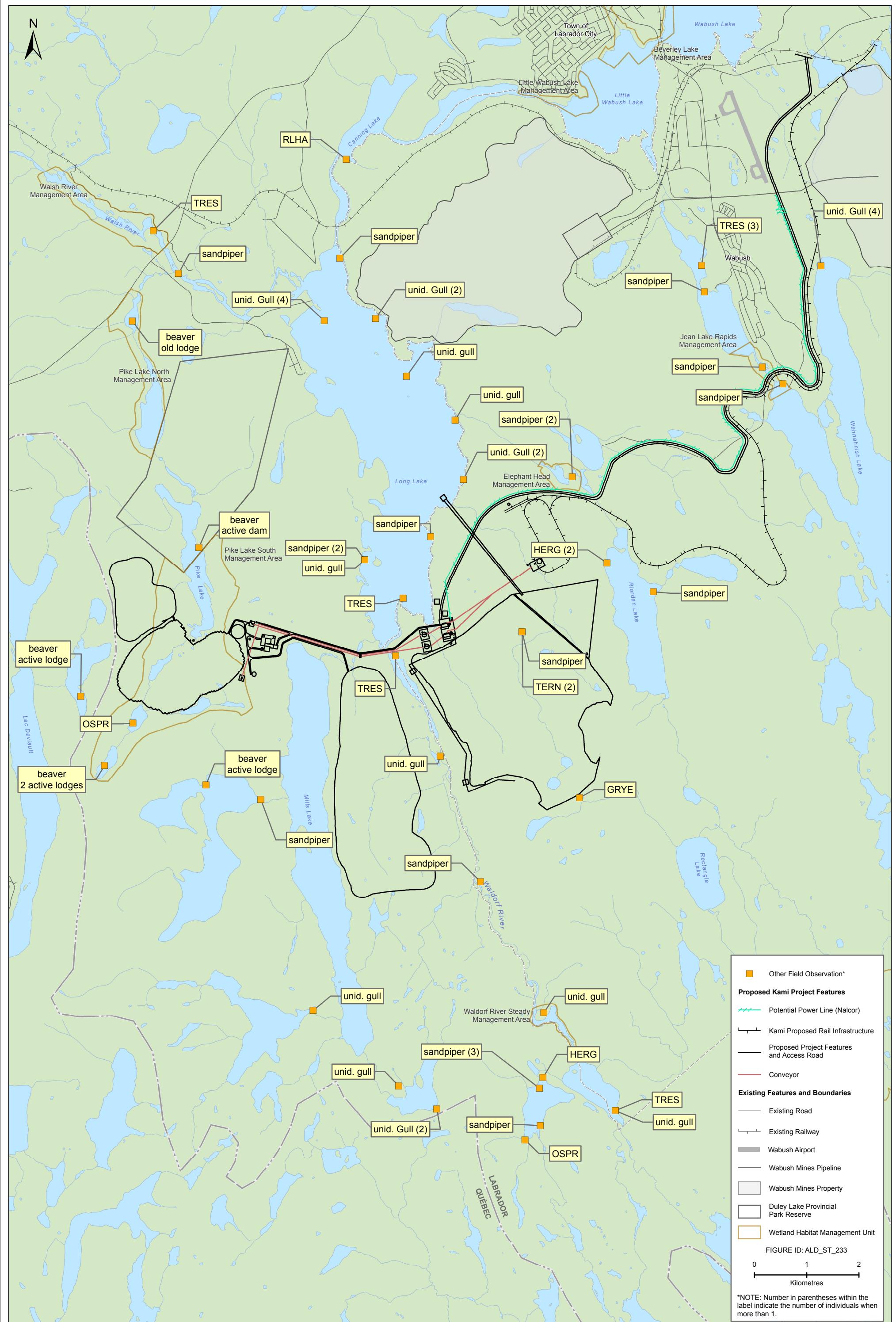


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ALDERON IRON ORE CORP.

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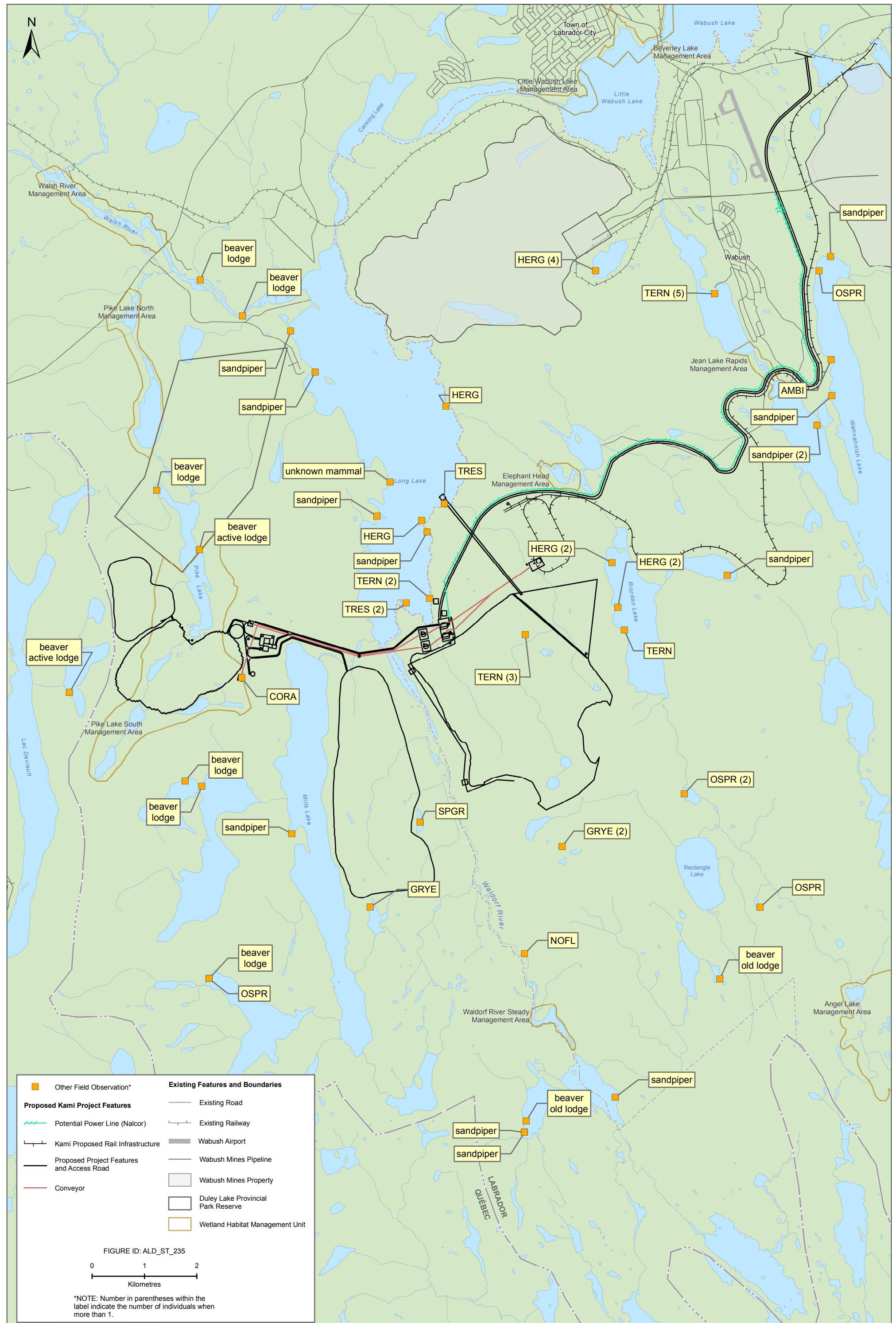
OTHER FIELD OBSERVATIONS - SURVEY 3 - 08-09 JUNE 2011



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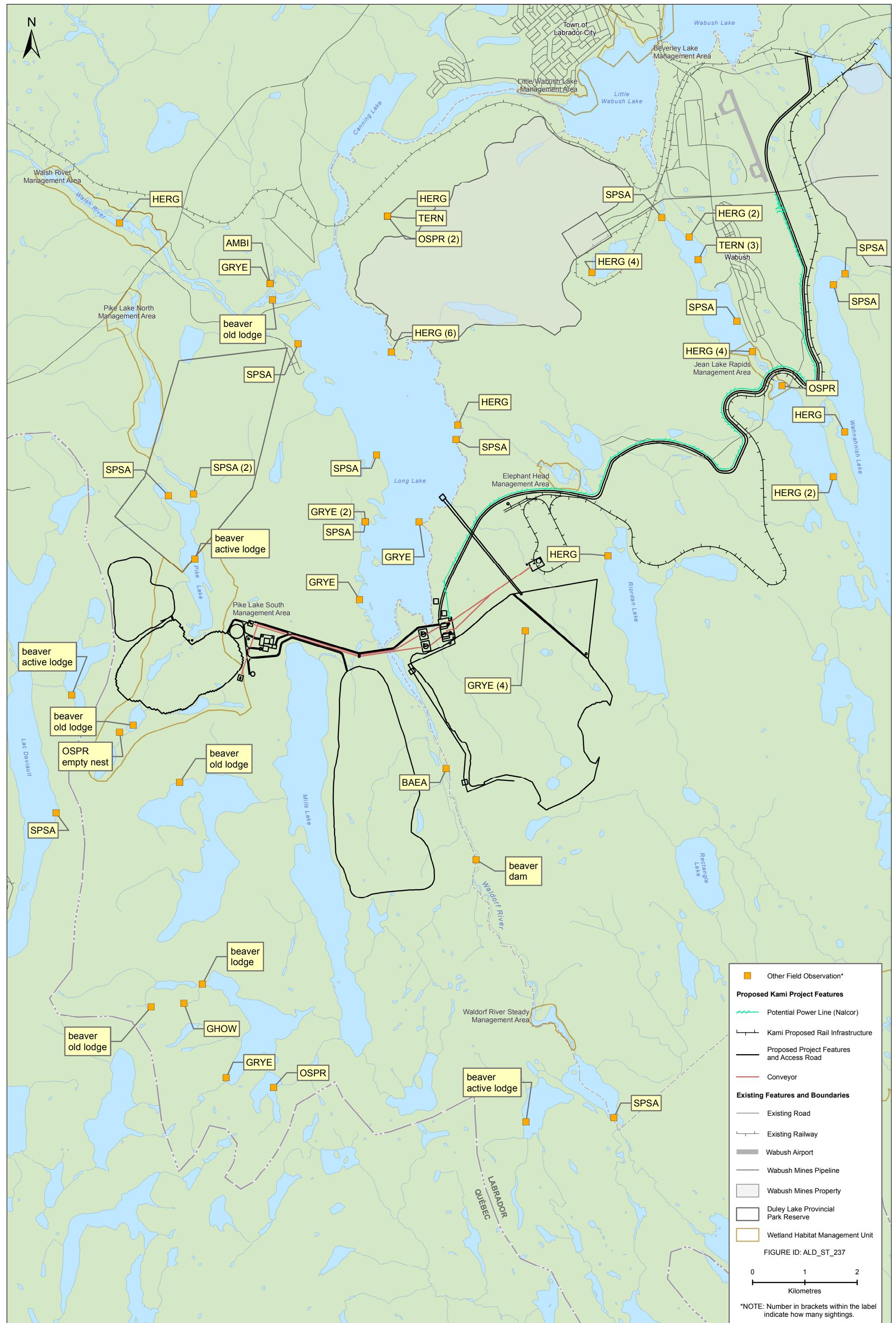
11月高中物理月考试卷及答案

OTHER FIELD OBSERVATIONS SURVEY 4 12 JULY 2011



ALDERON IRON ORE CORP.

OTHER FIELD OBSERVATIONS - SURVEY 5 - 27 JULY 2011



CLIENT:

ALDERON IRON ORE CORP.

DRAWING TITLE:

OTHER FIELD OBSERVATIONS - SURVEY 6 - 17 AUGUST 2011