# John Hart Lake Community Watershed and McIvor lake Water Quality Objectives Attainment Report 2010-11

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Approved by _____

Date Approved _____

## Executive Summary

Water Quality Objectives were approved for John Hart Lake and McIvor Lake in 2012 (Barlak and Phippen, 2012) based on data collected between 2003 and 2006. Attainment monitoring occurred from May 2010 through March 2011. Attainment data and changes that have occurred in the watershed between 2006 and 2011 are presented in this report. Data showed that water quality was generally excellent in both lakes, and objectives were met for all parameters except cadmium, which is showing continually decreasing levels. Recommendations to improve and maintain water quality in the watersheds include: regular summer low flow monitoring of *E. coli* at the John Hart Lake pumphouse and investigating the source of periodic *E. coli* contamination, continuing the watershed education and awareness program by the City of Campbell River and continuing measurement of chlorophyll *a* throughout the water column.

## Introduction

As part of the Province of British Columbia, Ministry of Environment's (MoE) mandate to manage water bodies, water quality objective reports have been created for a number of lakes, rivers and marine surface waters. These reports provide a list of objectives to protect water quality that are tailored to the specific water body for which they have been created, taking into account natural local water quality, water uses, water movement, and waste discharges. While the water quality objectives currently have no legal standing, they can direct resource managers aiming to protect the water body in question and are used as a standard against which to measure the water quality of that water body. Once objectives have been developed, periodic monitoring (every three to five years) is undertaken to determine whether they are being met.

John Hart Lake and McIvor Lake are both part of the Campbell River watershed near the outlet end of Lower Campbell Lake, located to the west of Campbell River, BC. Objectives were approved for John Hart Lake and McIvor Lake in 2012, based on data collected between 2003 and 2006. Attainment monitoring occurred from May 2010 through March 2011. This report summarizes attainment monitoring data. The data are summarized in Appendix 1.

## Changes in the Watershed Since Objectives Development

The following noteable activities that have occurred in the watershed since 2006:

- Test drilling in an around John Hart Dam for geotechnical analysis took place in early 2011, while safety upgrades to the John Hart dam were completed in August 2011. In order to complete these works, John Hart Lake was drawn down about 30 cm for approximately one year starting in the summer of 2010. Around the same time, seismic upgrades also were completed on the Strathcona Dam (Watson, pers comm. 2011).

- In 2008 improvements were made to the Myra Falls Operations mine effluent treatment (including automated lime addition) and drainage system that resulted in lower metals levels in discharged effluent and the receiving environment (Henderson, 2011).
- Educational and community participation programs have been implemented by the City of Campbell River to raise awareness around watershed health and unauthorized watershed use. This has included garbage cleanup and signage in the restricted John Hart Lake watershed; however, unauthorized use of the watershed by the public still occurs (Richardson, pers comm. 2011).
- The City of Campbell River is continually developing their water quality monitoring program, adding components such as a remote continuous monitor for turbidty, conductivity and temperature in John Hart Lake (Neill, pers comm. 2011).
- The landfill near McIvor Lake is reaching capacity; however, changes are proposed for the site that may see it continue operations for 5-6 more years (Comox Strathcona Waste Management, 2012). Thus, gulls carrying garbage to the lake may still be an issue.
- Forestry activities have continued in the upper watershed at a rate consistant with that in 2006. TimberWest sold 85 acres of land with approximately 130 m of lake frontage on south side of McIvor Lake. This land may or may not still be part of the managed forest; it is zoned for forestry or agricultural related use with one single family dwelling (Iannidinardo pers. comm., 2011)

## Sampling and Analytical Methods

Five water quality sites were sampled from May 2010 through March 2011 following recommendations in the Water Quality Objectives report (Table 1).

**Table 1.** Water quality sampling program including site names, EMS IDs and sampling descriptions.

| Frequency and timing | Characteristic to be measured | Site (EMS ID and Site Name) |
|---|---|---|
| Quarterly sampling (once each season, including spring overturn; May, August, November, March) | • Profile (every metre): temperature, pH, dissolved oxygen, specific conductivity, oxidation-reduction potential (ORP)<br>• Secchi depth<br>• Grab samples (three depths per site: surface, 10 m and 1 m from bottom): pH, specific conductivity, colour, turbidity, TOC, DOC, total phosphorous, nitrogen species, total and dissolved metals, hardness, Chlorophyll I (surface only) | Deep Stations: E259337 John Hart Reservoir mid-lake (deep station); E207156 McIvor Lake (deep station) |
| Summer and fall (once a week for five consecutive weeks) | • *E. coli*, total and dissolved metals | E252669 John Hart Lake at Ladore Dam (inlet); 1130020 John Hart Reservoir at Pumphouse (outlet); E283129 possible future intake in Lower Campbell Lake |
| Twice per year (summer and spring overturn) | • Phytoplankton and zooplankton | Deep Stations: E259337, E207156 |

For the inlet, outlet and intake sites, five weekly samples were collected over 30 days (5-in-30 sampling) to calculate 30-day averages and 90$^{th}$ percentiles. This sampling included a new site (not sampled during objectives development) at the possible future location of an intake where McIvor and Lower Campbell Lakes meet. Summer low flow sampling occurred from August 19 to September 15, 2010 and fall flush sampling occurred from October 20 to November 17, 2010. At the lake deep station sites, quarterly lake sampling occurred in 2010 on May 24, August 19, November 24, 2010 and March 16, 2011. Quarterly lake sampling was completed in partnership by MOE and City of Campbell River staff, while 5 in 30 sampling was conducted by City of Campbell River staff. Depth profiles of chlorophyll *a* using a Hydrolab sonde were added to the program by City of Campbell River staff.

## Objectives Attainment

Objectives were met for all parameters except cadmium (Table 2). Attainment data is summarized in Appendix 1.

**Table 2.** Summary of water quality objectives for John Hart Lake and McIvor Lake.

| Variable | Objective Value | Objective met? (yes/no) |
|---|---|---|
| **Water temperature** | ≤ 15°C summer maximum (>15 m depth) | Yes |
| **Secchi depth** | Annual average ≥ 8 m | Yes |
| **Dissolved Oxygen** | ≥ 5 mg/L 1 m above substrate | Yes |
| ***Escherichia coli* Bacteria** | ≤10 CFU/100 mL (90$^{th}$ percentile) with a minimum 5 weekly samples collected over a 30-day period | Yes |
| **Turbidity** | ≤ 2.0 NTU maximum 5 m above substrate | Yes |
| **Total phosphorus** | ≤5 µg/L average during epilimnetic growing season (May –Sept) | Yes |
| **Total cadmium** | ≤ 0.01 µg/L average | **No (just above objective in John Hart Lake)** |
| **Total copper** | ≤ 4 µg/L maximum, ≤ 2 µg/L average (minimum 5 weekly samples collected over a 30-day period) | Yes |
| **Total zinc** | ≤ 33 µg/L maximum, ≤ 7.5 µg/L average (minimum 5 weekly samples collected over a 30-day period) | Yes |
| **Chlorophyll *a*** | ≤ 1.5 µg/L chlorophyll *a* maximum, eplimnetic growing season | Yes |

The summer 90$^{th}$ percentile value for *E. coli* at the John Hart Lake Pumphouse (outlet) site was 10 CFU/100 mL, meeting the objective; however, results such as these that are so close to the objective level highlight the need for water purveyors to provide adequate treatment prior to consumption. The Pumphouse site is very close to shore with a lot of duck activity in the summer, and tends to get higher bacteriological values than the other sites (Neill pers. comm., 2011). The City of Campbell River samples this site twice monthly, quarterly and completes five weekly samples in 30 days in summer and fall every year.

Metals levels continued to show a decreasing trend from historical 2003-2006 sample period values for cadmium, copper and zinc (Table 3). Cadmium was at or just above the objective in John Hart Lake throughout the year (Table 4), but is a decreasing concern as levels showed a continuous reduction in concentrations over time. One very high total copper value (11.2 µg/L) was observed on March 16, 2011; this value is inconsistently high relative to the dissolved copper value, relative to other metals observed on the same day and relative to all other copper values observed in McIvor Lake (the next highest was 0.9 µg/L). Thus, it is likely a data entry error and has been removed from the data set.

**Table 3.** Comparison of maximum concentrations of all samples of dissolved cadmium, copper, lead and zinc (µg/L) in John Hart Lake between 1981, 2003-2006 and 2010/11, in McIvor Lake 2003-2006 and 2010/11, and in Lower Campbell Lake in 2010/11.

| Metal | John Hart Lake 1981 | John Hart Lake 2003-2006 | John Hart Lake 2010/11 | McIvor Lake 2003-2006 | McIvor Lake 2010/11 | Lower Campbell Lake 2010/11 |
|---|---|---|---|---|---|---|
| Dissolved cadmium | 1.8 | 0.8 | 0.02 | 0.1 | 0.03 | 0.04 |
| Dissolved copper | 20 | 4.4 | 0.6 | 1.0 | 1.0 | 0.9 |
| Dissolved lead | 6 | 0.2 | 0.01 | 0.1 | 0.02 | 0.02 |
| Dissolved zinc | 70 | 14.2 | 8.2 | 9.6 | 6.6 | 3.4 |

**Table 4.** Summary of 2010/11 maximum and 5 sample in 30 day average total metals concentrations (µg/L) in John Hart Lake, McIvor Lake (maximums only) and Lower Campbell Lake compared with aquatic life (AL) (guidelines based on average hardness 20 mg/L). Values in bold exceed aquatic life guidelines.

| | John Hart Lake max (range of averages) | McIvor Lake max | Lower Campbell Lake max (range of averages) | Avg AL guideline | Max. AL guideline |
|---|---|---|---|---|---|
| Total cadmium | 0.04 (0.007-**0.014**) | 0.04 | 0.02 (0.008-0.009) | 0.01 | n/a |
| Total copper | 1.1 (0.5-0.6) | 0.9 | 0.7 (0.5-0.6) | 2 | 4 |
| Total lead | 0.2 (0.006–0.01) | 0.08 | 0.02 (0.007-0.01) | 4 | 10 |
| Total zinc | 12.5 (2.7-4.8) | 7.1 | 6.9 (2.7-3.6) | 7.5 | 33 |

Chlorophyll *a* values collected in March 2011 using the Hydrolab (field samples) in McIvor Lake were as high as 2.3 µg/L at depths greater than 4 m. Though higher than the objective of 1.5 µg/L (the objective is based on surface samples only), these values were observed outside of the epilimnetic growing season, are still within the range of values considered normal for a low productivity (oligotrophic) lake such as McIvor Lake, and thus are not of concern. The Hydrolab instrument allowed the entire water column values to be monitored, as opposed to grab samples taken at the water surface. It is recommended that the City of Campbell River continue to monitor chlorophyll *a* profiles in both lakes to determine normal values throughout the water column.

## Conclusions and Recommendations

Given that the pumphouse site is also a water intake for the Gordon Road and Industrial Park areas, it is recommended that regular bacteriological monitoring by the City of Campbell River continue. Cadmium levels appear to be following a downward trend and thus are likely a decreasing concern, though monitoring should continue as per the Water Quality Objectives recommendations. The watershed education and awareness program implemented by the City of Campbell River should continue indefinately. The City of Campbell River should continue to do chlorophyll *a* profiles using a Hydrolab to determine the natural chlorophyll *a* range throughout the water column, especially during the epilimnetic growing season.

## References


Barlak, R. and Phippen, B. 2012. Water quality assessment and objectives for the John Hart Lake Community Watershed and McIvor Lake: technical report. British Columbia Ministry of Environment. Victoria, B.C. Available online at: http://www.env.gov.bc.ca/wat/wq/wq_objectives.html

Comox Strathcona Waste Management Service. 2012. Campbell River Landfill Frequently Asked Questions. Comox Valey Regional District. Available online at: http://www.cswm.ca

Iannidinardo, D. 2011. TimberWest Forest Corp. Manager, Environment and Resource Integration.

Henderson, S. 2011. 2010 Annual Environmental Report. NVI Mining Ltd. Myra Falls Operations.

Neill, A. 2011. City of Campbell River. Water Quality Technologist.

Richardson, L. 2011. City of Campbell River. Contract Educator.

Watson, S. 2011. BC Hydro. Vancouver Island Community Relations.

## Appendix 1: Water quality monitoring results

Figure 1 – Dissolved oxygen profile for John Hart Lake mid lake site.

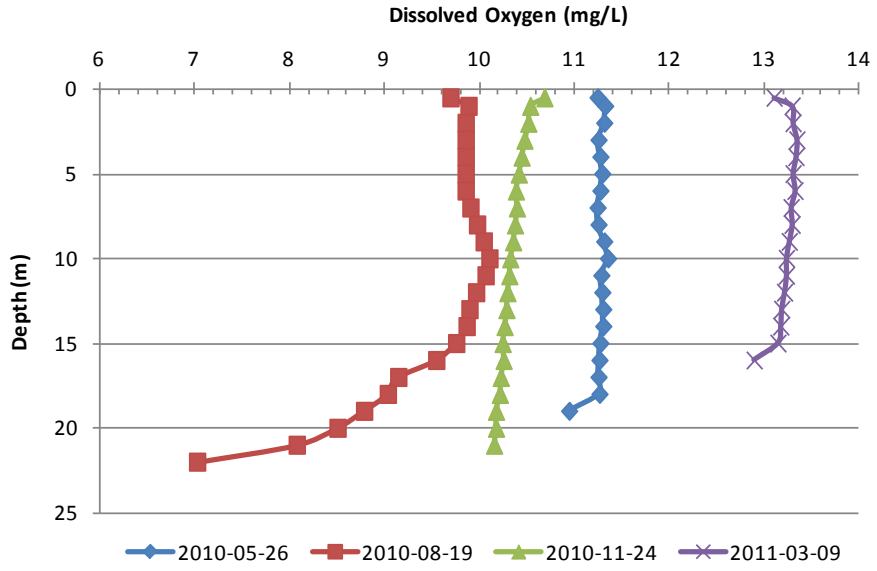


Figure 2 – Temperature profile for John Hart Lake mid lake site.

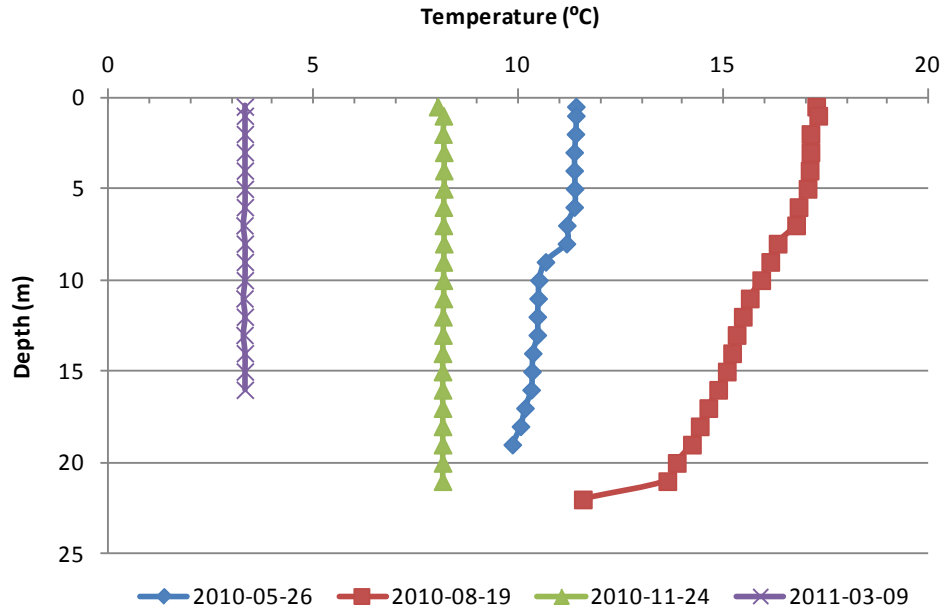

Figure 3 – Chlorophyll *a* profile for John Hart Lake mid lake site.

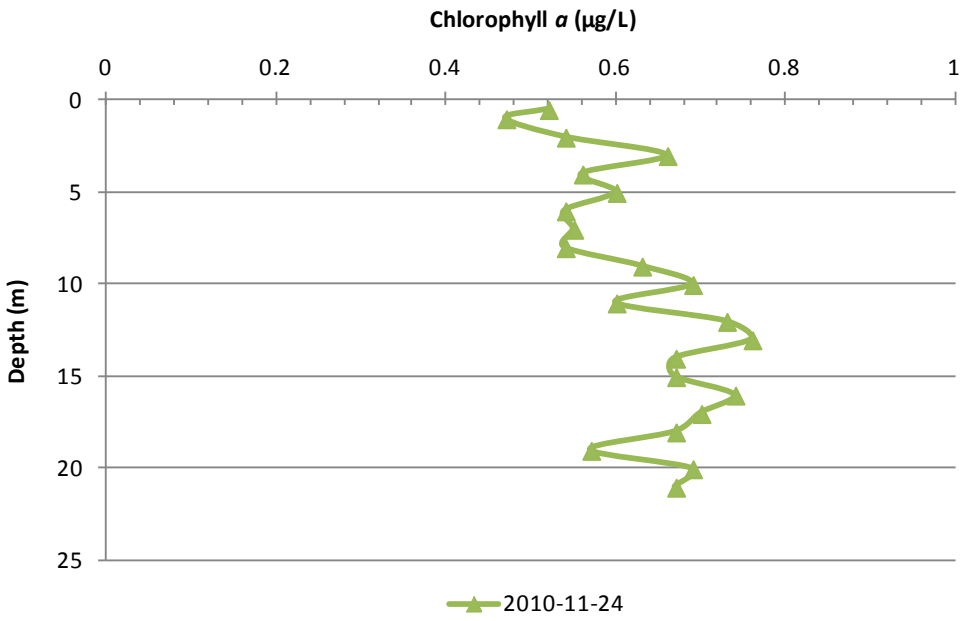


Figure 4 – Dissolved oxgyen profile for McIvor Lake deep station site.

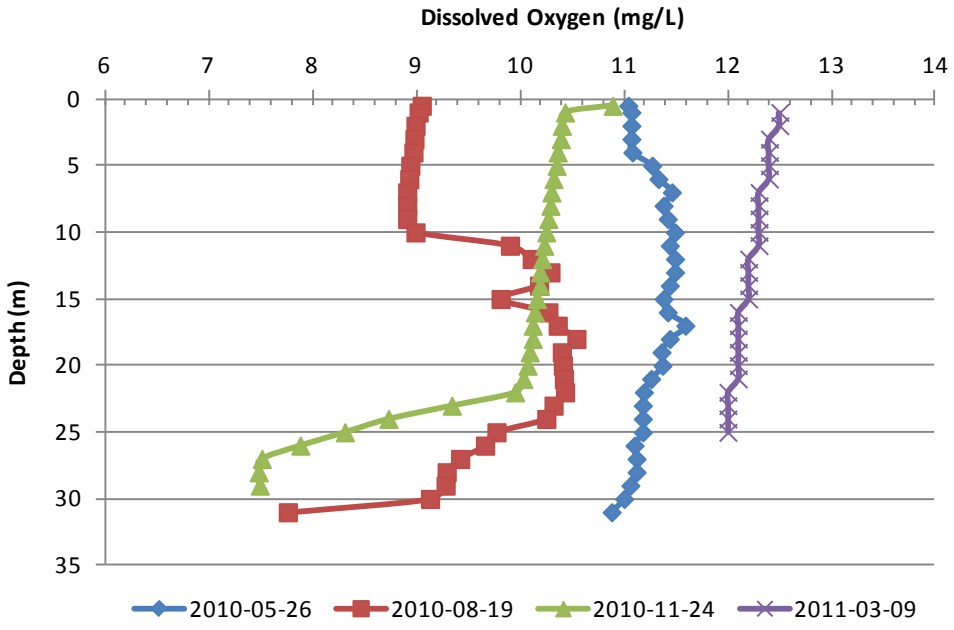

Figure 5 – Temperature profile for McIvor Lake deep station site.

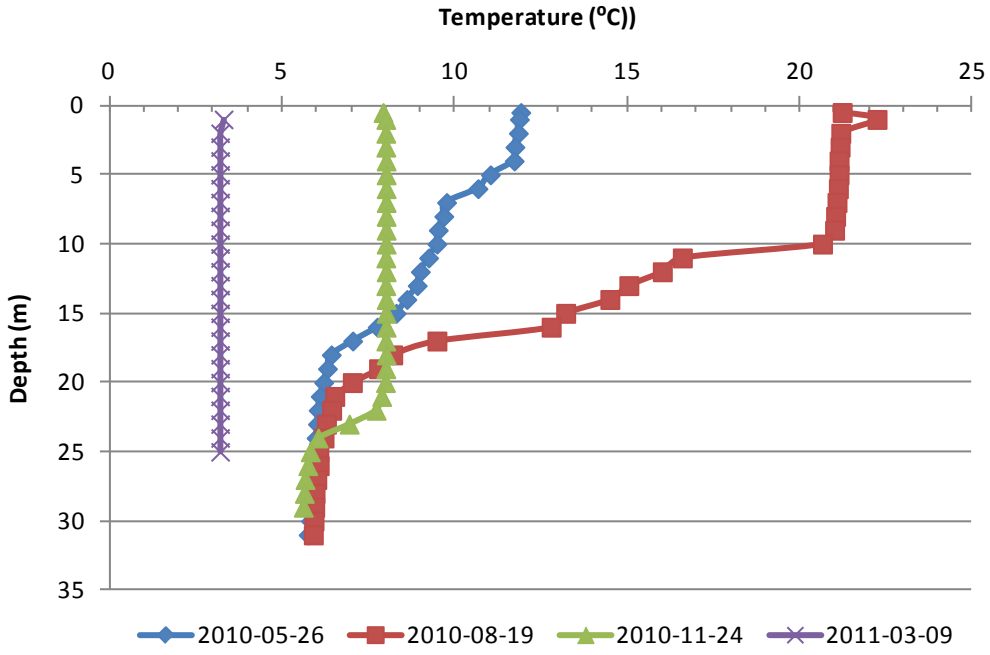


Figure 6 – Chlorophyll *a* profile for McIvor Lake deep station site.

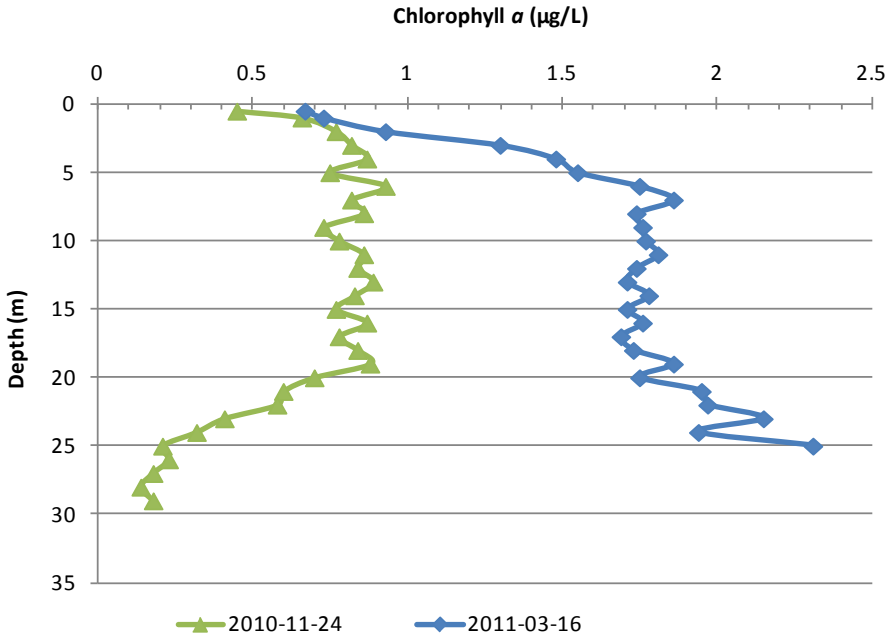

Figure 7 – Secchi depths for John Hart Lake mid lake and McIvor Lake deep station sites.

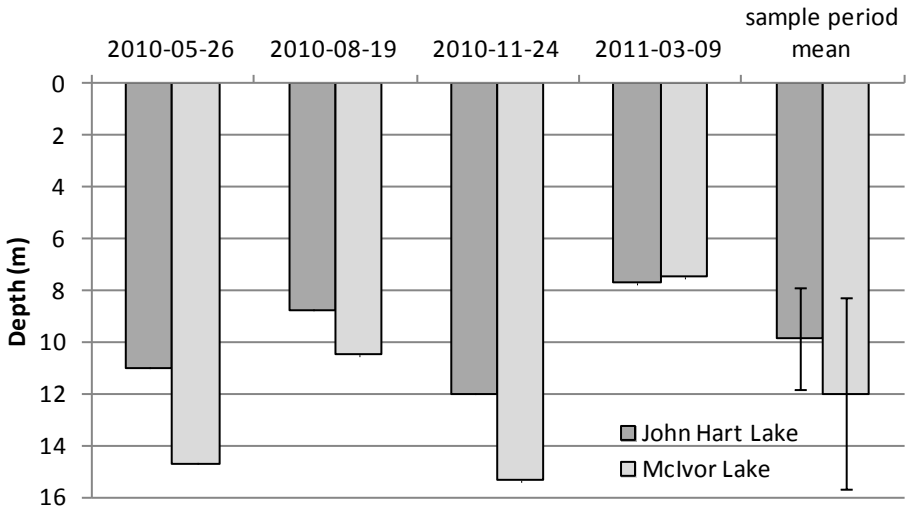


Table 5 – Bacteriological results for John Hart Lake and McIvor Lake sites.

| EMS ID | LOCATION NAME | Dates | 90th percentile Fecal Coliforms (CFU/100mL) | 90th percentile *E. Coli* (CFU/100mL) |
|---|---|---|---|---|
| 1130020 | JOHN HART RESERVOIR NEAR PUMPHOUSE AT DAM | Aug 19-Sept 15, 2010 | **20.8** | **10.4** |
| E252669 | JOHN HART LAKE AT LADORE DAM | Aug 19-Sept 15, 2010 | 3.6 | 1 |
| E283129 | FUTURE LOWER CAMPBELL LAKE INTAKE | Aug 19-Sept 15, 2010 | 3.2 | 1 |
| 1130020 | JOHN HART RESERVOIR NEAR PUMPHOUSE AT DAM | Oct 20-Nov 17, 2010 | 2.6 | 2 |
| E252669 | JOHN HART LAKE AT LADORE DAM | Oct 20-Nov 17, 2010 | 1 | 1 |
| E283129 | FUTURE LOWER CAMPBELL LAKE INTAKE | Oct 20-Nov 17, 2010 | 1.6 | 1.6 |

Table 6 – Summary statistics for all John Hart Lake and McIvor Lake sites from May 2010 through March 2011. Shaded cells indicate values below minimum detection limits.

| LOCATION NAME | E252669 JOHN HART LAKE AT LADORE DAM | | | | |
|---|---|---|---|---|---|
| Parameter | Min | Max | Average | StdDev | Number of samples |
| Ag-D (mg/L) | 0.000005 | 0.000005 | 0.000005 | 0 | 10 |
| Ag-T (mg/L) | 0.000005 | 0.000005 | 0.000005 | 0 | 10 |
| Al-D (mg/L) | 0.0094 | 0.0146 | 0.01259 | 0.001605857 | 10 |
| Al-T (mg/L) | 0.0101 | 0.0201 | 0.01387 | 0.002481062 | 10 |
| As-D (mg/L) | 0.00006 | 0.00013 | 0.000099 | 1.96921E-05 | 10 |
| As-T (mg/L) | 0.00003 | 0.00012 | 0.000095 | 2.50555E-05 | 10 |
| B--D (mg/L) | 0.05 | 0.05 | 0.05 | 7.31424E-18 | 10 |
| B--T (mg/L) | 0.05 | 0.05 | 0.05 | 7.31424E-18 | 10 |
| Ba-D (mg/L) | 0.00273 | 0.00297 | 0.002852 | 9.89725E-05 | 10 |
| Ba-T (mg/L) | 0.00273 | 0.00316 | 0.002897 | 0.000126495 | 10 |
| Be-D (mg/L) | 0.00001 | 0.00001 | 0.00001 | 0 | 10 |
| Be-T (mg/L) | 0.00001 | 0.00001 | 0.00001 | 0 | 10 |
| Bi-D (mg/L) | 0.000005 | 0.000005 | 0.000005 | 0 | 10 |
| Bi-T (mg/L) | 0.000005 | 0.000005 | 0.000005 | 0 | 10 |
| Ca-D (mg/L) | 7.11 | 7.97 | 7.682 | 0.258577304 | 10 |
| Cd-D (mg/L) | 0.000005 | 0.000016 | 0.000009 | 3.3665E-06 | 10 |
| Cd-T (mg/L) | 0.000005 | 0.000035 | 0.0000127 | 8.62876E-06 | 10 |
| Co-D (mg/L) | 0.000005 | 0.000007 | 0.0000053 | 6.74949E-07 | 10 |
| Co-T (mg/L) | 0.000005 | 0.00001 | 0.0000069 | 1.72884E-06 | 10 |
| Cr-D (mg/L) | 0.0001 | 0.0001 | 0.0001 | 1.42856E-20 | 10 |
| Cr-T (mg/L) | 0.0001 | 0.0001 | 0.0001 | 1.42856E-20 | 10 |
| Cu-D (mg/L) | 0.00036 | 0.00054 | 0.000459 | 6.72392E-05 | 10 |
| Cu-T (mg/L) | 0.00045 | 0.00109 | 0.000634 | 0.000216651 | 10 |
| Li-D (mg/L) | 0.0005 | 0.0005 | 0.0005 | 1.14285E-19 | 10 |
| Li-T (mg/L) | 0.0005 | 0.0005 | 0.0005 | 1.14285E-19 | 10 |
| Mg-D (mg/L) | 0.82 | 0.93 | 0.868 | 0.030110906 | 10 |
| Mg-T (mg/L) | 0.699 | 0.902 | 0.8376 | 0.063880444 | 10 |
| Mn-D (mg/L) | 0.00005 | 0.00044 | 0.000161 | 0.000130848 | 10 |
| Mn-T (mg/L) | 0.00267 | 0.00624 | 0.0035 | 0.001101504 | 10 |
| Mo-D (mg/L) | 0.00012 | 0.00016 | 0.000135 | 1.50923E-05 | 10 |
| Mo-T (mg/L) | 0.00009 | 0.00013 | 0.000115 | 1.35401E-05 | 10 |
| Ni-D (mg/L) | 0.00002 | 0.00027 | 0.000052 | 7.69993E-05 | 10 |
| Ni-T (mg/L) | 0.00002 | 0.00006 | 0.00004 | 1.33333E-05 | 10 |
| P--T (mg/L) | | | | | |
| Pb-D (mg/L) | 0.000005 | 0.000014 | 0.0000069 | 3.38132E-06 | 10 |
| Pb-T (mg/L) | 0.000005 | 0.000029 | 0.0000126 | 9.68619E-06 | 10 |
| Sb-D (mg/L) | 0.00002 | 0.00003 | 0.000024 | 5.16398E-06 | 10 |
| Sb-T (mg/L) | 0.00002 | 0.00003 | 0.000023 | 4.83046E-06 | 10 |
| Se-D (mg/L) | 0.00005 | 0.00009 | 0.000072 | 1.22927E-05 | 10 |
| Se-T (mg/L) | 0.00007 | 0.0001 | 0.000082 | 9.18937E-06 | 10 |
| Sn-D (mg/L) | 0.00001 | 0.00093 | 0.000102 | 0.00029093 | 10 |
| Sn-T (mg/L) | 0.00001 | 0.00375 | 0.000385 | 0.001182345 | 10 |
| Sr-D (mg/L) | 0.0113 | 0.0119 | 0.01159 | 0.000179196 | 10 |
| Sr-T (mg/L) | 0.0106 | 0.0126 | 0.01161 | 0.000532186 | 10 |

| LOCATION NAME | E252669 JOHN HART LAKE AT LADORE DAM | | | |
|---|---|---|---|---|
| Parameter | Min | Max | Average | StdDev |
| Tl-D (mg/L) | 0.000002 | 0.000002 | 0.000002 | 4.46426E-22 |
| Tl-T (mg/L) | 0.000002 | 0.000002 | 0.000002 | 4.46426E-22 |
| U--D (mg/L) | 0.000005 | 0.00002 | 0.0000083 | 4.34741E-06 |
| U--T (mg/L) | 0.000002 | 0.00001 | 0.0000063 | 2.35938E-06 |
| V--D (mg/L) | 0.0002 | 0.0007 | 0.00035 | 0.000158114 |
| V--T (mg/L) | 0.0002 | 0.0004 | 0.00024 | 6.99206E-05 |
| Zn-D (mg/L) | 0.0019 | 0.0039 | 0.00264 | 0.000643256 |
| Zn-T (mg/L) | 0.0025 | 0.0125 | 0.00404 | 0.003015221 |
| | | | | |
| | | | | |
| Carbon Dissolved Organic (mg/L) | | | | |
| Carbon Total Organic (mg/L) | | | | |
| Chlorophyll A (mg/L) (meter) | | | | |
| Chlorophyll A (mg/L) (lab) | | | | |
| Coli:Fec (CFU/100mL) | 1 | 4 | 1.5 | 1.08012345 |
| Diss Oxy (mg/L) | | | | |
| E Coli (CFU/100mL) | 1 | 1 | 1 | 0 |
| Extinction Depth | | | | |
| Hardness Total (D) (mg/L) | 21.3 | 23.5 | 22.76 | 0.661983551 |
| ORP (mV) | | | | |
| pH (pH units) | | | | |
| Specific Conductance (uS/cm) | | | | |
| Temp (C) | | | | |
| Turbidity (NTU) | | | | |

| LOCATION NAME | E259337 JOHN HART LAKE MID LAKE SITE | | | | |
|---|---|---|---|---|---|
| Parameter | Min | Max | Average | StdDev | Number of samples |
| Ag-D (mg/L) | 0.000005 | 0.000007 | 5.16667E-06 | 5.7735E-07 | 12 |
| Ag-T (mg/L) | 0.000005 | 0.000005 | 0.000005 | 0 | 12 |
| Al-D (mg/L) | 0.0028 | 0.0193 | 0.010883333 | 0.005541223 | 12 |
| Al-T (mg/L) | 0.004 | 0.0715 | 0.019033333 | 0.017149786 | 12 |
| As-D (mg/L) | 0.00007 | 0.00028 | 0.00011 | 5.5922E-05 | 12 |
| As-T (mg/L) | 0.00006 | 0.00034 | 0.000111667 | 7.35877E-05 | 12 |
| B--D (mg/L) | 0.05 | 0.05 | 0.05 | 7.24744E-18 | 12 |
| B--T (mg/L) | 0.05 | 0.05 | 0.05 | 7.24744E-18 | 12 |
| Ba-D (mg/L) | 0.002 | 0.00302 | 0.002765833 | 0.000264316 | 12 |
| Ba-T (mg/L) | 0.00243 | 0.00309 | 0.002768333 | 0.000208494 | 12 |
| Be-D (mg/L) | 0.00001 | 0.00001 | 0.00001 | 0 | 12 |
| Be-T (mg/L) | 0.00001 | 0.00001 | 0.00001 | 0 | 12 |
| Bi-D (mg/L) | 0.000005 | 0.000005 | 0.000005 | 0 | 12 |
| Bi-T (mg/L) | 0.000005 | 0.000005 | 0.000005 | 0 | 12 |
| Ca-D (mg/L) | 6.86 | 7.79 | 7.265 | 0.308765872 | 12 |
| Cd-D (mg/L) | 0.000006 | 0.000015 | 1.13333E-05 | 2.46183E-06 | 12 |
| Cd-T (mg/L) | 0.000005 | 0.000029 | 0.00001425 | 6.82409E-06 | 12 |
| Co-D (mg/L) | 0.000005 | 0.000008 | 5.91667E-06 | 1.1645E-06 | 12 |
| Co-T (mg/L) | 0.000005 | 0.000036 | 0.0000145 | 8.86771E-06 | 12 |
| Cr-D (mg/L) | 0.0001 | 0.0001 | 0.0001 | 2.83103E-20 | 12 |
| Cr-T (mg/L) | 0.0001 | 0.0002 | 0.000108333 | 2.88675E-05 | 12 |
| Cu-D (mg/L) | 0.00036 | 0.00064 | 0.0004875 | 8.01277E-05 | 12 |
| Cu-T (mg/L) | 0.0004 | 0.0008 | 0.000581667 | 0.000129463 | 12 |
| Li-D (mg/L) | 0.0005 | 0.0005 | 0.0005 | 1.13241E-19 | 12 |
| Li-T (mg/L) | 0.0005 | 0.0005 | 0.0005 | 1.13241E-19 | 12 |
| Mg-D (mg/L) | 0.81 | 1.32 | 0.895833333 | 0.137209749 | 12 |
| Mg-T (mg/L) | 0.789 | 1.33 | 0.91275 | 0.154185912 | 12 |
| Mn-D (mg/L) | 0.00008 | 0.011 | 0.001575 | 0.002991526 | 12 |
| Mn-T (mg/L) | 0.00007 | 0.0259 | 0.004401667 | 0.006900894 | 12 |
| Mo-D (mg/L) | 0.00009 | 0.00012 | 0.000106667 | 1.23091E-05 | 12 |
| Mo-T (mg/L) | 0.00007 | 0.00015 | 0.000104167 | 2.4293E-05 | 12 |
| Ni-D (mg/L) | 0.00002 | 0.00007 | 0.0000475 | 1.71226E-05 | 12 |
| Ni-T (mg/L) | 0.00003 | 0.00025 | 9.66667E-05 | 6.87992E-05 | 12 |
| P--T (mg/L) | 0.002 | 0.004 | 0.002416667 | 0.000668558 | 12 |
| Pb-D (mg/L) | 0.000005 | 0.000012 | 0.00000625 | 2.17945E-06 | 12 |
| Pb-T (mg/L) | 0.000005 | 0.000174 | 3.69167E-05 | 4.92682E-05 | 12 |
| Sb-D (mg/L) | 0.00002 | 0.00004 | 2.83333E-05 | 7.17741E-06 | 12 |
| Sb-T (mg/L) | 0.00002 | 0.00003 | 2.41667E-05 | 5.14929E-06 | 12 |
| Se-D (mg/L) | 0.00006 | 0.00009 | 8.08333E-05 | 9.00337E-06 | 12 |
| Se-T (mg/L) | 0.00005 | 0.0001 | 7.58333E-05 | 1.24011E-05 | 12 |
| Sn-D (mg/L) | 0.00001 | 0.00001 | 0.00001 | 0 | 12 |
| Sn-T (mg/L) | 0.00001 | 0.00001 | 0.00001 | 0 | 12 |
| Sr-D (mg/L) | 0.0113 | 0.0144 | 0.011908333 | 0.000865982 | 12 |
| Sr-T (mg/L) | 0.0105 | 0.0147 | 0.011658333 | 0.001106558 | 12 |

| LOCATION NAME | E259337 JOHN HART LAKE MID LAKE SITE | | | | |
|---|---|---|---|---|---|
| Parameter | Min | Max | Average | StdDev | Number of samples |
| Tl-D (mg/L) | 0.000002 | 0.000002 | 0.000002 | 4.42349E-22 | 12 |
| Tl-T (mg/L) | 0.000002 | 0.000003 | 2.08333E-06 | 2.88675E-07 | 12 |
| U--D (mg/L) | 0.000003 | 0.000008 | 6.08333E-06 | 1.37895E-06 | 12 |
| U--T (mg/L) | 0.000004 | 0.000035 | 8.58333E-06 | 8.4149E-06 | 12 |
| V--D (mg/L) | 0.0003 | 0.0005 | 0.000358333 | 7.92961E-05 | 12 |
| V--T (mg/L) | 0.0002 | 0.0006 | 0.000308333 | 0.00011645 | 12 |
| Zn-D (mg/L) | 0.0009 | 0.0082 | 0.003908333 | 0.001931772 | 12 |
| Zn-T (mg/L) | 0.0013 | 0.0086 | 0.005125 | 0.002482347 | 12 |
| | | | | | |
| | | | | | |
| Carbon Dissolved Organic (mg/L) | 0.5 | 2.1 | 1.016666667 | 0.563807403 | 12 |
| Carbon Total Organic (mg/L) | 0.5 | 1.6 | 0.9 | 0.33028913 | 12 |
| Chlorophyll A (mg/L) (meter) | 0.00047 | 0.00076 | 0.000625909 | 8.0691E-05 | 22 |
| Chlorophyll A (mg/L) (lab) | 0.0005 | 0.0009 | 0.000675 | 0.000206155 | 4 |
| Coli:Fec (CFU/100mL) | | | | | |
| Diss Oxy (mg/L) | 7.02 | 13.34 | 10.92609756 | 1.407011329 | 82 |
| E Coli (CFU/100mL) | | | | | |
| Extinction Depth | 7.71 | 12 | 9.8625 | 1.979568556 | 4 |
| Hardness Total (D) (mg/L) | 20.5 | 24.3 | 21.825 | 1.112838304 | 12 |
| ORP (mV) | 339 | 468 | 400.9512195 | 35.85082345 | 82 |
| pH (pH units) | 6.38 | 7.95 | 7.257926829 | 0.478094825 | 82 |
| Specific Conductance (uS/cm) | 43 | 49 | 46.76097561 | 1.921853279 | 82 |
| Temp (C) | 3.31 | 17.3 | 9.874146341 | 4.468064168 | 82 |
| Turbidity (NTU) | 0.2 | 0.4 | 0.241666667 | 0.079296146 | 12 |

| LOCATION NAME | 1130020 JOHN HART RESERVOIR NEAR PUMPHOUSE AT DAM | | | | |
|---|---|---|---|---|---|
| Parameter | Min | Max | Average | StdDev | Number of samples |
| Ag-D (mg/L) | 0.000005 | 0.000005 | 0.000005 | 0 | 10 |
| Ag-T (mg/L) | 0.000005 | 0.000005 | 0.000005 | 0 | 10 |
| Al-D (mg/L) | 0.0011 | 0.0139 | 0.00876 | 0.004010597 | 10 |
| Al-T (mg/L) | 0.0079 | 0.0152 | 0.01167 | 0.001959053 | 10 |
| As-D (mg/L) | 0.00005 | 0.00012 | 0.000094 | 2.27058E-05 | 10 |
| As-T (mg/L) | 0.00003 | 0.00012 | 0.000085 | 2.4608E-05 | 10 |
| B--D (mg/L) | 0.05 | 0.05 | 0.05 | 7.31424E-18 | 10 |
| B--T (mg/L) | 0.05 | 0.05 | 0.05 | 7.31424E-18 | 10 |
| Ba-D (mg/L) | 0.0019 | 0.00307 | 0.00281 | 0.000333067 | 10 |
| Ba-T (mg/L) | 0.00245 | 0.00317 | 0.002867 | 0.000194939 | 10 |
| Be-D (mg/L) | 0.00001 | 0.00001 | 0.00001 | 0 | 10 |
| Be-T (mg/L) | 0.00001 | 0.00001 | 0.00001 | 0 | 10 |
| Bi-D (mg/L) | 0.000005 | 0.000005 | 0.000005 | 0 | 10 |
| Bi-T (mg/L) | 0.000005 | 0.000005 | 0.000005 | 0 | 10 |
| Ca-D (mg/L) | 6 | 9.77 | 7.703 | 0.924878971 | 10 |
| Cd-D (mg/L) | 0.000005 | 0.000011 | 0.0000067 | 1.88856E-06 | 10 |
| Cd-T (mg/L) | 0.000005 | 0.000014 | 0.000009 | 3.26599E-06 | 10 |
| Co-D (mg/L) | 0.000005 | 0.000009 | 0.0000055 | 1.2693E-06 | 10 |
| Co-T (mg/L) | 0.000006 | 0.000012 | 0.000008 | 1.94365E-06 | 10 |
| Cr-D (mg/L) | 0.0001 | 0.0004 | 0.00013 | 9.48683E-05 | 10 |
| Cr-T (mg/L) | 0.0001 | 0.0001 | 0.0001 | 1.42856E-20 | 10 |
| Cu-D (mg/L) | 0.00031 | 0.00058 | 0.00043 | 8.52447E-05 | 10 |
| Cu-T (mg/L) | 0.00038 | 0.0006 | 0.000504 | 6.71979E-05 | 10 |
| Li-D (mg/L) | 0.0005 | 0.0005 | 0.0005 | 1.14285E-19 | 10 |
| Li-T (mg/L) | 0.0005 | 0.0005 | 0.0005 | 1.14285E-19 | 10 |
| Mg-D (mg/L) | 0.75 | 0.88 | 0.841 | 0.03725289 | 10 |
| Mg-T (mg/L) | 0.634 | 0.921 | 0.8427 | 0.082236853 | 10 |
| Mn-D (mg/L) | 0.00006 | 0.004 | 0.000643 | 0.001220656 | 10 |
| Mn-T (mg/L) | 0.00299 | 0.0053 | 0.004241 | 0.000786871 | 10 |
| Mo-D (mg/L) | 0.00007 | 0.00021 | 0.000142 | 5.18116E-05 | 10 |
| Mo-T (mg/L) | 0.00009 | 0.00012 | 0.000108 | 1.13529E-05 | 10 |
| Ni-D (mg/L) | 0.00002 | 0.00006 | 0.000037 | 1.33749E-05 | 10 |
| Ni-T (mg/L) | 0.00002 | 0.00008 | 0.000039 | 1.66333E-05 | 10 |
| P--T (mg/L) | 0 | 0 | #DIV/0! | #DIV/0! | 0 |
| Pb-D (mg/L) | 0.000005 | 0.000014 | 0.0000064 | 2.87518E-06 | 10 |
| Pb-T (mg/L) | 0.000005 | 0.000011 | 0.0000066 | 2.41293E-06 | 10 |
| Sb-D (mg/L) | 0.00002 | 0.00004 | 0.000025 | 7.07107E-06 | 10 |
| Sb-T (mg/L) | 0.00002 | 0.00003 | 0.000021 | 3.16228E-06 | 10 |
| Se-D (mg/L) | 0.00005 | 0.0001 | 0.000075 | 1.2693E-05 | 10 |
| Se-T (mg/L) | 0.00006 | 0.0001 | 0.000078 | 1.0328E-05 | 10 |
| Sn-D (mg/L) | 0.00001 | 0.00001 | 0.00001 | 0 | 10 |
| Sn-T (mg/L) | 0.00001 | 0.00002 | 0.000011 | 3.16228E-06 | 10 |
| Sr-D (mg/L) | 0.00916 | 0.0121 | 0.011446 | 0.000822357 | 10 |
| Sr-T (mg/L) | 0.00954 | 0.0124 | 0.011454 | 0.000768146 | 10 |

| LOCATION NAME | 1130020 JOHN HART RESERVOIR NEAR PUMPHOUSE AT DAM | | | |
|---|---|---|---|---|
| Parameter | Min | Max | Average | StdDev |
| Tl-D (mg/L) | 0.000002 | 0.000002 | 0.000002 | 4.46426E-22 |
| Tl-T (mg/L) | 0.000002 | 0.000002 | 0.000002 | 4.46426E-22 |
| U--D (mg/L) | 0.000003 | 0.000016 | 0.0000066 | 3.83551E-06 |
| U--T (mg/L) | 0.000002 | 0.000013 | 0.0000065 | 3.2059E-06 |
| V--D (mg/L) | 0.0002 | 0.0005 | 0.00033 | 0.00011595 |
| V--T (mg/L) | 0.0002 | 0.0004 | 0.00025 | 7.07107E-05 |
| Zn-D (mg/L) | 0.0003 | 0.0028 | 0.00216 | 0.000756013 |
| Zn-T (mg/L) | 0.0022 | 0.0036 | 0.00283 | 0.000492274 |
| | | | | |
| | | | | |
| Carbon Dissolved Organic (mg/L) | | | | |
| Carbon Total Organic (mg/L) | | | | |
| Chlorophyll A (mg/L) (meter) | | | | |
| Chlorophyll A (mg/L) (lab) | | | | |
| Coli:Fec (CFU/100mL) | 1 | 26 | 6 | 8.205689083 |
| Diss Oxy (mg/L) | | | | |
| E Coli (CFU/100mL) | 1 | 16 | 2.8 | 4.66190233 |
| Extinction Depth | | | | |
| Hardness Total (D) (mg/L) | 18.1 | 27.9 | 22.71 | 2.385814559 |
| ORP (mV) | | | | |
| pH (pH units) | | | | |
| Specific Conductance (uS/cm) | | | | |
| Temp (C) | | | | |
| Turbidity (NTU) | | | | |
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| LOCATION NAME | E207156 MCIVOR LAKE | | | | |
|---|---|---|---|---|---|
| Parameter | Min | Max | Average | StdDev | Number of samples |
| Ag-D (mg/L) | 0.000005 | 0.000005 | 0.000005 | 0 | 12 |
| Ag-T (mg/L) | 0.000005 | 0.000017 | 6.4167E-06 | 3.47611E-06 | 12 |
| Al-D (mg/L) | 0.0044 | 0.0141 | 0.00876667 | 0.003179575 | 12 |
| Al-T (mg/L) | 0.0044 | 0.0195 | 0.01203333 | 0.004961366 | 12 |
| As-D (mg/L) | 0.00002 | 0.00011 | 8.0833E-05 | 2.67848E-05 | 12 |
| As-T (mg/L) | 0.00004 | 0.00011 | 8.6667E-05 | 1.92275E-05 | 12 |
| B--D (mg/L) | 0.05 | 0.05 | 0.05 | 7.24744E-18 | 12 |
| B--T (mg/L) | 0.05 | 0.05 | 0.05 | 7.24744E-18 | 12 |
| Ba-D (mg/L) | 0.00269 | 0.00297 | 0.00282583 | 8.95908E-05 | 12 |
| Ba-T (mg/L) | 0.00249 | 0.00306 | 0.00280583 | 0.000205137 | 12 |
| Be-D (mg/L) | 0.00001 | 0.00001 | 0.00001 | 0 | 12 |
| Be-T (mg/L) | 0.00001 | 0.00001 | 0.00001 | 0 | 12 |
| Bi-D (mg/L) | 0.000005 | 0.000005 | 0.000005 | 0 | 12 |
| Bi-T (mg/L) | 0.000005 | 0.000005 | 0.000005 | 0 | 12 |
| Ca-D (mg/L) | 6.96 | 8.58 | 7.48416667 | 0.524221645 | 12 |
| Cd-D (mg/L) | 0.000005 | 0.000029 | 9.9167E-06 | 6.8551E-06 | 12 |
| Cd-T (mg/L) | 0.000005 | 0.000038 | 1.2417E-05 | 8.70171E-06 | 12 |
| Co-D (mg/L) | 0.000005 | 0.000007 | 5.6667E-06 | 8.87625E-07 | 12 |
| Co-T (mg/L) | 0.000005 | 0.000021 | 8.5833E-06 | 4.50168E-06 | 12 |
| Cr-D (mg/L) | 0.0001 | 0.0001 | 0.0001 | 2.83103E-20 | 12 |
| Cr-T (mg/L) | 0.0001 | 0.0001 | 0.0001 | 2.83103E-20 | 12 |
| Cu-D (mg/L) | 0.00039 | 0.00101 | 0.00051 | 0.000166842 | 12 |
| Cu-T (mg/L) | 0.00039 | 0.00091 | 0.00053909 | 0.000143419 | 11 |
| Li-D (mg/L) | 0.0005 | 0.0005 | 0.0005 | 1.13241E-19 | 12 |
| Li-T (mg/L) | 0.0005 | 0.0005 | 0.0005 | 1.13241E-19 | 12 |
| Mg-D (mg/L) | 0.79 | 0.88 | 0.85166667 | 0.024802248 | 12 |
| Mg-T (mg/L) | 0.796 | 0.981 | 0.87391667 | 0.064815063 | 12 |
| Mn-D (mg/L) | 0.00005 | 0.00194 | 0.0007775 | 0.000708855 | 12 |
| Mn-T (mg/L) | 0.00013 | 0.00468 | 0.00238417 | 0.001203219 | 12 |
| Mo-D (mg/L) | 0.00006 | 0.00013 | 0.0001025 | 1.71226E-05 | 12 |
| Mo-T (mg/L) | 0.00006 | 0.00013 | 0.00010083 | 2.15146E-05 | 12 |
| Ni-D (mg/L) | 0.00004 | 0.00013 | 6.4167E-05 | 2.81096E-05 | 12 |
| Ni-T (mg/L) | 0.00003 | 0.00096 | 0.00013333 | 0.000261615 | 12 |
| P--T (mg/L) | 0.002 | 0.003 | 0.00225 | 0.000452267 | 12 |
| Pb-D (mg/L) | 0.000005 | 0.00002 | 8.3333E-06 | 5.49931E-06 | 12 |
| Pb-T (mg/L) | 0.000005 | 0.000075 | 2.3667E-05 | 2.02544E-05 | 12 |
| Sb-D (mg/L) | 0.00002 | 0.00006 | 3.0833E-05 | 9.96205E-06 | 12 |
| Sb-T (mg/L) | 0.00002 | 0.00007 | 3.0833E-05 | 1.31137E-05 | 12 |
| Se-D (mg/L) | 0.00004 | 0.0001 | 0.0000775 | 1.54479E-05 | 12 |
| Se-T (mg/L) | 0.00006 | 0.0001 | 7.9167E-05 | 1.08362E-05 | 12 |
| Sn-D (mg/L) | 0.00001 | 0.00136 | 0.00025833 | 0.000510095 | 12 |
| Sn-T (mg/L) | 0.00001 | 0.0013 | 0.00024 | 0.000472344 | 12 |
| Sr-D (mg/L) | 0.0111 | 0.012 | 0.011525 | 0.000298861 | 12 |
| Sr-T (mg/L) | 0.0107 | 0.012 | 0.01144167 | 0.000435803 | 12 |

| LOCATION NAME | E207156 MCIVOR LAKE | | | | |
|---|---|---|---|---|---|
| Parameter | Min | Max | Average | StdDev | Number of samples |
| Tl-D (mg/L) | 0.000002 | 0.000002 | 0.000002 | 4.42349E-22 | 12 |
| Tl-T (mg/L) | 0.000002 | 0.000002 | 0.000002 | 4.42349E-22 | 12 |
| U--D (mg/L) | 0.000002 | 0.000007 | 0.000005 | 1.80907E-06 | 12 |
| U--T (mg/L) | 0.000002 | 0.000008 | 0.00000525 | 1.60255E-06 | 12 |
| V--D (mg/L) | 0.0002 | 0.0004 | 0.00026667 | 7.78499E-05 | 12 |
| V--T (mg/L) | 0.0002 | 0.0007 | 0.000325 | 0.000148477 | 12 |
| Zn-D (mg/L) | 0.0005 | 0.0066 | 0.00329167 | 0.001498762 | 12 |
| Zn-T (mg/L) | 0.0005 | 0.0071 | 0.003775 | 0.001660298 | 12 |
| | | | | | |
| | | | | | |
| Carbon Dissolved Organic (mg/L) | 0.6 | 1.7 | 1.1 | 0.282842712 | 12 |
| Carbon Total Organic (mg/L) | 0.6 | 1.9 | 1.125 | 0.362127552 | 12 |
| Chlorophyll A (mg/L) (meter) | 0.00014 | 0.00231 | 0.00128079 | 0.000675571 | 38 |
| Chlorophyll A (mg/L) (lab) | 0.0005 | 0.0009 | 0.00063333 | 0.00023094 | 3 |
| Coli:Fec (CFU/100mL) | | | | | |
| Diss Oxy (mg/L) | 7.48 | 12.5 | 11.1842105 | 1.684996803 | 38 |
| E Coli (CFU/100mL) | | | | | |
| Extinction Depth | 7.48 | 15.34 | 12.0025 | 3.703875223 | 4 |
| Hardness Total (D) (mg/L) | 20.9 | 25 | 22.2 | 1.346375606 | 12 |
| ORP (mV) | 347 | 447 | 407.894737 | 35.07735812 | 38 |
| pH (pH units) | 6.36 | 6.98 | 6.77 | 0.150584447 | 38 |
| Specific Conductance (uS/cm) | 44.3 | 48.3 | 45.5289474 | 1.46008291 | 38 |
| Temp (C) | 3.2 | 8.01 | 4.32736842 | 1.772970761 | 38 |
| Turbidity (NTU) | 0.1 | 0.3 | 0.20833333 | 0.066855792 | 12 |

| LOCATION NAME | E283129 | FUTURE INTAKE IN LOWER CAMPBELL LAKE | | | |
|---|---|---|---|---|---|
| Parameter | Min | Max | Average | StdDev | Number of samples |
| Ag-D (mg/L) | 0.000005 | 0.000005 | 0.000005 | 0 | 10 |
| Ag-T (mg/L) | 0.000005 | 0.000005 | 0.000005 | 0 | 10 |
| Al-D (mg/L) | 0.0105 | 0.0167 | 0.01288 | 0.001846197 | 10 |
| Al-T (mg/L) | 0.0097 | 0.0164 | 0.01279 | 0.001848994 | 10 |
| As-D (mg/L) | 0.00007 | 0.00011 | 0.000095 | 1.43372E-05 | 10 |
| As-T (mg/L) | 0.00005 | 0.00012 | 0.000097 | 2.21359E-05 | 10 |
| B--D (mg/L) | 0.05 | 0.05 | 0.05 | 7.31424E-18 | 10 |
| B--T (mg/L) | 0.05 | 0.05 | 0.05 | 7.31424E-18 | 10 |
| Ba-D (mg/L) | 0.00254 | 0.00308 | 0.002854 | 0.000169457 | 10 |
| Ba-T (mg/L) | 0.00263 | 0.00322 | 0.002887 | 0.000171985 | 10 |
| Be-D (mg/L) | 0.00001 | 0.00001 | 0.00001 | 0 | 10 |
| Be-T (mg/L) | 0.00001 | 0.00001 | 0.00001 | 0 | 10 |
| Bi-D (mg/L) | 0.000005 | 0.000005 | 0.000005 | 0 | 10 |
| Bi-T (mg/L) | 0.000005 | 0.000005 | 0.000005 | 0 | 10 |
| Ca-D (mg/L) | 7.11 | 8.16 | 7.585555556 | 0.321018345 | 9 |
| Cd-D (mg/L) | 0.000005 | 0.000044 | 0.000013 | 1.12052E-05 | 10 |
| Cd-T (mg/L) | 0.000005 | 0.000018 | 0.0000088 | 3.99444E-06 | 10 |
| Co-D (mg/L) | 0.000005 | 0.000007 | 0.0000052 | 6.32456E-07 | 10 |
| Co-T (mg/L) | 0.000005 | 0.000009 | 0.000006 | 1.33333E-06 | 10 |
| Cr-D (mg/L) | 0.0001 | 0.0002 | 0.00011 | 3.16228E-05 | 10 |
| Cr-T (mg/L) | 0.0001 | 0.0003 | 0.00016 | 8.43274E-05 | 10 |
| Cu-D (mg/L) | 0.0004 | 0.00085 | 0.000506 | 0.000132346 | 10 |
| Cu-T (mg/L) | 0.00043 | 0.00069 | 0.000533 | 7.2885E-05 | 10 |
| Li-D (mg/L) | 0.0005 | 0.0005 | 0.0005 | 1.14285E-19 | 10 |
| Li-T (mg/L) | 0.0005 | 0.0005 | 0.0005 | 1.14285E-19 | 10 |
| Mg-D (mg/L) | 0.811 | 0.91 | 0.8521 | 0.033461255 | 10 |
| Mg-T (mg/L) | 0.666 | 0.909 | 0.8451 | 0.068685192 | 10 |
| Mn-D (mg/L) | 0.00005 | 0.00145 | 0.000257 | 0.000426173 | 10 |
| Mn-T (mg/L) | 0.002 | 0.00322 | 0.002645 | 0.000432082 | 10 |
| Mo-D (mg/L) | 0.00011 | 0.00015 | 0.000124 | 1.3499E-05 | 10 |
| Mo-T (mg/L) | 0.00009 | 0.00013 | 0.000113 | 1.33749E-05 | 10 |
| Ni-D (mg/L) | 0.00002 | 0.00007 | 0.000045 | 1.77951E-05 | 10 |
| Ni-T (mg/L) | 0.00002 | 0.00014 | 0.000049 | 3.47851E-05 | 10 |
| | | | | | |
| Pb-D (mg/L) | 0.000005 | 0.00002 | 0.000008 | 5.12076E-06 | 10 |
| Pb-T (mg/L) | 0.000005 | 0.000015 | 0.0000092 | 4.41714E-06 | 10 |
| Sb-D (mg/L) | 0.00002 | 0.00004 | 0.000025 | 7.07107E-06 | 10 |
| Sb-T (mg/L) | 0.00002 | 0.00003 | 0.000021 | 3.16228E-06 | 10 |
| Se-D (mg/L) | 0.00005 | 0.0001 | 0.000077 | 1.41814E-05 | 10 |
| Se-T (mg/L) | 0.00007 | 0.00008 | 0.000076 | 5.16398E-06 | 10 |
| Sn-D (mg/L) | 0.00001 | 0.00579 | 0.002071 | 0.001729833 | 10 |
| Sn-T (mg/L) | 0.00001 | 0.00571 | 0.002126 | 0.001902421 | 10 |
| Sr-D (mg/L) | 0.0112 | 0.0122 | 0.01164 | 0.000323866 | 10 |
| Sr-T (mg/L) | 0.0101 | 0.0124 | 0.01151 | 0.000610009 | 10 |

| LOCATION NAME | E283129 | FUTURE INTAKE IN LOWER CAMPBELL LAKE | | | |
|---|---|---|---|---|---|
| Parameter | Min | Max | Average | StdDev | Number of samples |
| Tl-D (mg/L) | 0.000002 | 0.000002 | 0.000002 | 4.46426E-22 | 10 |
| Tl-T (mg/L) | 0.000002 | 0.000002 | 0.000002 | 4.46426E-22 | 10 |
| U--D (mg/L) | 0.000005 | 0.000011 | 0.0000071 | 1.96921E-06 | 10 |
| U--T (mg/L) | 0.000002 | 0.000009 | 0.000005 | 2.44949E-06 | 10 |
| V--D (mg/L) | 0.0002 | 0.0005 | 0.00032 | 0.000122927 | 10 |
| V--T (mg/L) | 0.0002 | 0.0004 | 0.00026 | 6.99206E-05 | 10 |
| Zn-D (mg/L) | 0.0022 | 0.0034 | 0.00262 | 0.00041042 | 10 |
| Zn-T (mg/L) | 0.0024 | 0.0069 | 0.00313 | 0.001347467 | 10 |
| | | | | | |
| | | | | | |
| Carbon Dissolved Organic (mg/L) | | | | | |
| Carbon Total Organic (mg/L) | | | | | |
| Chlorophyll A (mg/L) (meter) | | | | | |
| Chlorophyll A (mg/L) (lab) | | | | | |
| Coli:Fec (CFU/100mL) | 1 | 4 | 1.6 | 0.966091783 | 10 |
| Diss Oxy (mg/L) | | | | | |
| E Coli (CFU/100mL) | 21.1 | 23.8 | 22.45555556 | 0.806398027 | 9 |
| Extinction Depth | | | | | |
| Hardness Total (D) (mg/L) | 1 | 2 | 1.1 | 0.316227766 | 10 |
| ORP (mV) | | | | | |
| pH (pH units) | | | | | |
| Specific Conductance (uS/cm) | | | | | |
| Temp (C) | | | | | |
| Turbidity (NTU) | | | | | |
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Table 7 - Summary of dominant (*i.e*. >10% of sample) zooplankton species for McIvor Lake and John Hart Lake, 2010-11.

| | E207156 McIvor Lake deep station site | | | | | E259337 John Hart Lake Mid Lake Site | | | |
|---|---|---|---|---|---|---|---|---|---|
| | 2010-08-18 | | 2011-03-15 | | | 2010-08-18 | | 2011-03-08 | |
| | total organisms / sample | % of sample | total organisms / sample | % of sample | | total organisms / sample | % of sample | total organisms / sample | % of sample |
| **Sub-class : Copepoda** | | | | | | | | | |
| UID Calanoida / Cyclopoida nauplii | | | 810 | 51 | | | | 640 | 48 |
| **Phylum : Rotifera** | | | | | | | | | |
| *Kellicottia longispina* | | | | | | | | 280 | 21 |
| *Keratella cochlearis* | 13,000 | 78 | | | | 29,000 | 98 | | |
| *Keratella quadrata* | | | | | | | | 150 | 11 |
| **TOTAL per sample** | 16,604 | | 1,599 | | | 29,638 | | 1,342 | |

Table 8 - Summary of dominant (*i.e*. >10% of sample) phytoplankton species for McIvor Lake and John Hart Lake, 2010-11.

| | E207156 McIvor Lake deep station site | | | | | E259337 John Hart Lake Mid Lake Site | | | |
|---|---|---|---|---|---|---|---|---|---|
| | 2010-08-18 | | 2011-03-15 | | | 2010-08-18 | | 2011-03-08 | |
| | cells/mL | % of total | cells/mL | % of total | | cells/mL | % of total | cells/mL | % of total |
| **Order : Centrales** | | | | | | | | | |
| *Melosira italica* | 7.0 | 27.8 | | | | 15.4 | 16.9 | 28.0 | 35.1 |
| **Order : Chlorococcales** | | | | | | | | | |
| *Crucigenia rectangularis* | | | | | | 11.2 | 12.3 | | |
| *Elakatothrix gelatinosa* | 2.8 | 11.1 | | | | | | | |
| *Scenedesmus cf denticulatus* | | | | | | 11.2 | 12.3 | | |
| **Order : Chroococcales** | | | | | | | | | |
| *Anacystis elachista* | | | | | | 14.0 | 15.4 | | |
| **Order : Cryptomonadales** | | | | | | | | | |
| *Chroomonas acuta* | | | | | | | | 14.0 | 17.5 |
| **Order : Dinokontae** | | | | | | | | | |
| *Peridinium cf inconspicuum* | 4.2 | 16.7 | | | | | | | |
| **Order : Pennales** | | | | | | | | | |
| *Asterionella formosa ** | | | 102.2 | 64.0 | | | | 8.4 | 10.5 |
| *Navicula spp.* | 2.8 | 11.1 | | | | | | | |
| *Tabellaria flocculosa* | | | | | | | | 15.4 | 19.3 |
| **Order : Tetrasporales** | | | | | | | | | |
| *Gloeocystis ampla* | 2.8 | 11.1 | | | | | | | |
| TOTAL | 25.2 | | 159.6 | | | 91.0 | | 79.8 | |

Table 9 - Summary of # of plankton species for McIvor Lake and John Hart Lake, 2010-11.

| | McIvor Lake | | John Hart Lake | |
|---|---|---|---|---|
| | 2010-08-18 | 2011-03-15 | 2010-08-18 | 2011-03-15 |
| # zooplankton species | 16 | 17 | 14 | 14 |
| # phytoplankton species | 42 | 47 | 53 | 51 |