richardsonii) may also occur, though this is uncommon and is more often replaced by the related *S. calcicola* in this area. In areas between the birch mats, sedge species characteristic of the non-tussock sedge association may occur, along with simple Kobresia (*Kobresia simpliciuscula),* two-flower rush *(Juncus biglumis), mountain* foxtail *(Alopecurus magellanicus*), and arctic woodrush *(Luzula arctica),* and in some cases health vegetation, such as arctic blueberry, mountain cranberry, Labrador tea, and bog rosemary, where conditions are slightly drier.

4.3.1.3 Willow Riparian Community

The willow riparian community type occurs along the banks of stream courses may extend the entire width of a valley in a mix of multiple braided channels. The term “riparian” generally refers to the interface between a stream and the surrounding landscape, where water is bounded by a defined channel (as opposed to sheet flow). These areas are typically characterized by imperfectly drained, nutrient enriched soils and tend to be associated with landscapes that contain a high percentage of boulders. Willow riparian communities are very uncommon in both the Project and road LSAs and only account for 14 ha (<1%) of the total area (Table 4-7, Figure 4-3).

The dominant species present in this community are willows, including *Salix calcicola, S. arctophila, S. glauca, S. lanata* sp. *richardsonii,* and *S. planifolia,* as well as the less common *Sal planiofolia* sp. *tyrrellii).*These willow communities can grow quite tall, up to 1.5 metres and typically contain an understorey of swamp birch and various sedge species (e.g., *C. aquatilis, C. chordorrhiza, and C. saxatilis)* and cotton grasses. Health species, such as arctic blueberry, mountain cranberry, or crowberry, may also occur, along with forbs, such as marsh five-finger (*Comarum palustre*), Sudetan lousewort, yellow marsh saxifrage (*Saxifraga hirculus*), yellow anemone (*Anemone richardsonii)*, and viviparous knotweed (*Polygonum viviparum*).

4.3.1.4 Heath Tundra Community

The Heath tundra community type is found throughout the uplands and slopes of most ridges in the study area and is by far the most abundant and widespread community, covering 3341 ha (40%) of the Project and road LSAs (Table 4-7, Figure 4-3). Much of the health tundra landscape is characterized by gently rolling to undulating terrain that may contain a high percentage of boulders and, as a result, these areas tend to be associated with rapidly to well-drained soils that can be quite dry. Plant species assemblages within the heath tundra community are also very strongly influenced by microtopography, as permafrost and freeze-thaw cycles create microhabitats that can exhibit considerable variation in moisture availability to plants. Microtopography, coupled with wind exposure and other factors, such as solar insulation, may have a tremendous impact on the prevalence and distribution patterns of particular plant species or assemblages.

The most common species associated with the heath tundra community type are marsh Labrador tea, bearberry (*Arctostaphylos alpina* and *A. rubra*), arctic bell heather, arctic blueberry, mountain cranberry, bog rosemary, and black crowberry, along with various lichen species including *Cetraria* sp., *Cladonia* sp., reindeer lichens (*Cladina* sp.), and hair lichens (*Alectoria* sp.). Scattered occurrences of viviparous knotwed and Richardson’s bittercress *(Cardamine digitata),* as well as the occasional sedge species (e.g., *Carex. scirpoidea, C. bigelowii*, and *C. capillaris)* may also occur. Drier, more elevated areas are usually characterized by mats of mountain-avens or alpine-azalea *(Loiseleuria procumbens),* and on more exposed sites, small mats of *Diapensia lapponica*may occur. In areas with more moisture and less wind exposure (i.e., in troughs between high-centre polygons, frost cracks, and hummocks) species such as bog rosemary, northern buttercup (*Ranunculus pedatifidus*), Lapland lousewort, and arctic bell heather commonly occur, as well as a range of more moisture loving lichens including *Peltigera aphthosa*, and pixie cups (e.g., *Cladonia coccifera* and *C. cervicornis*).

Within the heath tundra community, 5 non-mappable plant association units could be differentiated based on variations in terrain features and soil moisture, or exposure to wind, frost heaving, and movement of the active soil layer:

- Heath tundra - uplands (HTu);
- Heath tundra - solifluction slopes (HTsolif);
- Heath tundra - frost scars (HTfs);
- Heath tundra - boulders (HTb/LRb); and
- Ridge or esker slope (RCsl).

4.3.1.5 Lichen-Heath – Cetraria Community

The lichen-heath – Cetraria[1] community tends to occur on lower slope positions, often below the lichen-health – hair lichen community, on more rapidly drained sandy substrates. It is characterized by a mosaic of small heath tundra plant communities growing in a larger matrix dominated by *Cetraria* lichen (primarily *Flaviocetraria nivalis* and *F. cucullata)* that is readily distinguished from the air by its pale yellow colour. Typical vascular plants that commonly occur include mountain cranberry, marsh Labrador tea, and black crowberry, as well as *Arctagrostis latifolia* and northern woodrush *(Luzula confusa*). Occasionally, glove lichen and worm lichen can be found intermingled in the mat of lichen, along with isolated occurrences of various sedges, such as *Carex bigelowii*, *C. capillaris*, *C. misandra*, *C. scirpoi*dea, and *C. vaginata*. Though widely distributed across the mine and road LSAs, the lichen-heath – *Cetraria* community is not common and only represents a total of 463 ha (6%) of the Project LSA (Table 4-7, Figure 4-3).

Only one non-mappable plant association unit was associated with the lichen-heath – *Cetraria* community:

- Ridge or esker crest (RCc).

4.3.1.6 Lichen-Heath – Hair Lichen Community

The lichen-heath – hair lichen community is found almost exclusively on the higher ridges of slopes and on drumlin and esker crests, where the ground cover consists of a high percentage of black and green hair lichens. Typically, black hair lichen species[2] (either a colour variation of *Alectoria ochroleuca,* or *A. nigricans, A. fuscescens* or *Bryocaulon divergens)* form a thin carpet on the more exposed ridge tops, while the green hair lichen *(A. ochroleuca)* dominates on more sloping terrain. Vitt et al. (1998) noted that *A. ochroleuca* areas exposed to “solar radiation” turn dark green, while those with less exposure to sunlight remain lighter in colour. Interspersed among the lichen are occurrences of mountain cranberry, arctic blueberry, or *Diapensia lapponica*,

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[1] The taxonomy of *Cetraria cucullata* and *C. nivalis* have been revised to be included in the genus *Flaviocetraria* and renamed as *Flaviocetraria cucullata* and *F. nivalis,* respectively. In this case, the original name (“Cetraria”) is part of the name of the plant community and as such is treated as a common name.

[2] The identification of the very common black hair lichen is difficult, as some literature refers to green and black forms of *Alectoria ochroleuca*, while others note the presence of *A. nigricans* or *Cornicularia divergens*, which seems to have been revised to the genus *Bryocaulon* (Vitt et al. 1998).

and mats of bearberry, black crowberry, and mountain avens. Prickly saxifrage (*Saxifraga tricuspidata*) also commonly grows in clumps in this community. The lichen-heath – hair lichen community is scattered throughout the Project and road LSAs and covers a total of 530 ha (6%) (Table 4-7, Figure 4-3).

Only one non-mappable plant association unit was associated with the lichen-heath – hair lichen community:

- Ridge or esker crest (RCc).

4.3.1.7 Lichen Rock Community

The lichen rock community is characterized by crustose lichens growing on the boulders or rocks that predominate on eskers or rocky plateaus. The lichen rock community is typically interspersed among other community types where boulder fields may be common (e.g., the heath tundra community or lichen-health – Cetraria community) but this community type refers to the specific plant community that is defined by lichens growing on rock surfaces. The species of crustose lichens that inhabit the rock surfaces are mostly related to the chemical composition of the rock itself, which tends to be acidic in this region. Thus, the most common lichens that are encountered include map lichen (*Rhizocarpon geographicum* and *R. geminatum*), sunburst lichen (*Arctoparmelia centrifuga*), rock tripe (*Umbilicaria* sp.), and blood spot lichen (*Haematomma lapponicum*). Calcicolous lichens, such as jewel lichens (*Xanthoria* sp. and *Caloplaca* sp.), tend to occur on glacial erratics with a high level of calcium carbonate or on rocks used as bird roosts or mammal scent posts. The lichen rock community is an uncommon unit that is only found on 134 ha (2%) of the Project and road LSAs (Table 4-7, Figure 4-3).

Within the lichen rock community, 5 non-mappable plant association units could be differentiated as follows:

- Boulder fields/streams, felsenmeer, heath tundra - boulders(LRb/HTb);
- Cobbles/gravel on ridges (LRb/RCc);
- Rounded/polished bedrock outcrops (LRrpol);
- Fractured bedrock outcrops and shattered bedrock (LRrf); and
- Cliff faces (LRrcf).

4.3.1.8 Un-vegetated (Sand)

Un-vegetated units in the LSA not associated with Lichen Rock communities are represented by sandy areas with limited to no vegetation cover. This unit is typically associated with steep sandy slopes and the margins of rivers and lakes. The un-vegetated (sand) unit makes up a small proportion of the Project and road LSAs, covering only 27 ha (<1%) (Table 4-7, Figure 4-3).

4.3.1.9 Disturbances

Disturbances in the LSA are represented by cleared areas and access roads associated with the Meliadine West and Discovery mine site, camp and other facilities, as well as various natural disturbance features. The current extent of the disturbance unit is <1 ha (<1%) (Table 4-7, Figure 4-3).

Within the disturbance class, 9 non-mappable associations could be differentiated based on anthropogenic and natural disturbance features:

- Den sites (DSd);
- Caribou trails;
- Avian nesting areas (DSng/DSnr);
- Faces of solifluction lobes (Dssolif);
- Hillside slumps (DSls);
- Drill sites (Dsdrill);
- Roads or ATV trails (DSr);
- Camps (DSc); and
- Greywater outflows (Dsgrey).

4.3.1.10 Water

The open water unit is represented by all waterbodies and watercourses that are present in the LSA and includes major waterbodies, such as Meliadine Lake, Lake B7, Lake A8, Lake B5, and Lake A6, as well as the Meliadine River. This unit covers a large proportion of the LSA at 1482 ha (18%), with most of the major waterbodies occurring in and around the proposed mine sites in the Meliadine and F Zone mine LSA (Table 4-7, Figure 4-3).

4.3.2 Rare Plants

Four rare plant species designated as “Sensitive” by the government of Nunavut (Government of Nunavut 2005) were observed within the LSA during the 1998, 2008, and 2009 field programs (Table 4-8). Among the 4 species (3 forbs and one shrub), there were 5 total rare plant occurrences observed in the LSA (Table 4-8). One species, *Salix planifolia* sp. *tyrrellii*, was initially recorded as “Threatened” by COSEWIC (1997) but has since been delisted (COSEWIC 2008). This species was formerly known to occur only around the Lake Athabasca sand dunes, with no previously known occurrences in the NWT or Nunavut (Dr. George Argus, 1998, 1999, pers. comm.). With more recent data collected in Nunavut for this project and others (e.g., the Meliadine project, the Meadowbank project, Bathurst Port and Road Project, and the Doris North Project), the distribution of *S. planifolia* sp. *tyrrellii* is more common than initially thought. No other territorial or federally listed plant species (Government of Nunavut 2005; COSEWIC 2008) were documented in the LSA. Two species, moor rush (*Juncus stygius*) and false chamomile (*Tripleurospermum maritimum*) have no previous documented records in Nunavut, as they were not included in the *Draft General Status Ranks of Vascular Plants in Nunavut* (Government of Nunavut 2005) and are considered as rare for purposes of this report.

It is important to note that the absence of rare plant observations does not preclude the potential for rare plants to inhabit the area. Therefore, a rare plant survey cannot confirm the absence of rare plants or rare plant communities; it can only confirm their presence.

Table 4-8: Rare Plants Observed within the Local Study Area

Scientific Name	Common Name	Strata	Rank		
			Nunavut[a]	COSEWIC[b]	Nature-Serve[c]
Astragalus eucosmus	Pretty milkvetch	Forb	Sensitive	Not listed	G5
Descurainia sophioides	Northern Tansy-mustard	Forb	Sensitive	Not listed	G5
Pinguicula villosa	Hairy butterwort	Forb	Sensitive	Not listed	G4
Salix lanata ssp. *calcicola)*(also S. *calcicola)*	Lanate willow	Shrub	Sensitive	Not listed	G4T4
Juncus stygius	Moor rush	Grass	No record found	Not listed	G5
Tripleurospermum maritimum	False chamomile	Forb	No record found	Not listed	G5T4T5

[a] Government of Nunavut (2005)

[b] COSEWIC (2008)

[c] Natureserve (2009)

Additionally, there are 13 species of rare plants not encountered during the 1998, 2008, and 2009 surveys that may have the potential to occur in the LSA (Table 4-9). These are all listed as "Sensitive" by the government of Nunavut (Government of Nunavut 2005), with the exception of autumn bluegrass (*Poa autumnalis*), which has been ranked as "Undetermined" due to insufficient data.

Table 4-9: Rare Plants that may Occur in the Local Study Area

Scientific Name	Common Name	Strata	Habitat	Rank		
				Nunavut[a]	COSEWIC[b]	Nature-Serve[c]
Argentina egedii	Egede'scinquefoil	Forb	Marine shores, silty or sandy; tidal marshes; occasionally freshwater meadows and marshes	Sensitive	Not listed	G5
Calamagrostis deschampsioides	Circumpolar small-reedgrass	Grass	Littoral, damp tundra, low seacoasts	Sensitive	Not listed	G4
Dendranthema arcticum	Arctic daisy	Forb	Moist, saline meadows, moist gravel, seashores	Sensitive	Not listed	G5
Montia fontana (also *M. lamprosperma*)	Fountain miner's-lettuce	Forb	Damp pond edges	Sensitive	Not listed	G5
Parnassia palustris	Marsh grass-of-Parnassus	Forb	Low areas along coast	Sensitive	Not listed	G5

Table 4-9: Rare Plants that may Occur in the Local Study Area (continued)

Scientific Name	Common Name	Strata	Habitat	Rank		
				Nunavut[a]	COSEWIC[b]	Nature-Serve[c]
Pinguicula vulgaris	Common butterwort	Forb	Wetlands	Sensitive	Not listed	G5
Ranunculus cymbalaria	Seaside crowfoot	Forb	Seashores, mudflats	Sensitive	Not listed	G5
Ranunculus longirostris (also *R. aquatilis*)	Eastern white water crowfoot	Forb	Shallow water, ponds	Sensitive	Not listed	G5
Ranunculus pallasii	Pallas' buttercup	Forb	Brackish meadows, coast	Sensitive	Not listed	G5
Puccinellia deschampsioides (also *P. nuttaliana)*	Polar alkali grass	Grass	Littoral, coastal	Sensitive	Not listed	G5
Sibbaldia procumbens	Arizona cinquefoil	Forb	Sheltered slopes, near snowbanks	Sensitive	Not listed	G5
Woodsia alpina	Northern woodsia	Forb	Uncommon, rock crevices, calcareous rocks	Sensitive	Not listed	G4
Poa autumnalis (also *Poa laxa)*	Autumn bluegrass	Grass	Gravelly, not too dry sites, often pioneering disturbed sites	Undetermined	Not listed	G5

[a] Government of Nunavut (2005)

[b] COSEWIC (2008)

[c] NatureServe (2009)

4.3.3 Baseline Metals Assessment in Soils and Plant Tissue

4.3.3.1 Soil Metal Concentrations

Metals concentrations for the collected soil samples were assessed relative to the CCME (2007) criteria for contaminated soils to determine if any metals exceeded acceptable limits for agricultural sites under the existing baseline conditions. The soil quality guidelines for agricultural sites were used, as the site in its current state is considered unaltered at baseline

The majority of soil metal concentrations in 2008 sample plots were within acceptable guidelines, with the exception of Arsenic (As), which exceeded CCME limits on 10 plots (Table 4-10). Most of these plots were found in the immediate vicinity of the proposed Meladine West gold mine site or along the proposed road near the mine site. The exception was plot 08-015, which was located southwest of the main mine site near the proposed Discovery Mine road. One plot, 08-010, had borderline values for Arsenic at 11.8. mg/kg Cobalt (Co), Copper

(Cu) and Selenium (Se) also exceeded CCME agricultural criteria on two sites (Table 4-10). Soil plot 08-002 had high

Table 4-10: Soil Metal Concentrations (mg/kg) Associated with each 2008 Sample Plot

	Antimony (Sb)	Arsenic (As)	Barium (Ba)	Beryllium (Be)	Cadmium (Cd)	Chromium (Cr)	Cobalt (Co)	Copper (Cu)	Lead (Pb)	Mercury (Hg)	Molybdenum (Mo)	Nickel (Ni)	Selenium (Se)	Silver (Ag)	Thallium (Tl)	Tin (Sn)	Uranium (U)	Vanadium (V)	Zinc (Zn)
Detection Limits	0.2	0.2	5	1	0.5	0.5	1	2	5	0.05	1	2	0.2	1	1	5	2	1	10
2007 CCME Guideline (agricultural)	20	12	750	4	1.4	64	40	63	70	6.6	5	50	1	20	1	5	23	130	200
2008 Soil Sample Plots																			
08-001	<0.2	**51.8**[a]	36	<1	<0.5	32.7	14	31	10	<0.05	<1	38	<0.2	<1	<1	<5	<2	22	50
08-002	<0.2	**59.9**	53	<1	0.5	11.1	9	**66**	8	0.05	<1	48	**1.2**	<1	<1	<5	<2	9	60
08-003	<0.2	**47.3**	93	<1	<0.5	16	19	30	<5	<0.05	2	20	0.4	<1	<1	<5	<2	15	20
08-004	<0.2	**13**	118	<1	<0.5	12.3	6	8	<5	0.16	<1	10	0.2	<1	<1	<5	<2	8	70
08-005	<0.2	**51.1**	117	<1	<0.5	10.7	**45**	**72**	<5	<0.05	7	39	0.8	<1	<1	<5	<2	9	40
08-006	<0.2	**26.9**	22	<1	<0.5	25.6	5	18	7	0.08	<1	20	0.2	<1	<1	<5	<2	15	50
08-007	<0.2	**13.9**	24	<1	<0.5	31.6	5	8	<5	0.09	<1	12	0.2	<1	<1	<5	<2	18	30
08-008	<0.2	**23.3**	31	<1	<0.5	22	6	9	<5	<0.05	<1	13	0.2	<1	<1	<5	<2	15	40
08-009	<0.2	1.2	51	<1	<0.5	5.2	1	5	<5	0.11	<1	4	0.4	<1	<1	<5	<2	4	20
08-010	<0.2	**11.8**	81	<1	0.8	23.1	9	18	<5	0.19	<1	19	0.4	<1	<1	<5	<2	15	60
08-011	<0.2	7	73	<1	<0.5	29.4	10	15	<5	<0.05	<1	24	0.2	<1	<1	<5	<2	39	40
08-012	<0.2	**49.7**	35	<1	<0.5	26.9	15	30	10	<0.05	1	31	<0.2	<1	<1	<5	<2	18	40
08-013	<0.2	5.9	40	<1	<0.5	27.4	7	18	<5	<0.05	1	15	<0.2	<1	<1	<5	<2	29	30
08-014	<0.2	8.4	64	<1	<0.5	29.1	8	29	<5	<0.05	1	24	0.4	<1	<1	<5	<2	25	30
08-015	<0.2	**19.5**	72	<1	<0.5	51.3	11	13	6	<0.05	<1	22	<0.2	<1	<1	<5	<2	38	50
08-016	<0.2	1.3	113	<1	<0.5	32.2	5	8	<5	0.16	<1	13	0.4	<1	<1	<5	<2	30	40
08-017	<0.2	2.7	74	<1	<0.5	31.8	7	7	<5	<0.05	<1	16	<0.2	<1	<1	<5	<2	27	30
08-018	<0.2	1.4	18	<1	<0.5	8.5	2	5	<5	<0.05	<1	5	<0.2	<1	<1	<5	<2	9	20
08-019	<0.2	1.1	22	<1	<0.5	12.7	3	2	<5	<0.05	<1	7	<0.2	<1	<1	<5	<2	14	20
08-020	<0.2	8.3	50	<1	<0.5	23	15	29	<5	<0.05	<1	26	<0.2	<1	<1	<5	<2	23	40

[a] Values in bold and shaded refer to soil metal concentrations that exceed CCME limits. Note: mg/kg= milligrams per kilograms; <= less than

Table 4-11: Soil Metal Concentrations (mg/kg) Associated with each 2009 Sample Plot

Metal		Detection Limits	2007 CCME Guideline (agricultural)	2009 Soil Sample Plots							
				09-D01	09-D02	09-D03	09-D04	09-D05	09-D06	09-D08	09-D09
Aluminum	(Al)	10	n/a	9670	9530	1240	9580	6370	3550	5820	8460
Antimony	(Sb)	0.05	20	<0.050	<0.050	0.113	0.056	<0.050	0.067	<0.050	<0.050
Arsenic	(As)	0.05	12	6.66	**12.6** [a]	4.52	8.91	1.85	1.80	**20.3**	4.03
Barium	(Ba)	0.1	750	71.3	72.7	61.9	73.6	119	99.9	51.7	64.0
Beryllium	(Be)	0.2	4	3.11	3.71	0.24	2.74	1.73	0.92	2.11	2.73
Bismuth	(Bi)	0.3	n/a	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30
Cadmium	(Cd)	0.5	1.4	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Calcium	(Ca)	10	n/a	5530	6760	26700	1950	3270	4100	7680	5810
Chromium	(Cr)	0.5	64	39.3	39.5	2.98	37.0	33.0	10.5	23.2	36.2
Cobalt	(Co)	0.5	40	11.1	18.4	3.75	6.80	4.89	3.68	10.9	8.95
Copper	(Cu)	0.5	63	53.4	42.6	31.1	22.7	13.5	12.9	32.5	19.4
Iron	(Fe)	5	n/a	17900	21300	1700	16100	10300	5170	11600	15300
Lead	(Pb)	0.1	70	5.31	4.35	5.29	3.98	2.92	2.87	4.06	3.67
Lithium	(Li)	0.5	n/a	12.0	13.1	0.83	9.40	3.24	1.45	7.16	12.6
Magnesium	(Mg)	5	n/a	6740	6550	1060	5200	3850	1770	4520	7080
Manganese	(Mn)	0.2	n/a	238	425	271	90.6	138	50.9	237	251
Mercury	(Hg)	0.01	6.6	0.113	0.023	0.202	0.169	0.180	0.161	0.015	0.025
Molybdenum	(Mo)	0.05	5	0.679	0.688	1.34	0.648	0.484	0.322	0.297	0.244
Nickel	(Ni)	0.5	50	26.8	33.0	20.6	16.3	10.5	6.97	17.2	16.9
Phosphorus	(P)	20	n/a	658	672	939	885	1070	872	619	596
Potassium	(K)	100	n/a	2670	1970	1090	1330	2300	680	1110	2530
Selenium	(Se)	1	1	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Sodium	(Na)	100	n/a	320	310	130	<100	120	100	210	230
Strontium	(Sr)	0.3	n/a	31.5	41.2	195	19.4	17.8	29.8	32.2	28.6
Thallium	(Tl)	0.03	1	0.174	0.214	0.066	0.106	0.137	0.043	0.090	0.124

Table 4-11: Soil Metal Concentrations (mg/kg) Associated with each 2009 Sample Plot (continued)

Metal		Detection Limits	2007 CCME Guideline (agricultural)	2009 Soil Sample Plots							
				09-D01	09-D02	09-D03	09-D04	09-D05	09-D06	09-D08	09-D09
Tin	(Sn)	0.2	5	0.47	0.42	0.28	0.25	0.30	0.25	0.31	0.37
Titanium	(Ti)	0.5	n/a	824	945	67.6	446	666	300	574	878
Uranium	(U)	0.01	23	1.97	1.37	0.634	0.647	0.592	0.353	0.527	0.688
Vanadium	(V)	0.5	130	27.7	26.1	3.67	16.3	19.2	6.91	17.7	26.6
Zinc	(Zn)	0.5	200	46.7	48.9	53.5	39.7	44.7	32.5	32.3	36.3

[a] Values in bold and shaded refer to soil metal concentrations that exceed CCME guidelines. Note: mg/kg= milligram per kilogram; <= less than.

levels of copper and selenium, whereas plot 08-005 had levels of cobalt and copper above CCME criteria. Both sites are located near the proposed Meladine West gold mine site. For the 2009 samples, only soil plots 09-D02 and 09-D08 had elevated levels of Arsenic (As) at 12.6 mg/kg and 20.mg/kg respectively, compared to the CCME guideline value of 12 mg/kg (Table 4-11). All other soil metal concentrations in the 2009 sample plots were below applicable CCME guidelines (Table 4-11).

4.3.3.2 Plant Tissue Metal Concentrations

Metal concentrations in tissue from selected plant species were also analyzed to provide an understanding of baseline levels of various metals that may be concentrated in plant tissue. The results of the plant tissue metals analyses for 2008 and 2009 indicate that there was a wide variability in the range of metal concentrations (Tables 4-12 and 4-13). Alpine manzanita and snow lichen tissue were found to have some the highest concentrations of aluminium and iron in both 2008 and 2009 sample plots, with black crowberry also showing high levels of aluminium in the 2009 plots. In the 2008 samples, nickel concentrations were found to be highest in *Oxytropis arctica var. belliii*, whereas flat-leaved willow and mountain cranberry had some of the highest levels for zinc and manganese, respectively (Table 4-12). This is in contrast to the 2009 samples taken along the proposed Discovery Road alignment, which showed high levels of nickel (Table 4-13). The highest levels of arsenic were found in alpine manzanita, along with water sedge on two plots located near the proposed Meliadine West gold mine site (Table 4-12).

Table 4-12: Range of Selected Metal Concentrations in Collected Plant Tissue in 2008

Scientific Name	Common Name	# of samples	Aluminum (Al) (mg/kg)	Arsenic (As) (mg/kg)	Iron (Fe) (mg/kg)	Manganese (Mn) (mg/kg)	Nickel (Ni) (mg/kg)	Zinc (Zn) (mg/kg)
Arctostaphylos alpina	Alpine manzanita	3	450 to 1890	0.7 to 2.1	266 to 1210	47.8 to 243	1.6 to 4.6	81.9 to 140
Aulacomnium moss	n/a	1	390	<0.2	256	749	3.8	48.6
Betula nana	Swamp birch	4	30 to 130	0.2 to 0.7	48 to 125	67.9 to 554	0.9 to 6	73.6 to 174
Carex aquatilis	Water sedge	3	190 to 520	1.8 to 3.7	245 to 1050	211 to 301	1.9 to 3.9	18.6 to 29.2
Carex misandra	Shortleaf sedge	1	170	0.5	187	121	4.1	17.5
Flavocetraria nivalis	Crinkled snow lichen	11	180 to 2090	0.2 to 1.4	140 to 1600	79.2 to 235	1 to 4.3	17.9 to 27.5
Empetrum nigrum	Black crowberry	11	30 to 880	0.2 to 1.1	33 to 628	271 to 860	2.1 to 4.9	11.7 to 19.8
Ledum paulstre ssp. *decumbens*	Marsh Labrador tea	2	70 to 80	<0.2 to <0.2	52 to 63	170 to 264	0.7 to 1	25.8 to 30.6
Oxytropis arctica var. belliii	Bell's Point-vetch	1	120	0.3	112	107	10	16.9
Poa sp.	Bluegrass	1	170	0.7	214	38.7	1.3	12.9
Salix planifolia	Tealeaf willow	1	40	<0.2	105	295	1.9	523
Salix lanata ssp. *richardsonii*	Lanate willow	1	220	1.7	389	136	2.6	378
Vaccinium uliginosum	Arctic blueberry	2	230 to 280	0.2 to 0.5	83 to 154	685 to 1160	1.2 to 1.6	39.3 to 46.3
Vaccinium vitis-idaea	Mountain cranberry	2	100 to 180	0.2 to 0.2	67 to 130	398 to 682	2.1 to 3.7	24.3 to 30.1

Table 4-13: Range of Selected Metal Concentrations in Collected Plant Tissue in 2009

Scientific Name	Common Name	# of samples	Aluminum (Al) (mg/kg)	Arsenic (As) (mg/kg)	Iron (Fe) (mg/kg)	Manganese (Mn) (mg/kg)	Nickel (Ni) (mg/kg)	Zinc (Zn) (mg/kg)
Arctostaphylos alpina	Alpine manzanita	1	155	0.398	281	1.09	47.2	55.3
Betula nana	Swamp birch	2	16 to 26	0.097	49.4 to 53.9	0.63 to 9.72	126 to 1330	49.2 to 222
Flavoetraria nivalis	Crinkled snow lichen	2	186 to 511	0.389 to 0.405	238 to 317	1.74 to 3.05	99.8 to 123	19.6 to 32.3
Empetrum nigrum	Black crowberry	6	91 to 222	0.085 to 0.257	104 to 251	2.55 to 5.73	253 to 659	12.3 to 21.1
Ledum paulstre ssp. *decumbens*	Marsh Labrador tea	3	43 to 46	0	32.3 to 42.6	0.81 to 0.94	579 to 1020	31.5 to 37.5
Vaccinium uliginosum	Arctic blueberry	1	48	0.057	42.1	6.07	1470	31.3
Vaccinium vitis-idaea	Mountain cranberry	1	91	0	45.8	1.02	2380	25.8

Note: mg/kg= milligram per kilogram

It is not known if these metal levels are of concern for these particular species, as there is no known literature available on the levels of metals that would be toxic to the plant species selected. At the time of sampling, there were no indications of disease or toxicity symptoms observed in the areas studied, with some rare exceptions of a fungus infection called “rust” affecting swamp birches. This condition is seen throughout the mainland arctic (P. Burt, 2008, pers. comm.), and is not particular to this area.

Excessive concentrations of metal elements are known to be toxic to most plant species. For example, Pais and Jones (1997) reported that greater than 2 mg/kg of arsenic in plant tissue is generally phytotoxic. Kabata-Pendais (2001) indicated that manganese may have toxic effects on plant species when in excess of 500 mg/kg, though some species tolerances may range to over 1000 mg/kg. This was also the case for both nickel and zinc. Plant species responses to high levels of these elements were variable, but most plants tended to show phytotoxic effects once nickel levels exceeded 10 to 100 mg/kg in their tissues and zinc in excess of 100 to 500 mg/kg (Kabata-Pendais 2001).

4.4 Summary and Conclusions

In summary, this report section describes the terrestrial vegetation and wetlands communities in the RSA and LSA, and provides a basis for evaluating the potential effects of the Project on terrestrial resources. The vegetation baseline report section represents a synthesis of all data collected during the 1998 to 2009 field programs and provides a summary of baseline conditions concerning the abundance and distribution of plant communities, occurrence of rare plants, and metal concentrations present in soils and plant tissues. Mapping of plant communities within the LSA was based on interpretation of 1:10 000 air photos or orthophotographs in conjunction with results from field data. The regional land cover classification map was developed using satellite imagery, remote sensing software, and GIS to provide information on the relative abundance and distribution of vegetation types within the RSA. Field data were collected over the summers of 1998, 2008, and 2009 on 416 sites across the range of vegetation types within the Project area, including 337 plots in 1998, 59 plots in 2008, and 20 plots in 2009.

The RSA boundary was established to assess the importance of the Project within a broader regional context, as it forms the foundation for quantifying potential effects of the Project on regional vegetation resources and wildlife habitat. The RSA was defined as a 52 km radius from the proposed Project and covers an area of approximately 850 000 ha. The RSA falls within the Maguse River Upland Ecoregion portion of the Southern Arctic Ecozone and is characterized by an abundance of waterbodies surrounded by uplands with terrestrial vegetation underlain by areas of continuous permafrost. Eight land cover classes were identified for the regional ELC classification. Heath vegetation represents the dominant vegetation cover in the RSA at 445 926 ha (52%) of the RSA, whereas wetlands and riparian areas are distributed over 122 575 ha (14%) of the RSA. The remaining 280 983 ha (33%) of the RSA are classified as water (predominantly lakes and the tidal basin of Hudson's Bay) and a small percentage of bare ground and rock outcrops.

The mine site LSA boundary encompasses the Meliadine West site, F Zone pit, and the Discovery Zone pit sites and was defined by the expected spatial extent of the immediate direct (e.g., Project footprint) and indirect effects (e.g., dust deposition) of the Project on surrounding soil, vegetation, and wildlife resources. The LSA for the anticipated mine sites was defined by the extent of the potential effects of the Project and is characteristic of regional habitat conditions and vegetation within the Maguse River Upland Ecoregion. However, the major landforms in the LSA are dominated by a large esker that runs northwest/southeast and numerous drumlins or drumlinoid ridges. The LSA for the proposed all-weather road was defined by the expected limit of direct and indirect effects from the road on the surrounding vegetation and was delineated by a 1 km buffer on either side of the anticipated right-of-way surrounding the proposed road alignment. The LSA for the road contains vegetation and landscape terrain features that are typical of the regional conditions. However, the proposed road is located primarily on high ground and tends to follow the ridge lines of eskers and bedrock outcrops.

In total, 10 plant community types were classified and mapped in the 8251 ha mine and road LSA, including 4 upland terrestrial vegetation classes, 3 wetlands classes, and 3 un-vegetated classes. Upland terrestrial vegetation encompasses 4468 ha (54%) of the LSA, with the heath tundra community type dominating the landscape. Wetlands are distributed over 2273 ha (27%) of the LSA, and the remaining 1509 ha (18%) of the LSA is classified as un-vegetated units that are predominantly composed of waterbodies and rivers. Disturbance features and un-vegetated sand areas represent <1% of the total LSA.

During the 1998, 2008, and 2009 vegetation field programs, 4 rare plant species designated as "Sensitive" by the government of Nunavut (Government of Nunavut 2005) were observed within the LSA. One other species commonly encountered in the area, *Salix planifolia sp. tyrellii*, was initially recorded as "Threatened" by COSEWIC (1997) but has since been delisted (COSEWIC 2008). No other territorial or federally listed species (Nunavut 2005; COSEWIC 2008) were documented as occurring in the LSA. There are an additional 13 species of rare plants that may have the potential to occur in the LSA, though they were not encountered during the 1998, 2008, or 2009 surveys. These are all listed as "Sensitive" (Government of Nunavut 2005), with the exception of autumn bluegrass (*Poa autumnalis*), which has been ranked as "Undetermined" due to insufficient data.

Assessments of baseline metal concentrations in plant tissue and soil in the LSA was undertaken in the fall of 2008 and completed in the fall of 2009, to provide a basis for evaluating potential effects of dust borne contaminants containing metals originating from the proposed mine sites and all-weather road. In total, 29 permanent sample sites were established in the vicinity of the mine site and along the road at which plant tissue samples from at least 2 different plant species and a soil sample were collected from each site. Most of the soil metal concentrations were within acceptable guidelines, with the exception of Arsenic (As), which exceeded CCME (2007) guidelines for agricultural use on 12 plots, all but 3 of which were found in the immediate vicinity of the proposed Meladine West gold mine site or along the proposed road near the mine site. Metal concentrations in tissue from selected plant species were also analyzed to provide an understanding of baseline levels of various metals that may be concentrated in plant tissue. The results of the plant tissue metals analyses indicated a wide variability in the range of metal concentrations, with highest levels of arsenic found in alpine manzanita, and water sedge on 2 plots located near the proposed Meliadine West mine site.

5.0 WILDLIFE BASELINE

5.1 Methods

5.1.1 Barren-ground Caribou Aerial Surveys

The objective of the barren-ground caribou aerial surveys was to document the seasonal distribution, behaviour, habitat associations, and abundance of caribou within the study area. From 1998 to 2000, aerial surveys were completed along 10 parallel lines in a 1214 km^2 study area encompassing the Project site (Figure 5-1). Survey transects oriented east-west were spaced 4 km apart and 500 m on either side of the aircraft (i.e., 1 km wide transects) were scanned for caribou, resulting in 25% coverage of the study area. In 2008 and 2009, the surveys were completed over a larger study area (Figure 5-1). Observations were made along 15 north-south transects, spaced 6 km apart over a 8495 km^2 study area (i.e., within a 52 km radius of the Project site), resulting in 15% coverage of the study area. Johnson et al. (2005) found that the potential zone of influence (ZOI) for caribou affected by mining activities may extend up to 30 km from a development. The larger study area was designed to capture potential mine-related effects on caribou (i.e., includes the ZOI) and provide control data outside the ZOI. Due to the large area, aerial surveys were completed over 2 days for 2 of the 3 aerial surveys in 2008. Surveys were classified, based on the time of year, as either 'spring migration and calving', 'post-calving through to fall migration and rut', or 'early winter.' This is based on the Qamanirjuaq caribou annual life history phases (Table 5-1, BQCMB 1999).

Table 5-1: Qamanirjuag Barren-Ground Caribou Herd Life History Periods

Life Cycle Period	Dates	Remarks on Timing and Location
Spring migration	16 March to 25 May	May be delayed if snow is deep. Timing depends on distance travelled. Route taken depends on winter distribution.
Calving	26 May to 25 June	Condition of cows affects timing. Most calves are born between 5 and 15 June. The same general area is used for calving each year, but the specific place where calves are born varies from year to year.
Post-calving	26 June to 31 July	Animals gather in large groups to reduce harassment by mosquitoes on calm days. Habitat used for escaping insects (sand, gravel, hills, lakeshore) is important. The post-calving period ends when caribou migrate south to near tree line.
Late summer	1 August to 15 September	Groups break up when harassment by mosquitoes decreases and that by warble flies and nose bots increases. Caribou begin to regroup in late August and September. Little is known about movement patterns.
Fall migration and rut	16 September to 31 October	Migration timing is influenced by weather, particularly early snowfall and ice formation. Rut occurs in late October.
Early winter	1 November to 31 December	Rapid movements occur in some years. Animals generally move away from areas with deep snow.
Late winter	1 January to 15 March	Forest-dwelling caribou generally stay in areas where snow is 40 to 60 cm deep. Movements decrease as snow deepens. Caribou wintering on tundra seek range where the snow is relatively shallow, such as on the tops of hills.

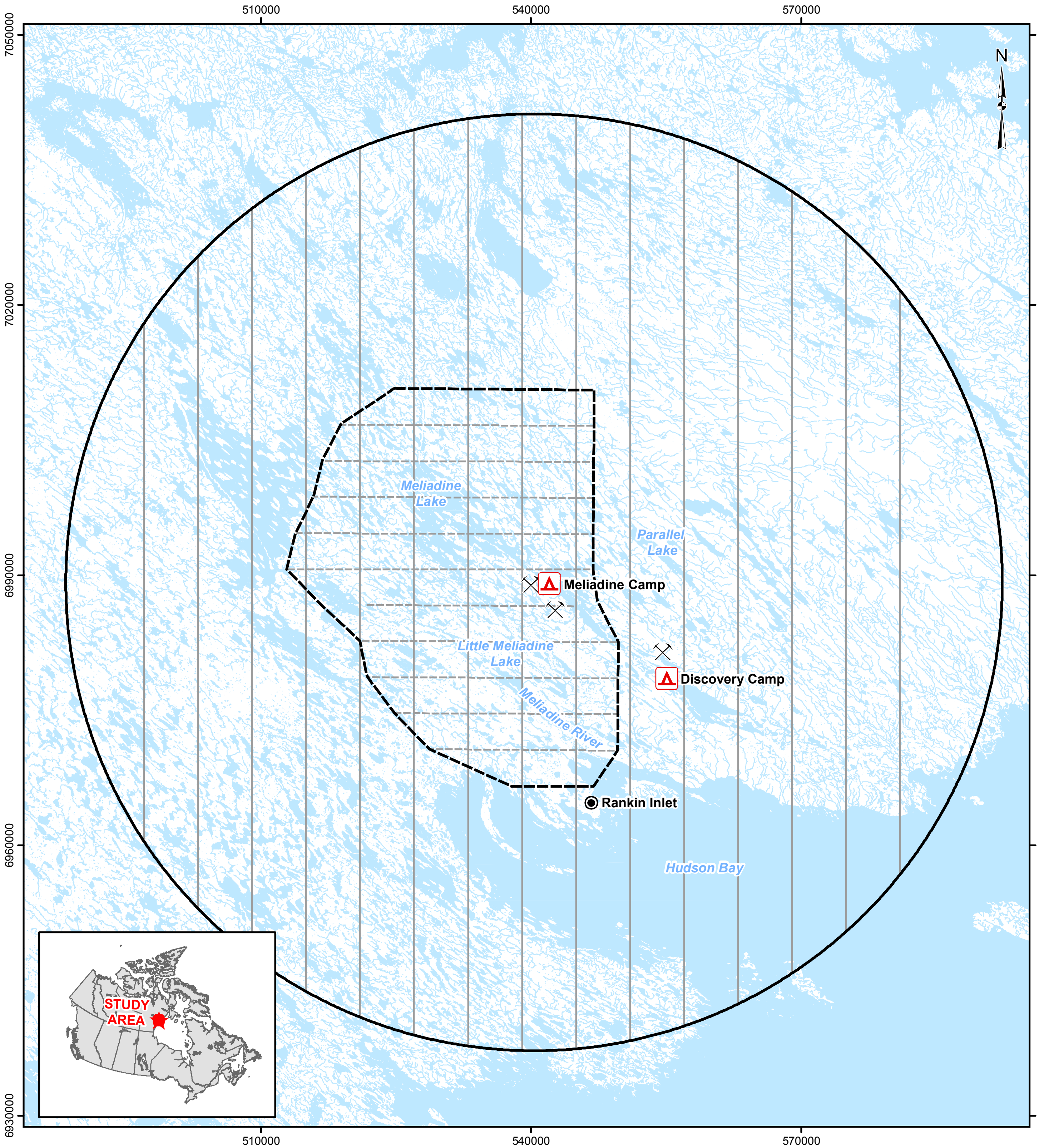
From BQCMB 1999

Surveys were completed in either a helicopter or a fixed-wing aircraft. For all surveys, transects were flown at a minimum altitude of 200 m above ground level (AGL) at a speed of 150 to 185 km/h. When surveys were completed in a helicopter, the search area was a 500 m wide strip on each side of the transect line, resulting in a transect width of 1 km. When surveys were completed from an fixed-wing aircraft, due to lack of visibility under the aircraft, the search area was 2 parallel 500 m wide transects on either side of the aircraft, again resulting in coverage totalling 1 km per transect. Strip width was calibrated by visual reference to landmarks at known distances. Survey crew included the pilot, an observer/navigator/recorder, and 2 rear-seat observers. Navigation was by GPS following the predetermined route based on waypoints at the beginning and end of each transect line. Location was confirmed on a regular basis by the pilot or an observer with the use of a 1:250 000 scale topographic map.

Wildlife observed within the 500 m strip on each side of the aircraft were identified, counted, and recorded in a notebook or on a field data sheet. In some years, large congregations of barren-ground caribou were photographed and later counted. In these cases, at least 3 photographs were taken of each congregation and the highest count was used. For all observations, the location and the time were recorded using a hand-held GPS. Following the survey, locations of observations were downloaded. When possible, barren-ground caribou were identified as cows, calves, or bulls. “Cows” included all barren-ground caribou that are one year or older, and that were not large-antlered. Groups were classified during the post-calving period (July) as nursery (i.e., adults with calves) or non-nursery (i.e., adults without calves) herds.

During the 2008 and 2009 surveys, the dominant behaviour of the group (i.e., bedded, feeding, alert, walking, trotting, running, standing, or courting/sparring) was recorded, as was the habitat type of each location. Habitat type was classified based on land cover classification as defined in Matthews et al. (2001). Matthews et al. (2001) classified vegetation within the Kitikmeot/Slave Geological Province. Although the Project study area falls outside of the Kitikmeot/Slave Geological Province, this classification encompasses the Southern Arctic ecozone and the Project study area is located in that ecozone. Therefore, this classification is representative of the vegetation that occurs within the Project study area. At the regional scale, vegetation cover in the Project area is dominated by heath tundra and heath boulder habitat types (See Section 4.2).

During all surveys, barren-ground caribou observed off-transect were recorded as incidental observations, with the number of individuals and a waypoint recorded. Although the surveys targeted barren-ground caribou, observations of other non-migratory wildlife species and incidental wildlife sign (e.g., dens) were also documented. These observations are discussed in their respective sections.



15 0 15

SCALE 1:600,000 KILOMETRES

LEGEND

- Camp
- Proposed Mine Site
- Aerial Survey Transect (2008-2009)
- Aerial Survey Transect (1998-2000)
- Watercourse
- Caribou Study Area (1998-2000)
- Terrestrial Regional Study Area
- Waterbody

DRAFT

REFERENCE

Base data obtained from NTDB. Wildlife data obtained from field survey.
Projection: UTM Zone 15 Datum: NAD 83

PROJECT

COMAPLEX MINERALS CORP

COMAPLEX MINERALS CORPORATION
MELIADINE GOLD PROJECT
NUNAVUT

TITLE

CARIBOU AERIAL SURVEY TRANSECTS AND SURVEY AREA

Golder Associates
Edmonton, Alberta

PROJECT NO. 09-1373-0010			PHASE No. 1000	
DESIGN	PS	23 Oct. 2009	SCALE AS SHOWN	REV. 0
GIS	JW	6 Nov. 2009	FIGURE 5-1	
CHECK	PS	13 Nov. 2009		
REVIEW	MJ	13 Nov. 2009		

N:\Bur-Graphics\Projects\2007\1373\07-1373-0055\Mapping\MXD\2009\Wildlife\figure-5-1_caribou-aerial-survey-transects.mxd

5.1.2 Fox Den Surveys

The objective of the fox den surveys was to determine the locations of arctic fox den sites and monitor for occupancy and productivity within the study area, focusing on a 10 km radius from the Project site. The study area had a 10 km radius as these surveys were on foot, and focused on collecting data in the area of the preliminary perimeter for the Project footprint. Surveys were completed in the spring season (June) when pup emergence from the den occurs and in the summer season (July) when pup survival can be monitored.

In 1998, searches for carnivore dens were conducted by unstructured ground and helicopter surveys between June and September. All potential denning areas, such as eskers, ridges, and boulder fields, within 10 km of camp were identified using aerial photographs. Eskers were targeted as these are common locations for dens. These areas were searched on foot using 2 observers. One observer walked along the foot of slopes while the second walked closer to or along the height of land to ensure that all dens were located. During other helicopter surveys through the field season, valleys within the study area were continually surveyed for potential denning areas. Each possible den site was inspected on foot. Careful observation was made to confirm that arctic ground squirrel burrows were not incorrectly identified as fox dens. When den sites were located, a survey of the immediate area was conducted to look for recent signs of occupancy (e.g., digs, fresh scat, tracks, hair, bedding material, and recent prey items), and a GPS waypoint of the location was taken. Detailed site characteristics were recorded.

In 1999, 2000, and 2008, fox den surveys were limited to incidental observations. Dens were recorded opportunistically during all wildlife surveys, including aerial surveys and while on foot. Observations by Project staff were also recorded. Most dens were recorded within 10 km of camp, other than 3 that were recorded in 2008 during the barren-ground caribou aerial surveys.

5.1.3 Raptor Nest Surveys

The objective of the raptor nest surveys was to determine the distribution, occupancy rate, and productivity of raptors nesting in the study area.

Between 1998 and 2000, and in 2008 and 2009, unstructured ground and aerial surveys were used to search for raptor nesting sites within approximately 10 km of the Project. The first survey determined occupancy of the historical nest sites and identified new nest sites. The second survey monitored for productivity.

In 1998 and 1999, intensive ground searches were completed in June, and aerial surveys were completed in July. In 2000, unstructured helicopter surveys were done in July and August. In 2008, unstructured ground surveys occurred in June and aerial surveys occurred in July. During the initial June survey, all nests were found opportunistically either during the upland breeding bird surveys or during aerial surveys for barren-ground caribou and waterfowl. In 2009, nest surveys occurred in mid-June. Nests were surveyed during a brief aerial survey or were surveyed opportunistically during other ground and aerial surveys. No raptor nest surveys were completed during the July 2009 field program due to inclement weather.

In all years, special attention was paid to cliffs, rock outcrops, boulders, and eskers. During aerial surveys, the helicopter was flown close to the elevation of the top of each cliff, at 20 to 50 km/h. Observers searched for flushing raptors, as well as whitewash and dense orange lichen growth. The locations of all nests and suspected nests were recorded and waypoints taken. Reports of raptor sightings by Project staff were recorded and investigated.

Proof of occupancy of a nest was determined by observing at least one adult bird at the nest, 2 birds in flight in close proximity to the nest, or finding a nest containing eggs or young. Any new nest sites located during these surveys and during other wildlife surveys were recorded. Although recorded, unoccupied nests within 200 m of an occupied nest were considered alternate nest sites within the same territory of that nesting pair (Court et al 1988). In late summer, nests were considered successful only if young birds were observed at the site. Productivity was calculated both as the number of young per occupied nest, as well as per successful nest.

It is recognized that, due to the proximity of the study area to Rankin Inlet, many of the raptor nests within the study area are subject to sources of disturbance other than the Project (i.e., boats, snow machines, ATVs and cabins), which compromises the usefulness of raptor nest monitoring as a tool for Project-related impact monitoring. As such, only known sites within a 10 km radius of the Project and the all-weather road were considered relevant to the site monitoring, and other nests, observed beyond the 10 km radius, were recorded but considered control sites.

The number of nesting sites monitored each year varied, as new nest sites at previously monitored locations were included in 2008 and most nests surveyed between 1998 and 2000 were not located in subsequent years because of restrictions on helicopter flying time.

5.1.4 Upland Bird Point Count Surveys

The objective of upland game bird point count surveys was to determine the composition and abundance of upland bird species and their habitat associations inside and outside the Project footprint. Point counts are best suited for collecting data on songbirds because they primarily detect birds by sound (i.e., singing birds). Upland bird (i.e., songbird and shorebird) surveys estimate population densities and species composition of the bird community (Robbins 1970). Breeding bird censuses also provide habitat-specific density data and can be used to measure the effect of land-use practices on breeding bird populations. For example, a recent 8 year study at the Ekati Diamond Mine tracked temporal changes in the richness and density of bird species associated with landscape scale and population level effects (Smith et al. 2005).

Prior to 2008, no upland bird baseline data had been collected in the Project area. Therefore, these data would establish benchmarks for upland bird species relative abundance and richness in habitats potentially affected by the Project.

In 2008 and 2009, 136 and 145 point counts or plots were completed, respectively, within and immediately adjacent to the potential mine footprint (Figure 5-3). Plots radiated out from the potential mine footprint and included the Tiriganiaq and F Zone areas. In 2008, another 30 plots were completed near the Discovery deposit. Plots were located a minimum of 100 m apart on each transect with approximately 100 m between transects. The distance between plots and between transects reduced the likelihood of re-counting individuals from adjacent plots, which would artificially inflate the number of birds in the area.

Surveys were performed using standard point count procedures between the hours of 2 a.m. and 10 a.m. to coincide with peak bird activity (i.e., actively singing males). All birds seen or heard in the 50 m radius plot within 3 and 5 minute intervals were recorded. Birds recorded within 3 minutes can be used to supply data to the annual North American Breeding Survey (Environment Canada 2004). Birds recorded within 5 minutes were used for analysis and to create a species list for the Project. Flyovers and birds observed outside of the plot were recorded as incidentals and used to develop a comprehensive species list, but were excluded from the analysis of plot data. Data recorded included plot location, observation number, time of observation, species, number of individuals, habitat (based on dominant landcover type; Matthews et al. 2001), and behavioural activity (i.e., flushed, territorial calls or displays, nest or nest with eggs, flyovers). Six habitat types were surveyed (Table 5-2). The numbers of plots per habitat type were selected based on relative proportions of habitats within the potential mine footprint and Discovery area; therefore, most plots were in heath tundra habitat.

Table 5-2: Plot Habitat Types Surveyed, 2008 and 2009

Habitat Type	2008		2009		Total	
	n	%	n	%	n	%
Heath boulder	3	2	5	0	8	3
Heath bedrock	2	1	0	3	2	1
Heath tundra	95	57	73	50	168	54
Sedge wetland	34	21	4	3	38	12
Tussock hummock	30	18	42	29	72	23
Esker	2	1	21	15	23	7
Total	**166**	**100**	**145**	**100**	**311**	**100**

Note: n = number of plots surveyed, % = percent

Species richness was calculated as the maximum number of bird species observed within a habitat type. Observations where birds were counted in the plot, but could not be identified to species were included in density estimates but excluded from the species richness estimate.

5.1.5 Shorebird Surveys

The objective of the 2008 and 2009 shorebird surveys was to determine shorebird species presence in the study area and their habitat associations following Program for Regional and International Shorebird Monitoring (PRISM) survey methods. The objective of PRISM is to estimate the size of breeding populations of shorebirds, describe the distribution, abundance, and habitat relationships of shorebird species, monitor trends in shorebird population size, monitor shorebird numbers at migration stopover locations, and assist managers in conservation goals (Bart et al. 2005). The PRISM survey methods are consistent across North America so data can be compiled and compared across the continent. Trends in population size can be monitored during the breeding season on the breeding grounds, as populations are stable rather than mobile (i.e., territorial not migrating) (Bart et al 2005).

In 2008 and 2009, shorebird surveys were completed following the rapid survey method as described in the 2008 PRISM manual (CWS 2008). Plot size was 300 m by 400 m (12 ha area) with plots falling as much as possible into monotypic habitat types. Habitat types were classified based on shorebird habitat suitability: good (sedge wetland), fair (tussock/hummock, heath tundra, esker), and poor (heath bedrock, heath boulder) (CWS 2008).