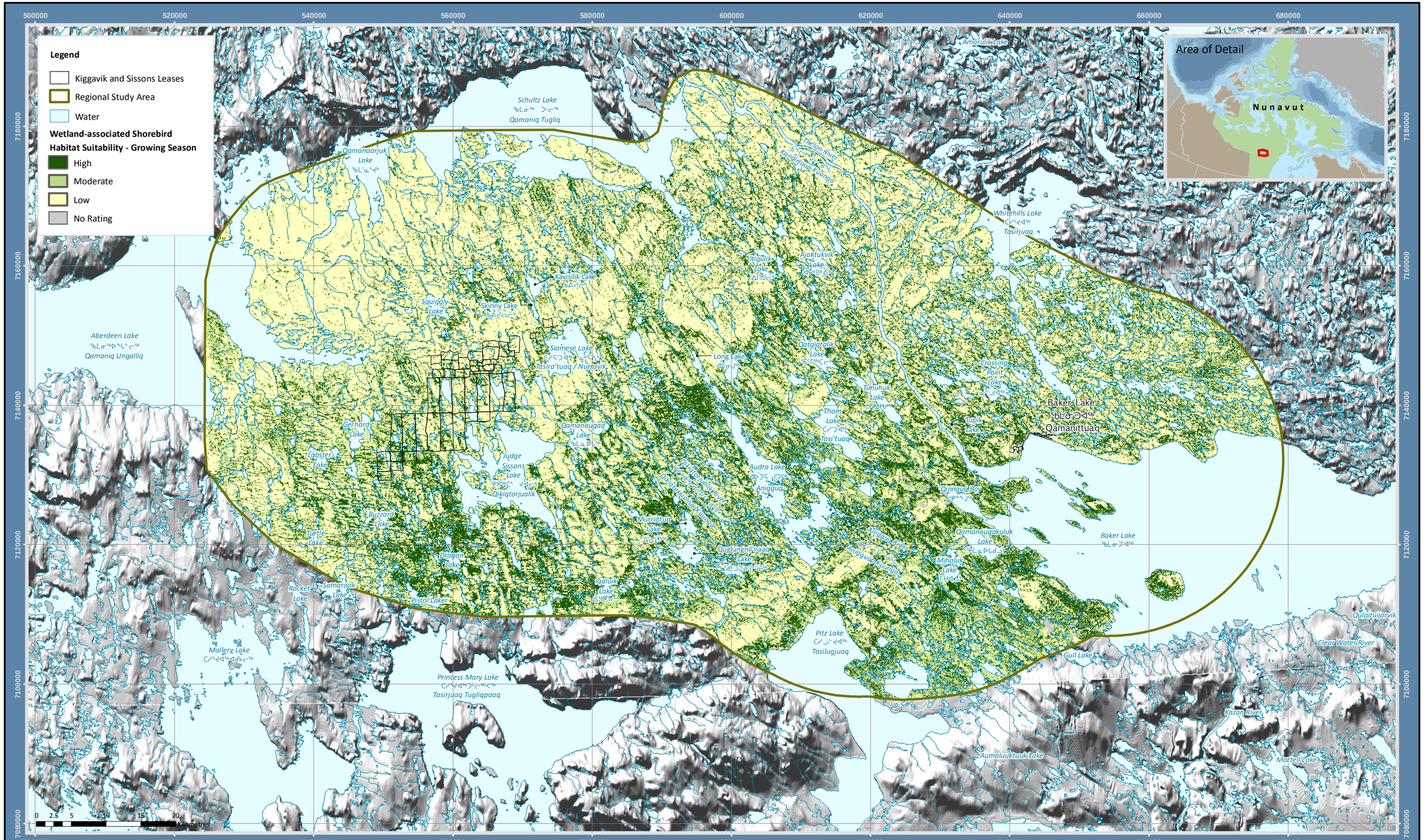


Projection: NAD 1983 UTM Zone 14N
Creator: CASLYS CONSULTING LTD.
Date: 05/30/2014 Scale: 1:500,000
File: 5.5-9_Wetland_Shorebird_Habitat_Suitability_Growing.mxd
Data Sources: Natural Resources Canada, GeoBase®, National Topographic Database, AREVA Resources Canada Inc., Gov't of Nunavut, and Gebauer & Associates.

FIGURE 5.5-9
WETLAND-ASSOCIATED SHOREBIRD HABITAT SUITABILITY - GROWING SEASON

KIGGAVIK PROJECT - EIS

Gebauer & Associates ENVIRONMENTAL CONSULTANTS
CASLYS CONSULTING
AREVA

AREVA Resources Canada Inc - P.O. Box 9204 - 817 - 45th Street West - Saskatoon, SK - S7K 3X5

Legend

- Kiggavik and Sissons Leases
- Regional Study Area
- Water

Upland-associated Shorebird Habitat Suitability - Growing Season

- High
- Moderate
- Low
- No Rating

Area of Detail

Nunavut

N

Schultz Lake
ᖃᓄᐃᓕᖅ ᑐᓴᖅ
Qamaniq Tugliq

Amarulik Lake

Qamanaarjuk Lake
ᖃᓄᓇᐊᕐᔪᒃ

Thelon River
ᑕᓐᓕᓐ ᑲᓇᖕᓂᐅᑉ ᖄᓂᖅ
Kangirjuup Kuunga

Whitehills Lake
ᑕᓯᕐᔪᐊᖅ
Tasirjuaq

Itigulik Lake
ᐃᑎᒍᓗᒃ

Ajaktukvik Lake
ᐊᔭᒃᑐᒃᕕᒃ

Kavisilik Lake
ᑲᕕᓯᓗᒃ

Squiggly Lake

Skinny Lake
ᓴᐃᓐᒋᒃ

Aberdeen Lake
ᖃᓄᖅᓄᐅᕐᓗᒋᑦ
Qamaniq Ungalliq

Siamese Lake
ᑕᓯᕐᔪᐊᖅ ᓄᓇᕕᒃ
Tasira'tuaq / Nurlavik

Long Lake
ᐊᖏᓚᒃ

Qatqiqtalik Lake
ᖁᐊᖅᑎᓪᓗᒃ

Crossing Point Lake
ᐊᐅᓚᓐᓂᖅ

Tunuhuk Lake
ᑐᓄᐅᒃ

Baker Lake
ᑲᒪᓂᑐᐃᑦ
Qamanittuaq

Gerhard Lake

Qamanaugaq Lake
ᖃᓄᓇᐅᒃ

Thom Lake
ᑐᒪᓐ ᓕᐊᒃ
Tasi'tuaq

Tupik Lake

Lobster Lake

Judge Sissons Lake
ᐃᓕᓴᕐᓗᒃ
Qikiqtarjualik

Audra Lake
ᐊᐅᑕ ᓕᐊᒃ
Aniggua

Qikiqtarjualip Kuunga

Qinnguq Bay
ᖁᓐᖅ ᒎᓐ

Buzzard Lake

Murriittuq Lake
ᒪᓕᐊᑐᖅ

Turtle Lake

Dragon Lake

Quglungnilnaaq Lake
ᖁᓗᓚᓐᓂᓚᓇᖅ

Aniggua River
ᐊᓂᖅᓄᐊ ᒎᓐ
Aniguaqkuunga

Qamanaqakuluk Lake
ᖃᓄᓇᖅᑲᓚᖅ

Mihaluk Lake
ᒥᐻᓚᒃ

Baker Lake
ᑲᒪᓂᑐᐃᑦ

Rocket Lake

Samarook Lake
ᓴᒪᕐᕉᒃ

Pistol Lake

Iglulik Lake
ᐃᒡᓗᓕᒃ

Pitz Lake
ᑭᓯᓚᖅ
Tasilugjuaq

Qulaituijarvik

Clear Water River

Mallery Lake
ᒪᓕᓚᕐᔪᐊᖅ

Gull Lake

Princess Mary Lake
ᑕᓯᕐᔪᐊᖅ ᒪᓂᕐᓂᖅ
Tasirjuaq Tugliqpaaq

Kazan River

Aumaluuktuuk Lake

Martell Lake

0 2.5 5 10 15 20 Kilometres

500000 520000 540000 560000 580000 600000 620000 640000 660000 680000

7180000 7160000 7140000 7120000 7100000 7080000

Projection: NAD 1983 UTM Zone 14N
Creator: CASLYS CONSULTING LTD.
Date: 05/30/2014 Scale: 1:500,000
File: 5.5-10_Upland_Shorebird_Habitat_Suitability_Growing.mxd
Data Sources: Natural Resources Canada, GeoBase®, National Topographic Database, AREVA Resources Canada Inc., Gov't of Nunavut, and Gebauer & Associates.

FIGURE 5.5-10
UPLAND-ASSOCIATED SHOREBIRD HABITAT SUITABILITY - GROWING SEASON

KIGGAVIK PROJECT - EIS

Gebauer & Associates ENVIRONMENTAL CONSULTANTS
CASLYS CONSULTING
AREVA

AREVA Resources Canada Inc - P.O. Box 9204 - 817 - 45th Street West - Saskatoon, SK - S7K 3X5

5.6 Birds of Prey

5.6.1 Status and Traditional Use

Eight raptor species have been observed in the RSA to date: peregrine falcon, gyrfalcon, rough-legged hawk, northern harrier, bald eagle, golden eagle, short-eared owl, and snowy owl (*Nyctea scandiaca*). The *tundrius* subspecies of peregrine falcon that breeds north of the tree line is 'Secure' in Nunavut (CESCC 2014, internet site), 'Special Concern' by COSEWIC, and is on *SARA* Schedule 1 (COSEWIC 2014, internet site; *SARA* 2014, internet site). Short-eared owl is 'Sensitive' in Nunavut (CESCC 2011, internet site), is listed as Special Concern by COSEWIC, and is also on Schedule 1 of the *SARA,* mostly because the population of this species has been declining over the past 40 years (COSEWIC 2014, internet site). Although population trend information is not available for Nunavut, data collected during Canadian Breeding Bird surveys indicate short-eared owls have declined by 4.6% annually since the 1970s (Canadian Bird Trends Website 2014, internet site).

Other raptors considered to be 'Sensitive' in Nunavut include the golden eagle, gyrfalcon and rough-legged hawk, none of which are listed by COSEWIC or the *SARA*. None of the other raptor species observed and expected to occur in the RSA are considered to be sensitive or otherwise at risk according to territorial and federal designations.

Populations of rough-legged hawk and snowy owl tend to follow small mammal population cycles (Shank 1997), whereas raptor species that hunt primarily birds or a broader variety of prey (e.g., peregrine falcon) have more stable populations (GNWT 2009, internet site).

Breeding chronology varies among rough-legged hawks, gyrfalcons, peregrine falcons, and snowy owls (Table 5.6-1). Gyrfalcons and snowy owls generally lay eggs and fledge young earlier than rough-legged hawks and peregrine falcons. Norment (1985) noted that in the Thelon River area, the peregrine falcon's breeding cycle is about one month later than that of the gyrfalcon.

The only raptor species documented in IQ studies were several observations of eagles: *I saw a large brown eagle a few years ago, but is not sure if it was a golden eagle or a juvenile bald eagle* (IQ-CI08 2009). Reference in the IQ study to a sighting of a burrowing owl (IQ-CHAH 2009) is unlikely given the very low population levels of this species in Canada and its restricted range in southern and western Canada.

Table 5.6-1 Breeding Chronology of Common Raptors Occurring in the Regional Study Area

Species	Location	Egg laying	Hatching	Fledging	Reference
Rough-legged hawk	Central Nunavut	28 May-23 June	ND	August	Kuyt 1980; Poole and Bromley 1988
	Warden Grove area, Nunavut	28 May-25 June	ND	ND	Norment 1985
Gyrfalcon[(a)]	Kilgavik, Nunavut	Late April to late May	Throughout June	Late July to early August	Martin 1978; Poole and Bromley 1988
	Warden Grove area, Nunavut	20 May	25 June	ND	Norment 1985
Peregrine falcon	Rankin Inlet, Nunavut	Throughout June	Beginning to the third week of July	Mid-August to 1st week of September	Court et al. 1988
Snowy owl	Baffin Island	Early May to early June	ND	Mid-July to late August	Watson 1957
Short-eared owl	Yukon	Late March to June (mainly June)	July to early August	August to early September	Sinclair et al. 2003; Wiggins et al. 2006

(a) Pair formation generally starts in late February (Martin 1978; Poole and Bromley 1988). Adult birds often remain around the nest site during winter (Sinclair et al. 2003)

ND = No data

5.6.2 Population Data

Wildlife surveys over the last 30 years have documented raptors in the RSA on a regular basis, although never in high numbers. Information on raptor occurrence from historical and baseline field programs is provided in Table 5.6-2. Raptor observations were noted during both aerial and all ground-based surveys. In particular, locations of raptor observations are included in Figure 5.1-1E for the 2008 RSA aerial survey. Northern harrier, peregrine falcon, and rough-legged hawk were observed along the All-Season Road (see Figure 5.1-3). Raptors have also been observed at the proposed Thelon River crossing and Baker Lake dock sites. Specific surveys for raptor nests and nest activity were also conducted at the Mine LSA and along the All-Season Road in 2008 and 2009 and along the previously considered South AWAR option in 2008. Golden eagle, peregrine falcon, and rough-legged hawk were observed along the South AWAR (see Figure 5.1-5). Baseline data on raptor nests focuses on the All-Season Road alignment and potential quarry areas.

Peregrine falcon and rough-legged hawk were seen most frequently, followed by bald eagle. The remaining five species were seen infrequently. A complete list of raptor species (including common and Latin names, and abbreviation codes) is provided in Attachment E.

Table 5.6-2 Summary of Current and Available Historical Data on Total Number of Sightings of Raptors for Kiggavik Regional Study Area

Year	Observation Method	Peregrine Falcon	Gyrfalcon	Rough-legged Hawk	Northern Harrier	Bald Eagle	Golden Eagle	Short-eared Owl	Snowy Owl
2010	South AWAR Nest Survey	0	0	1 (flying)	0	0	0	0	1
	Baker Lake Docks	0	0	0	0	0	0	1	0
	Bird Checklist	1	0	2	0	0	0	4	1
	Winter Road	1 (call)	0	0	0	0	0	2	1
	HOL (Mine LSA)	1	0	0	0	0	0	2	0
	Camp Log/Monitor	1 (flying)	0	0	2 (flying)	1 unidentified eagle		0	1 (flying)
2009	Bird Checklist	4(1 nest)	0	34	4	11	0	2	0
	All-Season Road Raptor Nest	15(7 nests)	0	0	0	0	0	0	0
	Incidentals	9 (4 sightings)	0	9 (7 sightings)	1	8 (6 sightings)	0	1	1
	South AWAR Ground	1	0	2	0	0	2	0	0
	All-Season Road Nest Survey	ND	0	2 (flying)	0	2	0	0	0
	Mine LSA Nest Survey	ND	0	0	1	0	0	0	0
	All-Season Road Molt Survey	2(1 nest)	0	0	0	0	0	0	0
	Mine LSA Molt Survey	2	0	0	0	1	0	0	0
	All-Season Road Transects	6	0	0	1	0	0	0	0
	Sissons Transects (Mine LSA)	1	0	1	0	0	0	1	0
	Thelon River Transects	2(1 nest)	0	1	0	1 (flying)	0	0	0
	All-Season Road Quarry	ND	0	2	0	0	0	0	0

Table 5.6-2 Summary of Current and Available Historical Data on Total Number of Sightings of Raptors for Kiggavik Regional Study Area

Year	Observation Method	Peregrine Falcon	Gyrfalcon	Rough-legged Hawk	Northern Harrier	Bald Eagle	Golden Eagle	Short-eared Owl	Snowy Owl
	HOL (Mine LSA)	4	0	11	1	7	0	1	0
	Camp Log/Monitor	1	0	1	0	0	0	2	0

Table 5.6-2 Summary of Current and Available Historical Data on Total Number of Sightings of Raptors for Kiggavik Regional Study Area

Year	Observation Method	Peregrine Falcon	Gyrfalcon	Rough-legged Hawk	Northern Harrier	Bald Eagle	Golden Eagle	Short-eared Owl	Snowy Owl
2008	Bird Checklist	2	2	14	0	0	2	2	2
	All-Season Road Raptor Nest	6 (6 nests)	0	ND (1 nest)	0	0	0	0	0
	RSA Aerial	1	0	2	0	0	0	0	1
	South AWAR Aerial	10	0	0	0	0	1	0	0
	Mine LSA Nest Survey	0	0	0	0	0	0	1	0
	HOL (Mine LSA)	1	1	2	0	0	0	2	0
	All-Season Road Transect	4	0	6	0	0	0	0	0
2007	Incidental	4 (1 nest + 4 inactive)	0	0	0	1	0	0	0
1980[(a)]	Ground survey	ND (+ 18 young) (8 nests +4 inactive)	2 (+4 young) (1 nest)	ND (+ 50 young) (21 nests)	0	0	0	2(+ 3 young) (1 nest)	2
1979[(b)]	Ground survey	ND (+ 3 young) (3 nests + 4 inactive)		ND (+ 3 young) (16 nests +3 inactive)	0	0	0	ND (1 nest)	ND (1 nest)

None of the peregrine falcon nests in 1979 or 1980 were within the current Mine LSA.

(a) URG 1981

Table 5.6-2 Summary of Current and Available Historical Data on Total Number of Sightings of Raptors for Kiggavik Regional Study Area

Year	Observation Method	Peregrine Falcon	Gyrfalcon	Rough-legged Hawk	Northern Harrier	Bald Eagle	Golden Eagle	Short-eared Owl	Snowy Owl
(b) Speller et al. 1979									
ND = No data									

In 2007, initial reconnaissance surveys found four inactive nests around the Mine LSA. In the 2008 and 2009 surveys, a higher number of nesting peregrine falcon was documented. All confirmed peregrine falcon nests were occupied (active) in either 2008 or 2009. A single active rough-legged hawk nest was located during field surveys. All inactive nests were stick nests, likely built by rough-legged hawk. Raptor nest locations identified during raptor nest surveys in 2008 and 2009 in the Mine LSA and All-Season Road are summarized in Table 5.6-3. Locations of all nests in these study areas are illustrated in Figures 5.6-1 and 5.6-2. A pair of short-eared owl was observed defending nesting territory along the Winter Road in 2010 but a nest was not located.

5.6.3 Distribution and Movement

Peregrine falcons and rough-legged hawks were the most common raptor species encountered during field programs. Nesting birds were closely associated with steep terrain including cliffs and rock outcrops. Observers noted that most suitable peregrine falcon habitats within the Mine and All-Season Road LSAs were occupied by nesting birds. The location of raptors seen on aerial surveys of the RSA is provided in Figure 5.1-1E. Observations for all of the surveyed access road LSAs are provided in Figures 5.1-4, 5.6-1, and 5.6-2 for the All-Season Road, Figure 5.1-6 for the previously considered South AWAR option, and Figure 5.1-7 for the Winter Road.

The presence of bald eagle in the RSA is unexpected because there have only been a few documented occurrences of the species in the region. During IQ interviews, Elders do not generally report seeing this species. One Elder saw a large brown eagle a few years ago, but was not sure if it was a golden eagle or a juvenile bald eagle (IQ-CI08 2009). Range maps for bald eagle indicate that only the extreme southwestern corner of Nunavut is within the known range (Floyd 2008; Sale 2006). Bald eagles were observed at Meadowbank mine. The increasing numbers of eagles in Nunavut in recent years and particularly in 2009 in the RSA may be a long-term trend of increasing eagle numbers in Nunavut. The presence of northern harrier in the study area is also unexpected. Northern harriers have a similar range to bald eagles and have rarely been documented in Nunavut (Floyd 2008; Sale 2006). Data on bald eagle and northern harrier observations in the RSA were overlain over distribution maps from CWS to demonstrate these unexpected distributions (Figure 5.6-3 and 5.6-4).

Short-eared owl, a species of special concern as per COSEWIC and the *SARA*, is not often observed during wildlife surveys but has been recorded regularly in the RSA (Figure 5.6-5). Short-eared owl nests are known to be well-camouflaged (Therrien 2010). Additionally, locating nests of such species that breed at low densities is logistically challenging particularly in remote areas (Booms et al. 2010). The low sighting of nests in the RSA may be due to these difficulties. Habitat preferences for short-eared owl are discussed in Section 5.6.6.2.

Table 5.6-3 Summary of Raptor Nest Surveys in the Mine Local Study Area and along the All-Season Road (2008 and 2009)

Nest	GN Raptor Database No.	Coordinates	Discovery Date	Species in 2008	Species in 2009	Eggs in 2008	Eggs in 2009	Comments in 2008 and 2009
RN1	38205	14W 624528 7145239	June 24, 2008	PEFA	PEFA	3	3	2008 On cliff along shoreline of Thelon R. Both adults vocalizing & circling 2009 Nest moved 30 m to SE. Three chicks on August 2nd
RN2	38206	14W 575671 7152388	June 24, 2008	PEFA	PEFA	4	4	2008 While being dive-bombed by pair a 3rd PEFA (young of last year?) joined in and one adult began driving it off 2009 Female defending. No birds, chicks or eggs on July 30th
RN3	38207	14W 573268 7151576	June 24, 2008	PEFA	PEFA	ND	3	2008 Female on nest, could not see eggs. 2009 Female flew off of site. No birds, chicks or eggs on July 30th
RN4	38208	14W 583888 7150707	June 21, 2008	PEFA	INACTIVE	3	n/a	2009 Pair moved to site RN5. No birds, chicks or eggs on July 30th
RN5	38209	14W 583880 7150656	June 21, 2008	RLHA	PEFA	3	4	2009 Three eggs observed June 18th and four at later date. No birds, chicks or eggs on July 30th

Table 5.6-3 Summary of Raptor Nest Surveys in the Mine Local Study Area and along the All-Season Road (2008 and 2009)

Nest	GN Raptor Database No.	Coordinates	Discovery Date	Species in 2008	Species in 2009	Eggs in 2008	Eggs in 2009	Comments in 2008 and 2009
RN8	38210	14W 602197 7147702	June 25, 2008	PEFA	PEFA	3	0	2008 Three eggs were observed 2009 Predated nest, female flushed. On July 30th, no nest or eggs, but two adults defending site.
RN9	38211	14W 612423 7152240	July 3, 2008	PEFA	PEFA	3	4	2009 Nest site moved 105 m SE on same cliff. On July 30th, no chicks or eggs seen but pair actively but not aggressively defending site.
RN10	3902	14W 608809 7150480	June 25, 2009	N/A	INACTIVE	n/a	n/a	2009 Abandoned stick nest site. No activity on July 30th
RN11	3903	14W 602088 7154827	June 25, 2009	N/A	PEFA	n/a	3	2009 Two chicks and two actively defending adults on July 30th
RN12	3904	14W 598686 7149154	June 25, 2009	N/A	INACTIVE	n/a	n/a	2009 Large stick nest, no eggs. No activity on July 30th
RN13	3905	14W 595733 7151818	June 25, 2009	N/A	INACTIVE	n/a	n/a	2009 Old large stick nest, no eggs. No activity on July 30th

Table 5.6-3 Summary of Raptor Nest Surveys in the Mine Local Study Area and along the All-Season Road (2008 and 2009)

Nest	GN Raptor Database No.	Coordinates	Discovery Date	Species in 2008	Species in 2009	Eggs in 2008	Eggs in 2009	Comments in 2008 and 2009
RN14	3906	14W 593964 7156419	June 25, 2009	N/A	INACTIVE	n/a	n/a	2009 Nest platforms RLHA style. No activity on July 30th
RN15	3907	14W 583810 7152076	June 25, 2009	N/A	PEFA	n/a	ND	2009 Probable nest site on conglomerate cliff. Defensive pair, but could not locate nest. On July 30th, pair actively defending site and calling heard from cliff while adults were flying. Assumed nest was active.

n/a = Not applicable

ND = No data

5.6.4 Nest Productivity

Some historical and recent data are available on nest productivity (Table 5.6-4). In 2008 and 2009, most nest data were for peregrine falcons. Average clutch size for rough-legged hawk ranged from 3.0 to 4.1 eggs, while the range for peregrine falcon was 3.2 to 5.0 eggs. Nesting success (i.e., fledgling success) was not reported in most cases. In 2009, the number of visits to nest sites was minimized to reduce potential observer-induced disturbance effects.

Table 5.6-4 Historical and Current Data on Raptor Nest Productivity in the Regional Study Area

Species and Measures	2009	2008	1980[(a)]	1979[(b)]
Rough-legged hawk				
Total Active Nests	0	1	21	19
Average clutch size	N/A	3	4 (n=13)	4.1
% hatched / % fledged	N/A	ND/ND	65/ND	85 (n=6)/ND
Peregrine falcon				
Total Active Nests	8	6	6	3
Average clutch size	3.5	3.2	5 (n=5)	3.6
% hatched / % fledged	ND/ND	ND/ND	ND/58	ND/ND
Short-eared owl				
Total Active Nests	0	0	1	1
Average clutch size	N/A	N/A	6	1
% hatched / % fledged	N/A	N/A	83/50	0/ND
Snowy owl				
Total Active Nests	0	0	0	1
Average clutch size	N/A	N/A	N/A	5 (n=1)
% hatched / % fledged	N/A	N/A	N/A	80 (n=5) / ND

(a) URG 1981

(b) Speller et al. 1979

ND = No data

N/A = Not applicable

5.6.5 Habitat Suitability

5.6.5.1 Habitat Suitability for Birds of Prey (Peregrine Falcon)

For the purpose of rating ELC units for raptor habitat suitability, peregrine falcon was used as a representative (or indicator) species for this VEC group. Peregrine falcons are an appropriate indicator species as they are the most abundant raptor in the area. Suitability of habitats within the RSA for raptors was determined by grouping raptor species together and rating each of the ELC habitat units as High, Moderate or Low for the growing season (see Tables 4.5-2 and 4.5-3B). A summary of the ELC units, ratings and justification is provided in Table 5.6-5 and discussed in more detail below.

Table 5.6-5 Summary of Relative Value of Ecological Land Classification Units to Raptors during the Growing Season

ELC Unit	Growing Season Ranking[(a)]	Reasoning
Water	M	Water provides foraging habitat for raptors during the growing season because of the abundance of waterbirds that occur on or around water bodies.
Sand	M	This ELC unit is poorly represented in the RSA, but many potential prey species such as shorebirds use available areas.
Gravel	M	This ELC unit is poorly represented in the RSA, but many potential prey species such as shorebirds use available areas.
Rock Association	M	Rock Associations are good lemming and arctic hare growing season habitat, so the habitat is rated as moderate raptor foraging habitat. Furthermore, the rocks provide camouflage and perching for raptors, and occasionally nest sites.
Wet Graminoid	M	Rated high quality habitat for waterbirds and moderate quality habitat for upland birds, so the habitat contains available prey for raptors during the growing season.
Graminoid Tundra	M	Rated high quality habitat for waterbirds and upland birds, so the habitat contains abundant prey for raptors during the growing season. The habitat is categorized as moderate growing season habitat for raptors because the habitat provides little cover and few perches.
Graminoid/ Shrub Tundra	M	Rated high quality habitat for waterbirds and upland birds, so the habitat contains prey for raptors during the growing season.
Shrub Tundra	H	Rate high quality habitat for upland birds, so the habitat contains abundant prey for raptors during the growing season.
Shrub/Heath Tundra	M	Rated high quality habitat for upland birds, so the habitat contains moderate prey for raptors during the growing season.
Heath Tundra	H	Rated high quality habitat for upland birds, so the habitat contains abundant prey for raptors during the growing season.
Heath	H	Rated high quality habitat for upland birds, so the habitat contains abundant prey for raptors

Table 5.6-5 Summary of Relative Value of Ecological Land Classification Units to Raptors during the Growing Season

ELC Unit	Growing Season Ranking[(a)]	Reasoning
Upland		during the growing season.
Heath Upland/Rock Complex	M	Rated moderate quality habitat for upland birds, so the habitat contains prey for raptors during the growing season.
Lichen Tundra	M	Rated moderate quality habitat for upland birds, so the habitat contains prey for raptors during the growing season.

Growing season is approximately June 1 to September 30 (four months).

(a) Indicator species is peregrine falcon

H = High; M = Moderate; L = Low

Nesting habitat for peregrine falcon is primarily steep rocky areas and cliffs although they have also been reported as nesting on large rocks. Peregrine falcon foraging habitat is determined by the density of available prey, which are primarily birds. In a two-year study conducted at Rankin Inlet, the most common prey items were passerines (i.e., snow bunting, Lapland longspurs, horned lark, and American pipit), followed by collared lemmings, shorebirds, and Arctic ground squirrels (Bradley and Oliphant 1991). Consequently, falcon habitat selection is dependent on prey bird species abundance. The mobility of peregrine falcons allows them to forage long distances from their nests. Identification of habitat, described as ELC units, selected by falcons was done by categorizing habitats by the predicted abundance of prey species targeted by falcons. As well, all habitats within 2 km of active and inactive nest sites were considered to be high quality habitat and were rated as such irrespective of the type of ELC unit present.

Total area of High, Moderate, and Low suitability raptor (peregrine falcon) habitat within the RSA and all LSAs during the growing season is presented in Table 5.6-6. Almost all study areas are rated as High or Moderate suitability habitat. In general, during the growing season a greater percentage of High-rated habitats are found within the Mine and All-Season Road LSAs than the RSA and the Winter Road. The greatest percentage of Moderate-rated habitat is found along the Winter Road LSA. Distribution of High, Moderate, and Low suitability raptor habitats for the growing season is provided in Figure 5.6-6. Generally, High-rated habitats for raptors are more prevalent in the northern portion of the RSA.

Table 5.6-6 Comparative Percentages of Raptor Habitat Suitability in Local and Regional Study Areas

Habitat Suitability – Growing Season[a]	Mine LSA		All-Season Road LSA		Winter Road LSA		RSA	
	ha	%	ha	%	ha	%	ha	%
High[b]	20,152	44.8%	26,530	51.0%	11,906	21.2%	322,250	32.8%
Moderate	24,857	55.2%	25,339	48.7%	43,981	78.4%	658,024	66.9%
Low	0	0.0%	0	0.0%	0	0.0%	0	0.0%
No Rating	0	0.0%	162	0.3%	203	0.4%	2,585	0.3%
Totals	**45,009**	**100.0%**	**52,031**	**100.0%**	**56,090**	**100.0%**	**982,859**	**100.0%**

Growing season is approximately June 1 to September 30 (four months).

[a] Indicator species is peregrine falcon

[b] High suitability habitat includes all areas within 2 km of known active and inactive raptor nest sites

ha = hectare

5.6.5.2 Habitat Suitability for Sensitive Species (Short-eared Owl)

Because short-eared owls are identified as a species at risk, habitat suitability rankings were developed specifically for this bird of prey. Habitat suitability for short-eared owls was determined by rating each of the ELC habitat units as High, Moderate, or Low for the growing season (see Tables 4.5-2 and 4.5-3B). A summary of the ELC units, ratings and justification for short-eared owls is provided in Table 5.6-7 and discussed in more detail below.

Table 5.6-7 Summary of Relative Value of Ecological Land Classification Units to Short-eared Owls during the Growing Season

ELC Unit	Growing Season Ranking	Reasoning
Water	Nil	Short-eared owl does not nest in open water habitats.
Sand	L	Vegetation generally absent to sparse for supporting nesting short-eared owl; limited foraging opportunities.
Gravel	L	Vegetation generally absent to sparse for supporting nesting short-eared owl; limited foraging opportunities.
Rock Association	L	Pockets of vegetation are sparsely distributed and of variable suitability for supporting and concealing a nest. Rock Associations are good prey species habitat (lemmings and voles) for short-eared owls.
Wet Graminoid	M	Small hummocks and rises within this habitat type provide moderate quality nesting habitat for short-eared owl. Habitat also of moderate to high quality for prey species (lemmings and voles).
Graminoid Tundra	H	High quality nesting and feeding habitat for short-eared owl; prey species abundant in this habitat.
Graminoid/ Shrub Tundra	H	High quality nesting and feeding habitat for short-eared owl; prey species abundant in this habitat.
Shrub Tundra	H	High quality nesting and feeding habitat for short-eared owl; prey species abundant in this habitat.
Shrub/Heath Tundra	H	High quality nesting and feeding habitat for short-eared owl; prey species abundant in this habitat.
Heath Tundra	M	Moderate quality nesting and feeding habitat for short-eared owls; prey species abundant in this habitat.
Heath Upland	M	Vegetative cover generally well-represented, but vertical structure suitable for nesting short-eared occurs in small pockets. Habitat contains prey for short-eared owl.
Heath Upland/Rock Complex	L	Vegetation inadequate as short-eared owl nesting habitat, and moderately suitable for supporting prey (voles)
Lichen Tundra	L	Vegetation inadequate as short-eared owl nesting habitat, and moderately suitable for supporting prey (voles).
Growing season is approximately June 1 to September 30 (four months). H = High; M = Moderate; L = Low		

In Canada, short-eared owl wintering grounds are typically located in southern regions of Canada and throughout the USA, with summer breeding areas occurring in Arctic regions. This species is highly nomadic with no noted breeding site fidelity, making it difficult to assess local population trends. The primary limiting factor affecting short-eared owls is habitat loss and alteration (COSEWIC 2008, internet site). Secondary to habitat loss is increased nest depredation by species such as snowy owls, peregrine falcon, and great horned owls (Clark 1975). Nest depredation has been increasing as a result of habitat fragmentation (Johnson and Temple 1986; COSEWIC 2008, internet site). Declines in prey abundance (as a result of changes in habitat), collisions with vehicles, utility lines and barbed wire fences, and to a lesser degree, effects due to pesticide and contaminants are also factors in the decline of short-eared owl (COSEWIC 2008, internet site).

Short-eared owl diet is thought to consist of voles (*Microtus* spp.), shrews (*Blarina* and *Sorex* spp.), pocket gophers (*Thomomys*), mice (*Peromyscus*), kangaroo rats (*Dipodomys*), and lemmings (Holt 1993). In Nunavut, collared and brown lemmings were documented prey (Therrien 2010). Meadow voles and red-backed voles were been observed in the RSA. Population levels can fluctuate yearly due to variation in cyclic small mammal populations, such as voles and lemmings, making local occurrence unpredictable (Clark 1975; Dechant et al. 2001). Short-eared owl nest sites are typically associated with cyclic prey populations (Holt and Leasure 1993; Poulin et al. 2001). In Nunavut, higher concentrations of short-eared owl occur during years of lemming outbreaks (COSEWIC 2008, internet site).

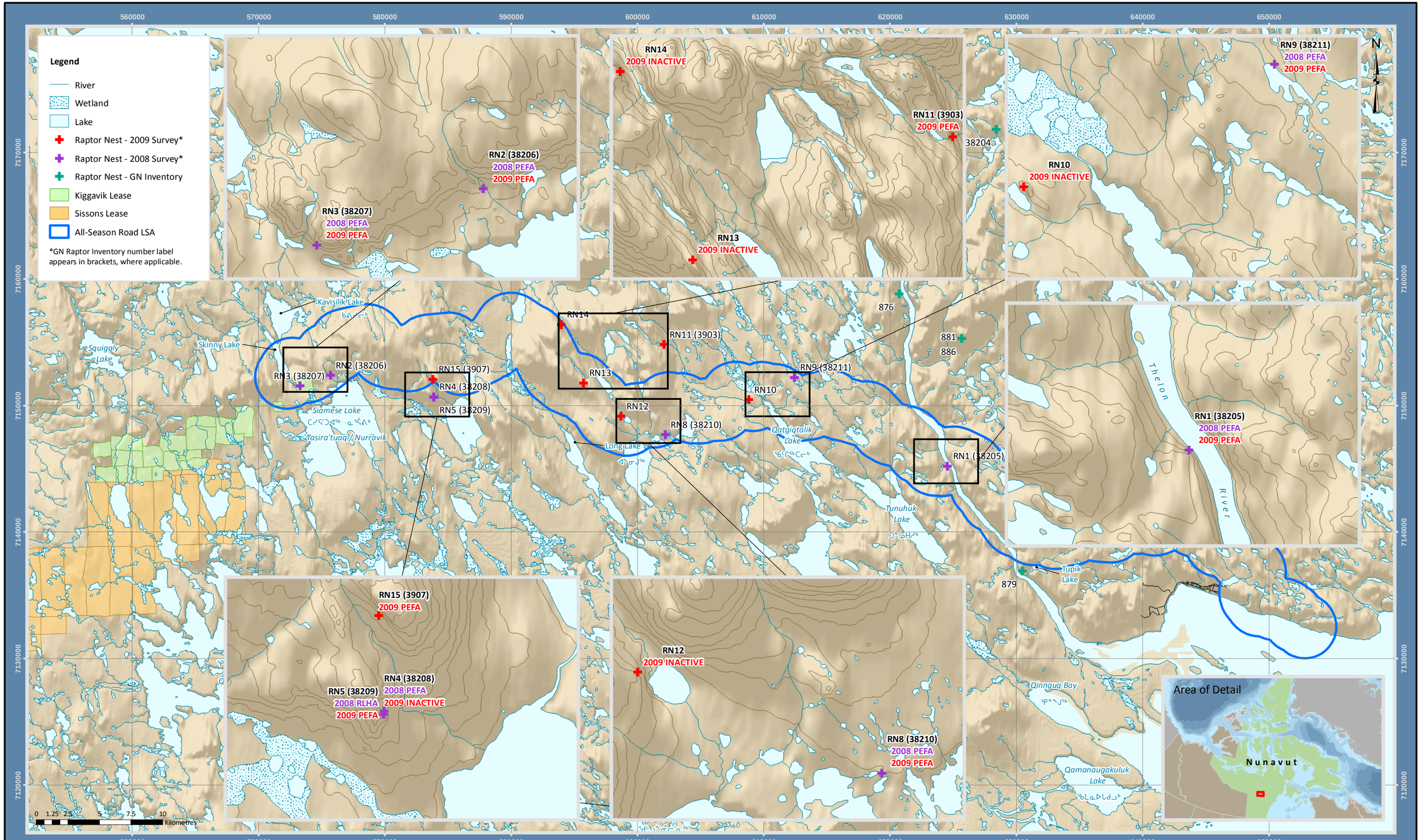
Short-eared owl uses open habitats such as Arctic tundra (Johnsgard 1998), grasslands (Clark 1975), peat bogs (Mikkola 1983), fresh and saltwater marshes (Holt and Leasure 1993), old pasture/croplands (Houston 1997), and shrub-steppe (Lehman et al. 1998). Preferred nesting sites include large dense grasslands (Herkert et al. 1999), as well as tundra containing small willows (e.g., in Churchill region, Jehl 2004), generally in areas larger than 100 ha in size (Dechant et al. 2001). Breeding sites south of the Arctic regions are chosen in March to May, with egg-laying occurring in late April to early June. In the Arctic region (e.g., Churchill, Manitoba region), nests are thought to be initiated in early June (Jehl 2004). ELC units that contain willow components are Graminoid/Shrub Tundra, Shrub Tundra, and Shrub/Heath Tundra.

Total area of High, Moderate, and Low suitability short-eared owl habitat within the RSA and all LSAs during the growing season is presented in Table 5.6-8. Almost all study areas are rated as High or Moderate suitability habitat. A slightly greater percentage of High-rated habitats during the growing season are found within the Mine LSA than the RSA and road LSAs. The greatest percentage of Moderate-rated habitat is found in the Mine LSA. Distribution of High, Moderate, and Low suitability short-eared owl habitats for the growing season is provided in Figure 5.6-7. Generally, High-rated habitats for short-eared owls are more prevalent in the central portion of the RSA.

Table 5.6-8 Co Comparative Percentages of Short-eared Owl Habitat Suitability in Local and Regional Study Areas

Habitat Suitability – Growing Season[(a)]	Mine LSA		All-Season Road LSA		Winter Road LSA		RSA	
	ha	%	ha	%	ha	%	ha	%
High	16,973	37.7%	16,991	32.7%	17,779	31.7%	303,685	30.9%
Moderate	20,580	45.7%	22,551	43.3%	14,576	26.0%	344,110	35.0%
Low	1,377	3.1%	4,672	9.0%	2,705	4.8%	81,319	8.3%
No Rating	6,080	13.5%	7,817	15.0%	21,030	37.5%	253,746	25.8%
Totals	45,009	100.0%	52,031	100.0%	56,090	100.0%	982,859	100.0%

Growing season is approximately June 1 to September 30 (four months).
ha = hectare



Projection: NAD 1983 UTM Zone 14N
Creator: CASLYS CONSULTING LTD.
Date: 05/06/2014 Scale: 1:275,000
File: 5.6-1_Raptor_Nest_Survey_Results_AWAR.mxd
Data Sources: Natural Resources Canada, GeoBase®, National Topographic Database, AREVA Resources Canada Inc., Gov't of Nunavut, and Gebauer & Associates.

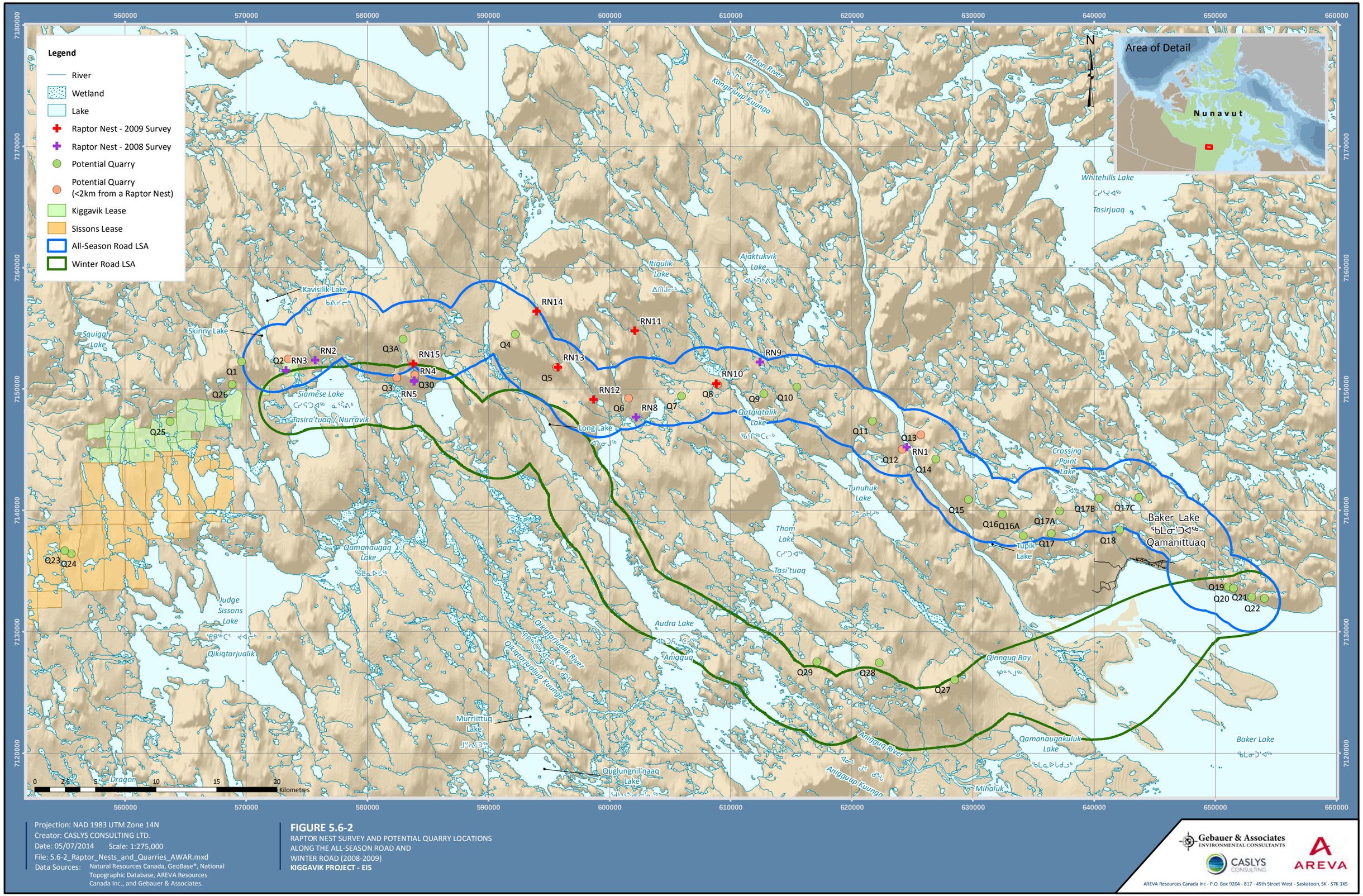
FIGURE 5.6-1
RAPTOR NEST SURVEY RESULTS ALONG THE ALL-SEASON ROAD (2008 - 2009)

KIGGAVIK PROJECT - EIS

Nest ID	Zone	UTM East	UTM North
RN1	14	624528.0	7145239.0
RN2	14	575671.0	7152388.0
RN3	14	573268.0	7151576.0
RN4	14	583888.0	7150707.0
RN5	14	583880.0	7150656.0
RN8	14	602197.0	7147702.0
RN9	14	612423.0	7152240.0

Nest ID	Zone	UTM East	UTM North
RN10	14	608808.7	7150480.5
RN11	14	602088.0	7154826.5
RN12	14	598685.8	7149153.6
RN13	14	595733.0	7151818.2
RN14	14	593964.3	7156418.7
RN15	14	583809.5	7152076.2

Gebauer & Associates ENVIRONMENTAL CONSULTANTS
CASLYS CONSULTING
AREVA
AREVA Resources Canada Inc - P.O. Box 9204 - 817 - 45th Street West - Saskatoon, SK - S7K 3X5



Projection: NAD 1983 UTM Zone 14N
Creator: CASLYS CONSULTING LTD.
Date: 05/07/2014 Scale: 1:275,000
File: 5.6-2_Raptor_Nests_and_Quarries_AWAR.mxd
Data Sources: Natural Resources Canada, GeoBase®, National Topographic Database, AREVA Resources Canada Inc., and Gebauer & Associates.

FIGURE 5.6-2
RAPTOR NEST SURVEY AND POTENTIAL QUARRY LOCATIONS ALONG THE ALL-SEASON ROAD AND WINTER ROAD (2008-2009)
KIGGAVIK PROJECT - EIS

Gebauer & Associates ENVIRONMENTAL CONSULTANTS
CASLYS CONSULTING
AREVA

AREVA Resources Canada Inc - P.O. Box 9204 - 817 - 45th Street West - Saskatoon, SK - S7K 3X5