Surface measurements of dissolved oxygen concentrations were only measured in summer 1995. Limnology profiles were not collected. The dissolved oxygen concentration was 9.7 mg/L at a water temperature of 12.5°C, higher than the CWQG of 9.5 mg/L for the protection of early life stages of cold water fish. Field-measured pH values were taken during both events (pH 7.1 and 7.8) and were within the ranges of applicable guidelines.

Water quality was similar between the 2 sampling events. Laboratory-measured conductivity values were 54 and 68 µS/cm and total dissolved solids concentrations were 38 and 43 mg/L. Bicarbonate was not measured in either sample, but other major ions that were measured included calcium (5.7 and 8.0 mg/L), carbonate (18 mg/L), chloride (3.7 and 4.4 mg/L), sodium (3.0 and 3.2 mg/L), and sulphate (2.9 and 3.4 mg/L).

Total alkalinity was measured only in the summer 1994 sample at a concentration of 24 mg/L. This value indicated that the lake water had low sensitivity to acid (Table 5-2; Saffran and Trew 1996). Total hardness concentrations in the 2 sampling events were 18 and 25 mg/L, which indicated that the waters were very soft (Table 5-3; McNeely et al. 1979). Total suspended solids were measured in one sample at less than 1 mg/L and turbidity values were 0.52 and 0.65 NTU. Total cyanide and organic compounds concentrations were not measured in these samples.

Detection limits were at or above the CWQG for most parameters:

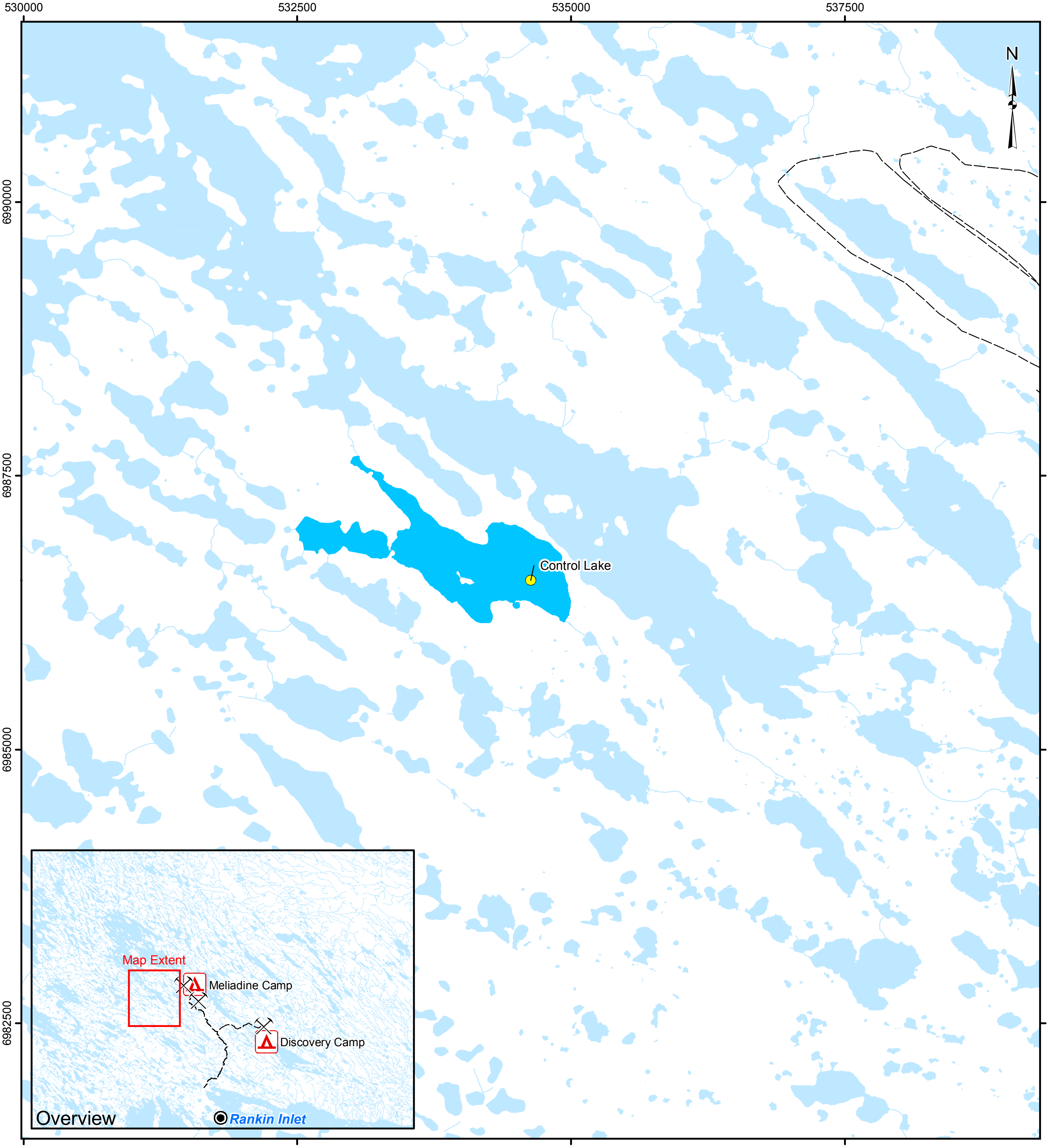
- The detection limit for aluminum was 200 µg/L, higher than the CWQG of 100 µg/L.
- The detection limit for cadmium was 0.2 µg/L, higher than the CWQG of 0.017 µg/L.
- The detection limit for chromium was 15 µg/L, higher than the CWQGs of 1.0 µg/L for hexavalent chromium and 8.9 µg/L for trivalent chromium.
- The detection limit for copper was 10 µg/L, higher than the CWQG of 2 µg/L.
- The detection limit for mercury was 0.05 µg/L, higher than the CWQG of 0.026 µg/L.
- The detection limit for silver was 15 µg/L, higher than the CWQG of 0.1 µg/L.
- The detection limit for thallium was 100 µg/L, higher than the CWQG of 0.8 µg/L.

Total metal concentrations were either below detection limits or below applicable guidelines.

5.3.1.5 Control Lake

Water quality was measured in Control Lake during 7 sampling events (Figure 5-6; Appendix B, Table B2-10):

- Summer 1998, 1999, and 2000;
- Summer and fall 2007;
- Summer 2008; and
- Winter 2009.



LEGEND

Water Sampling Location

- Lake
- Stream
- Camp
- Proposed Mine Site
- Proposed Road
- Watercourse
- Sampled Waterbody
- Waterbody

1,250 0 1,250

SCALE 1:50,000 METRES

DRAFT

REFERENCE

Base data obtained from Comaplex Minerals Corporation. Water quality data obtained from the field.
Projection: UTM Zone 15 Datum: NAD 83

PROJECT

COMAPLEX MINERALS CORP

COMAPLEX MINERALS CORPORATION
MELIADINE GOLD PROJECT
NUNAVUT

TITLE

WATER QUALITY SAMPLING LOCATIONS IN CONTROL LAKE

Golder Associates
Edmonton, Alberta

PROJECT NO. 09-1373-0010			PHASE No. 1000	
DESIGN	KS	06 Oct. 2009	SCALE AS SHOWN	REV. 0
GIS	CDB	06 Oct. 2009	FIGURE 5-6	
CHECK	KS	27 Oct. 2009		
REVIEW	PMC	27 Oct. 2009		

N:\Bur-Graphics\Projects\2007\1373\07-1373-0055\Mapping\MXD\2009\WaterQuality\figure_05-06_water-sampling-control-lake.mxd

Limnology profiles (surface to bottom) of dissolved oxygen concentration and temperature were measured during 3 sampling events: summer 1998; summer 1999; and winter 2009. Maximum depths at the sampling stations were 4.2 and 4.3 m (summer) and 3.0 m (winter). Dissolved oxygen concentrations were above 9.5 mg/L at all depths during the summer sampling event. Lower dissolved oxygen concentrations were measured during the winter event; concentrations ranged from 8.7 to 9.4 mg/L, below the CWQG of 9.5 mg/L. Water temperatures ranged from less than 2°C in the winter to less than 15°C in the summer.

Field measurements of conventional parameters and water chemistry samples were collected during all sampling events. Concentrations of most parameters were higher in the winter than in the summer and fall. Field-measured pH values ranged from 6.9 to 7.9 during all sampling events except the winter event, which had pH 6.3. This pH value is lower than the CWQG and GCDWQ of pH 6.5. Field-measured conductivity was also higher in the winter (175 µS/cm) compared to the summer and fall (64 to 84 µS/cm).

Total dissolved solids concentrations ranged from 21 to 46 µS/cm in the summer and fall. Calculated total dissolved solids concentration in the winter was 99 mg/L. Major ions included bicarbonate (26 to 76 mg/L), calcium (6.7 to 21.6 mg/L), chloride (5.2 to 18.1 mg/L), sodium (2.8 to 9.2 mg/L), and sulphate (1.3 and 4.7 mg/L). All concentrations of major ions were similar in the summer and fall and highest in the winter.

Total alkalinity values were 21 to 24 mg/L in the summer and fall and 63 mg/L in the winter. These values indicate that lake waters had a low sensitivity to acid in open water conditions (Table 5-2; Saffran and Trew 1996). Total hardness concentrations were 17 to 26 mg/L in the summer and fall and 69 mg/L in the winter. Based on these values, the lake waters are very soft in open water conditions (Table 5-3; McNeely et al. 1979).

Phosphorus and nitrogen concentrations varied among sampling events. Total phosphorus concentrations were similar among sampling events and ranged from 0.003 to 0.045 mg/L. All values were lower than the guideline of 0.3 mg/L in NT and Nunavut. Nitrogen concentrations were higher in the winter. Total Kjeldahl nitrogen concentrations were 0.21 to 0.40 mg/L in the summer and fall and 0.73 mg/L in the winter. Total ammonia concentrations were higher in the winter (0.075 mg/L) compared to the summer and fall (<0.05 mg/L). Chlorophyll *a* was measured during summer events only and ranged from 0.44 to 1.52 µg/L. Based on the total Kjeldahl nitrogen, total phosphorus, and chlorophyll *a* concentrations, the lake was classified as oligotrophic (Table 5-4; Wetzel 1983).

Total organic carbon was similar between sampling events during open water conditions; concentrations ranged from 3.7 to 4 mg/L. Carbon concentrations were not available for the winter event. Total cyanide concentrations were 1 to 2 mg/L in some summer samples, but were generally below the detection limit of 2 µg/L.

Detection limits of total metals were at or below the CWQG with 4 exceptions:

- Cadmium was not detected in 5 samples. The detection limits in these samples ranged from 0.010 to 0.2 µg/L. Four samples had detection limits of 0.02 to 0.2 µg/L that were higher than the CWQG of 0.017 µg/L.
- Chromium was not detected in 2 samples. The detection limit in these samples ranged from 0.06 to 5 µg/L. One sample had a detected limit of 5 µg/L, higher than the CWQG of 1.0 µg/L for hexavalent chromium and less than the CWQG of 8.9 µg/L for trivalent chromium.

- Mercury was not detected in 6 samples. Detection limits ranged from 0.02 to 0.2 µg/L. In one sample, the detection limit of 0.2 µg/L was higher than the CWQG of 0.026 µg/L.
- Silver was not detected in 6 samples. Detection limits ranged from 0.02 to 0.4 µg/L. In one sample, the detection limit of 0.4 µg/L was higher than the CWQG of 0.1 µg/L.

Total metal concentrations were either below detection limits or below applicable guidelines with the following 3 exceptions:

- Cadmium concentrations in one sample from summer 1998 was 0.2 µg/L, which exceeded the CWQG of 0.017 µg/L. Only dissolved metal concentrations were measured in the fall 2007 sample, which had a dissolved cadmium concentration of 0.2 µg/L.
- Chromium concentrations in 2 samples were 2.28 µg/L (summer 1998) and 2.2 µg/L (winter 2009), higher than the CWQG of 1.0 µg/L for hexavalent chromium, but lower than the CWQG of 8.9 µg/L for trivalent chromium. Chromium was detected in two other summer samples at 0.37 and 0.41 µg/L.
- Copper concentration in the summer 2007 sample was 2 µg/L, which was equal to the CWQG of 2 µg/L. Only dissolved metal concentrations were measured in the fall 2007 sample, which had a dissolved copper concentration of 2 µg/L.

Phenol concentrations ranged from less than the detection limit of 1 µg/L to 2 µg/L. Concentrations of BTEX, total volatiles, and total extractable were only measured in 2 summer samples and were below detection limits.

5.3.2 Peter Lake Drainage

Water quality was measured in Peter Lake (PL) during 2 sampling events: winter and summer of 1998 (Figure 5-4; Appendix B, Table B2-11).

Limnology profiles (surface to bottom) of dissolved oxygen concentration and temperature were measured during each sampling event. Maximum depths at the sampling stations were 17.4 m (winter) and 18.8 m (summer). Dissolved oxygen concentrations were 9.5 mg/L or higher at all depths during the summer sampling event. However, lower dissolved oxygen concentrations were measured during the winter event, where dissolved oxygen concentrations dropped below the CWQG of 9.5 mg/L at 12.0 m or deeper. Minimum dissolved oxygen concentration was 7.5 mg/L, lower than the CWQG for protection of early life stages of cold water fish (i.e., 9.5 mg/L) but higher than the CWQG for protection of other life stages (i.e., 6.5 mg/L). Water temperatures ranged from less than 3°C in the winter to less than 15°C in the summer.

Field measurements of pH were only reported for the winter 1998 sample; this value (6.5) was similar to that measured in the laboratory (6.6). Laboratory-measured pH values in the summer samples were higher (~7.0). All pH values were within the range of applicable guidelines. Field-measured conductivity ranged from 52 µS/cm (summer) to 69 µS/cm (winter).

Water chemistry samples were collected during both sampling sampling events. Concentrations of most parameters were higher in the winter than in the summer. Total dissolved solids concentrations ranged from 16 to 20 mg/L. Major ions included bicarbonate (11 to 13 mg/L), calcium (3.1 to 3.5 mg/L), chloride (2.7 to 3.5 mg/L), sodium (2.0 to 2.7 mg/L), and sulphate (1.8 to 2.5 mg/L). Total alkalinity values ranged from 9 to

11 mg/L and total hardness concentrations ranged from 10 to 12 mg/L. These values indicated that lake waters had a moderate to high sensitivity to acid (Table 5-2; Saffran and Trew 1996) and were very soft (Table 5-3; McNeely et al. 1979).

Phosphorus and nitrogen concentrations varied between sampling events. Total phosphorus concentrations were higher in the summer (0.005 and 0.007 mg/L) than in the winter (0.003 mg/L). All values were lower than the guideline of 0.3 mg/L in NT and Nunavut. Total ammonia concentrations were higher in the winter (0.012 mg/L) compared to the summer (<0.005 mg/L). However, the opposite trend was observed in total Kjeldahl nitrogen concentrations, which were higher in summer (0.30 and 0.33 mg/L) than in the winter (0.17 mg/L). Chlorophyll *a* was measured during summer only and was 0.30 µg/L. Based on the total Kjeldahl nitrogen, total phosphorus, and chlorophyll *a* concentrations, the lake was classified as oligotrophic (Table 5-4; Wetzel 1983).

Total organic carbon was similar between sampling events (range from 2.3 to 2.8 mg/L), but total inorganic carbon was higher in the winter (3.5 mg/L) than in the summer (1.9 mg/L). Total cyanide was not detected in either sample (detection limit was 1 µg/L).

Detection limits were at or below the CWQG with the exception of cadmium, which had a detection limit of 0.1 µg/L in the winter sample (CWQG of 0.017 µg/L). Total metal concentrations were either below detection limits or below applicable guidelines with the following 2 exceptions:

- Cadmium concentrations in the summer were 0.06 and 0.07 µg/L, which exceeded the CWQG of 0.017 µg/L.
- Copper concentration in the winter was 3.7 µg/L, greater than the CWQG of 2 µg/L. The copper concentrations in the summer were 0.8 µg/L.

Phenol was not detected in either sample (detection limit was 1 µg/L). Concentrations of BTEX, total volatiles, and total extractable were only measured in the summer samples, and were below detection limits.

5.3.3 Atulik Lake Drainage

Water quality was measured in 3 lakes of the Atulik Lake drainage (Figure 5-5; Appendix B, Table B2-12):

- DI1 (summer 1994, summer 1995, summer 2008, winter 2009);
- DI3 (summer 1995); and
- DI5 (summer 1995).

Limnology profiles (surface to bottom) of dissolved oxygen concentration and temperature were measured in Lake DI1 in winter 2009. Profiles were not measured in any other lakes in this drainage. The maximum depth at the sampling station in Lake DI1 was 8.98 m. Dissolved oxygen concentrations were above the CWQG of 9.5 mg/L at 1.0 and 2.0 m below water surface, but declined from 7.3 mg/L at 3.0 m to 0.5 mg/L at 8.5 m. Water temperatures were less than 4°C during the profile measurements.

Surface limnology measurements (i.e., dissolved oxygen, water temperature, pH, and conductivity) were collected in all lakes during the summer sampling events. The lakes were generally well-oxygenated during the summer. Surface dissolved oxygen concentrations ranged from 9.4 to 12.1 mg/L. Concentrations were lower than the CWQG of 9.5 mg/L in Lake DI5 (9.4 mg/L).

Field-measured pH values were lower in the winter than in the summer samples. The pH values were 7.1 to 7.7 in the summer and 6.3 in the winter; the winter pH value was below the minimum CWQG and GCDWQ of 6.5. Laboratory-measured pH values were generally lower than the field-measured pH values, with the exception of the winter pH, which was higher (7.5). The laboratory-measured pH for Lake DI1 in summer 1994 was 6.2, below the minimum CWQG and GCDWQ. Field-measured conductivity values were 21 to 59 µS/cm in the summer and 120 µS/cm in the winter.

Most parameters were similar among lakes and sampling events for the same sampling season; however, values were higher in the winter than in the summer samples. Total dissolved solids concentrations were 24 to 36 mg/L in the summer; the calculated value was 69 mg/L in the winter. Major ions included:

- Bicarbonate[8] (16 mg/L in the summer and 49 mg/L in the winter);
- Calcium (3.9 to 5.1 mg/L in the summer and 15 mg/L in the winter);
- Chloride (2.9 to 5.6 mg/L in the summer and 12 mg/L in the winter);
- Sodium (1.7 to 3.8 mg/L in the summer and 5.9 mg/L in the winter); and
- Sulphate (2.2 to 2.8 mg/L in the summer and 7.4 mg/L in the winter).

Total alkalinity values were 11.6 to 13.8 mg/L in the summer and 40 mg/L in the winter. Total hardness concentrations were 12 to 17 mg/L in the summer and 48 mg/L in the winter. These values indicated that lake waters in the summer had a moderate sensitivity to acid (Table 5-2; Saffran and Trew 1996) and were very soft (Table 5-3; McNeely et al. 1979).

Total suspended solids and total cyanide were measured only in samples collected from Lake DI1. Total suspended solids concentrations ranged from 1 to less than 3 mg/L. Total cyanide was not detected (detection limit was 2 µg/L).

Most nutrient data were collected in 2 samples from Lake DI1 (summer 2008 and winter 2009). Nitrogen and phosphorus concentrations were similar between sampling events. Total phosphorus concentrations were twice as high in the winter (0.0085 mg/L) as in the summer (0.004 mg/L). Values were lower than the guideline of 0.3 mg/L in NT and Nunavut. Total Kjeldahl nitrogen concentrations were less than 0.2 mg/L in the summer and 0.5 mg/L in the winter. Total ammonia concentrations were less than 0.05 mg/L in the summer and 0.054 mg/L in the winter. Nitrate and nitrite were not detected in either sample (detection limits were 0.1 mg/L or lower). Chlorophyll *a* was measured during summer only and was less than 1 µg/L. Carbon concentrations are available only in the summer sample. Total organic carbon was 4 mg/L and total inorganic carbon was 3 mg/L. Based on

[8] Bicarbonate concentrations were measured only in samples from lake DI1 collected summer 2008 and winter 2009.

the total Kjeldahl nitrogen, total phosphorus, and chlorophyll *a* concentrations in the summer sample, the lake was classified as oligotrophic (Table 5-4; Wetzel 1983).

Detection limits in most samples (particularly those from 1994 and 1995) were higher than CWQGs for most parameters:

- Aluminum was not detected in any sample at detection limits ranging from 0.2 to 200 µg/L. Three samples had detection limits of 200 µg/L, higher than the CWQG of 100 µg/L (based on pHs of greater than or equal to 6.5 in these samples). One sample had a detection limit of 6.0 µg/L, higher than the CWQG of 5 µg/L based on a pH of 6.3 in this sample.
- Cadmium was not detected in 5 samples at detection limits ranging from 0.05 to 2 µg/L. These detection limits are higher than the CWQG of 0.017 µg/L.
- Chromium was not detected in any sample; detection limits ranged from 0.06 to 15 µg/L. Four samples had detection limits of 15 µg/L, higher than both the CWQG of 1.0 µg/L for hexavalent chromium and 8.9 µg/L for trivalent chromium.
- Copper was not detected in 4 samples at detection limits ranging from 10 to 100 µg/L, higher than the CWQG of 2 µg/L.
- Lead was not detected in any sample; detection limits ranged from 0.05 to 10 µg/L. Two samples had a detection limit of 10 µg/L, higher than the CWQG of 1 µg/L.
- Selenium was not detected in any sample; detection limits ranged from 0.1 to 5 µg/L. Two samples had a detection limit of 5 µg/L, higher than the CWQG of 1.0 µg/L.
- Silver was not detected in any sample; detection limits ranged from 0.02 to 15 µg/L. Four samples had a detection limit of 15 µg/L, higher than the CWQG of 0.1 µg/L.
- Thallium was not detected in any sample; detection limits ranged from 0.03 to 10 µg/L. One sample had a detection limit of 10 µg/L, higher than the CWQG of 0.8 µg/L.
- Antimony was not detected in any samples; one sample had a detection limit of 200 µg/L, which was higher than the GCDWQ of 6 µg/L.

Total metal concentrations were either below detection limits or below applicable guidelines with the following two exceptions:

- Cadmium concentration in the winter sample from Lake DI1 was 0.025 µg/L, which exceeded the CWQG of 0.017 µg/L.
- Copper concentration in the winter sample was 2.3 µg/L, which was greater than the CWQG of 2 µg/L. Copper was detected in one other sample (Lake DI1, summer 2008) at a concentration of 1.8 µg/L.

Total extractable hydrocarbons (fractions C9 to C40 and C10 to C30) were measured in 2 summer samples from Lakes DI1 and DI3. Concentrations were less than the detection limits of 1000 µg/L.

5.4 Hudson Bay

A water quality sample was collected in summer 1998 from an ocean station in Prairie Bay (part of Hudson Bay) north of Rankin Inlet (Appendix B, Table B2-13). This station was chosen because it received waters originating from the Meliadine Lake area (RL&L 1999).

A limnology profile (surface to near-bottom at 1 m intervals) of dissolved oxygen concentrations and water temperature was collected at this station. Dissolved oxygen concentrations ranged from 11.8 to 14.3 mg/L along the 8 m vertical profilewith water temperatures ranging from 8.3 to 13.1°C. All dissolved oxygen concentrations were higher than the minimum CWQG of 8.0 mg/L required for marine species. Field-measured pH was 7.7. Based on the laboratory-measured conductivity, salinity was approximately 35 parts per thousand (‰), which is typical for a seawater sample.

The ocean station exhibited low turbidity (0.3 NTU), but total suspended solids concentration was slightly elevated (13 mg/L). Concentrations of the major ions such as bicarbonate, calcium, chloride, magnesium, potassium, sodium, and sulphate were elevated relative to the values recorded in the freshwater streams and lakes, which was expected given that the station was in a marine environment.

The carbon content was dominated by total inorganic carbon (24 mg/L) compared to total organic carbon (1.6 mg/L). Total phosphorus concentration was 0.029 mg/L, all in the dissolved form. Total Kjeldahl nitrogen concentration was 0.63 mg N/L whereas total ammonia and nitrate were not detected (detection limits were 0.005 mg/L and 0.05 mg/L, respectively). Chlorophyll *a* concentrations were 0.72 µg/L.

Detection limits were at or below the CWQG (marine) except for cadmium (detection limit was 2 µg/L; CWQG is 0.12 µg/L) and chromium (detection limit was 10 µg/L; CWQG is 1.5g/L for hexavalent chromium and 56 µg/L for trivalent chromium). Total metal concentrations were either below detection limits or below applicable guidelines with the exception of mercury. Total mercury concentration was 0.3 µg/L, which was higher than the CWQG of 0.016 µg/L for the protection of marine aquatic life.

Phenol was detected at a concentration of 2 µg/L. Concentrations of BTEX, total volatiles, or total extractables were below detection limits.

5.5 Summary and Conclusions

Streams of the study area are generally well-oxygenated freshwater streams characterized by low ionic strength, very soft to soft water hardness, low alkalinity, and neutral to alkaline pH. Dissolved oxygen concentrations in most streams were also at or above saturation levels for given ambient water temperatures, further indicating that the streams were well-oxygenated during the sampling events. Major ions in stream waters were bicarbonate, calcium, chloride, and sodium. Measured nutrient concentrations were typical of oligotrophic waterbodies in subarctic regions. Baseline water quality parameters were less than CWQG and GCDWQ with the exception of some parameters (i.e., nitrite, cadmium, chromium, lead, iron, manganese, selenium, silver, and phenol).

Most lakes in the study area are generally well-oxygenated freshwater lakes during open water conditions. Lakes were not thermally stratified during the open water sampling events. Dissolved oxygen concentrations were low in the Peninsula lakes during under ice conditions, which likely limited their use by overwintering fish. In contrast, dissolved oxygen concentrations were higher during the winter in larger lakes such as Meliadine Lake, Little Meliadine Lake, and Peter Lake.

Lakes were generally characterized by low ionic strength, very soft to soft water hardness, low alkalinity, and neutral pH. Major ions in lakes waters were bicarbonate, calcium, chloride, sodium, and sulphate. Concentrations were higher under ice conditions, likely as a result of ice formation, which concentrated the ions in the remaining water column. The range of total alkalinity values during open water conditions indicated that the lake waters had low to moderate sensitivity to acid. Measured nutrient concentrations were typical of oligotrophic waterbodies in subarctic regions. Baseline water quality parameters were less than CWQG and GCDWQ with the exception of some parameters (i.e., dissolved oxygen, pH, cyanide, arsenic, cadmium, chromium, copper, lead, iron, manganese, zinc, and phenol).

Data from the following ponds in Basin A do not necessarily represent undisturbed baseline conditions: Ponds A9, A13, A15, A38, A54, A56, and A57. The ponds are located near the portal and working of the underground exploration program and have been monitored periodically by Comaplex as part of a routine water quality monitoring program[9]. At least one pond (pond A54) is immediately adjacent to the portal and workings of the underground exploration program and as such receives all of the flow originating from primary containment and runoff from pads and spoil in the underground exploration work area (B. Hubert, 2008, Comaplex, pers.comm.).

These ponds were characterized by higher ionic strength, hard to very hard water, low alkalinity, and alkaline pH. Major ions are the same as in the lakes, but concentrations are higher. Concentrations of phosphorus, total metals, and organic compounds were similar to those in the lakes. However, there were more exceedances of CWQGs and GCDWQs for total dissolved solids, chloride, nitrate, nitrite, and phenol than in the lakes. Dissolved metal concentrations, particularly of iron and manganese, were also higher in these ponds.

Water quality was also assessed at an ocean station in Hudson Bay that received waters originating from the Meliadine Lake area. Water from the station was well-oxygenated and was characterized by alkaline pH, high conductivity, and elevated concentrations of major ions, typical for seawater. Nutrient concentrations were similar to those measured in the study area. Baseline water quality parameters were less than marine CWQG with the exception of mercury.

[9] These 7 ponds as well as other sampling locations were included in Comaplex's monitoring program. Some sampling locations were mandated by the terms of the water license issued by the Nunavut Water Board. Other locations were meant to monitor local development impacts and to provide continuity with historical sampling records (S. Barham, 2008c, Comaplex, pers.comm.).

6.0 SEDIMENT QUALITY

This section of the baseline report describes the baseline sediment quality for the study area. These data include sediment chemistry in lakes during open water conditions.

The specific objectives of the sediment quality baseline were as follows:

- to describe and discuss the baseline sediment conditions in lakes of the study area;
- to discuss seasonal and spatial variation of sediment quality parameters; and
- to compare baseline sediment quality data with applicable guidelines for the protection of aquatic life.

The description of sediment quality is based on historical data (1994, 1995, and 1998) and data collected from more recent field programs (2008 and 2009) within the study area. All data were compiled into a database that was used to describe the baseline sediment quality.

6.1 Methods

6.1.1 Data Sources

Sediment quality data were collected during 5 baseline studies that were performed between 1994 and 2009 (Table 6-1). Sediment samples were collected from 8 stations in August 1994 (Dillon 1994). These stations were located in lakes on the Peninsula draining into Meliadine Lake (specifically, from Basins A, B, C, and D); in Chickenhead Lake (part of the Atulik Lake drainage basin), and in DI2 Lake, which is part of a watershed that drains into the southeast basin of Meliadine Lake. Samples were also collected from two different stations in the Meliadine Lake and Atulik Lake drainage basins by Dillon in July 1995 (Dillon 1995).

Sediment samples from 11 lake stations and 1 marine station (i.e., Hudson Bay) were collected by RL&L in July 1998. The freshwater stations were located in lakes on the Peninsula (specifically, from Basins A and B) and in Meliadine Lake (multiple locations), Control Lake, Peter Lake, and Little Meliadine Lake.

In June 2008, Golder (2008) collected sediment samples in 4 lakes on the Peninsula (specifically, from Basins A and B), in Meliadine Lake (multiple stations), in Chickenhead Lake (part of the Atulik Lake drainage basin), and in Control Lake (a lake draining into the south basin of Meliadine Lake). In July 2009, sediment was collected from one station in Basin A.