

**RC BioSolutions Ltd.**

#3 Lindman Close  
Sylvan Lake, Alberta T4S 2M5  
Telephone (403) 887-0455  
Fax (403) 887-0412



[www.rcbio.ca](http://www.rcbio.ca)

**Contract Number: 16OIN889.**

**Assessment of 8 Alberta  
Waterbodies – Alberta Environment  
and Parks**

**Prepared for:**

Alberta Environment and Parks – Operation Infrastructure

**March 2016**

**# Copies:**

2 Bound Copies, 1 Electronic Copy

**RC BioSolutions Ltd.**

#3 Lindman Close  
Sylvan Lake, Alberta T4S 2M5  
Telephone (403) 887-0455  
Fax (403) 887-0412



**LETTER OF TRANSMITTAL**

March 29, 2016

Sean Douglas  
Alberta Environment and Parks  
Operations Infrastructure  
8<sup>th</sup> Floor, Oxbridge Building  
9820 - 106<sup>th</sup> Street NW  
Edmonton, AB  
T5K 2J6

**Contract No:** AEP – 16OIN889  
**Regarding:** Assessment of 8 Alberta Waterbodies – Alberta  
Environment and Parks

---

Dear Mr. Douglas:

Please find enclosed the summary report for the water quality and bathymetry assessment of 8 Alberta waterbodies, as outlined in contract number 16OIN889.

If you have any questions or require further information, please contact our office at your convenience.

Sincerely,  
**RC BioSolutions Ltd.**

A handwritten signature in black ink, appearing to read 'Richard Carson', with a period at the end.

Richard Carson, P. Biol., R.P.Bio.  
Senior Aquatic Biologist, President  
[richard.carson@rcbio.ca](mailto:richard.carson@rcbio.ca)  
403-877-9919 (direct)

# Table of Contents

	Page
<b>1. Introduction .....</b>	<b>1</b>
<b>2. Methods .....</b>	<b>3</b>
2.1 Study sites .....	3
2.2 Bathymetry.....	4
2.3 Water Quality Profiles .....	4
<b>3. Results .....</b>	<b>6</b>
3.1 Dolberg Lake .....	6
3.2 Salter's Lake .....	13
3.3 Muir Lake .....	19
3.4 Cardiff Park Pond.....	26
3.5 Black Nugget Mine Pit Lake .....	33
3.6 Dillberry Lake.....	39
3.7 Blood Indian Creek Reservoir .....	46
3.8 Tyrell Lake .....	55

## List Tables

---

Table 1. Water body location and survey dates summary. ....	3
Table 2. Dolberg Lake water quality profile summary at station DOL1.....	6
Table 3. Dolberg Lake water quality profile summary at station DOL2.....	7
Table 4. Dolberg Lake water quality profile summary at station DOL3.....	8
Table 5. Salter's Lake water quality profile summary at station SAL1.....	13
Table 6. Salter's Lake water quality profile summary at station SAL2.....	14
Table 7. Salter's Lake water quality profile summary at station SAL3.....	14
Table 8. Muir Lake water quality profile summary at station MUIR1. ....	19
Table 9. Muir Lake water quality profile summary at station MUIR2. ....	20
Table 10. Muir Lake water quality profile summary at station MUIR3. ....	21
Table 11. Cardiff Park Pond water quality profile summary at station CAR01.....	26
Table 12. Cardiff Park Pond water quality profile summary at station CAR02.....	27
Table 13. Cardiff Park Pond water quality profile summary at station CAR03.....	28
Table 14. Black Nugget Lake water quality profile summary at station BN1. ....	33
Table 15. Black Nugget Lake water quality profile summary at station BN2. ....	34
Table 16. Black Nugget Lake water quality profile summary at station BN3. ....	34
Table 17. Dillberry Lake water quality profile summary at station DL1.....	39
Table 18. Dillberry Lake water quality profile summary at station DL2.....	40
Table 19. Dillberry Lake water quality profile summary at station DL3.....	41
Table 20. Blood Indian Creek Reservoir water quality profile summary at station BL01. ....	46
Table 21. Blood Indian Creek Reservoir water quality profile summary at station BL02. ....	47

Table 22. Blood Indian Creek Reservoir water quality profile summary at station BL03. ....	48
Table 23. Blood Indian Creek Reservoir water quality profile summary at station BL04. ....	49
Table 24. Tyrell Lake water quality profile summary at station TYR1. ....	55
Table 25. Tyrell Lake water quality profile summary at station TYR2. ....	56
Table 26. Tyrell Lake water quality profile summary at station TYR3. ....	56
Table 27. Tyrell Lake water quality profile summary at station TYR4. ....	57
Table 28. Tyrell Lake water quality profile summary at station TYR5. ....	57

## List of Figures

Figure 1. Locations for eight Alberta waterbodies that were assessed for water quality and bathymetry. ....	2
Figure 2. Dolberg Lake dissolved oxygen profiles at station DOL1. ....	9
Figure 3. Dolberg Lake dissolved oxygen profiles at station DOL2. ....	9
Figure 4. Dolberg Lake dissolved oxygen profiles at station DOL3. ....	9
Figure 5. Dolberg Lake water temperature profiles at station DOL1. ....	10
Figure 6. Dolberg Lake water temperature profiles at station DOL2. ....	10
Figure 7. Dolberg Lake water temperature profiles at station DOL3. ....	10
Figure 8. Dolberg Lake Bathymetry Map Including Water Quality Profile Locations. ....	11
Figure 9. Dolberg Lake (August) – looking north from station DOL1. ....	12
Figure 10. Dolberg Lake (February) – sampling at station DOL1. ....	12
Figure 11. Salter’s Lake dissolved oxygen profiles at station SAL1. ....	15
Figure 12. Salter’s Lake dissolved oxygen profiles at station SAL2. ....	15
Figure 13. Salter’s Lake dissolved oxygen profiles at station SAL3. ....	15
Figure 14. Salter’s Lake water temperature profiles at station SAL1. ....	16
Figure 15. Salter’s Lake water temperature profiles at station SAL2. ....	16
Figure 16. Salter’s Lake water temperature profiles at station SAL3. ....	16
Figure 17. Salter’s Lake Bathymetry Map Including Water Quality Profile Locations. ....	17
Figure 18. Salter’s Lake (August) – looking north from station SAL1. ....	18
Figure 19. Salter’s Lake (February) – sampling at station SAL2. ....	18
Figure 20. Muir Lake dissolved oxygen profiles at station MUIR1. ....	22
Figure 21. Muir Lake dissolved oxygen profiles at station MUIR2. ....	22
Figure 22. Muir Lake dissolved oxygen profiles at station MUIR3. ....	22
Figure 23. Muir Lake water temperature profiles at station MUIR1. ....	23
Figure 24. Muir Lake water temperature profiles at station MUIR2. ....	23
Figure 25. Muir Lake water temperature profiles at station MUIR3. ....	23
Figure 26. Muir Lake Bathymetry Map Including Water Quality Profile Locations. ....	24
Figure 27. Muir Lake (August) – looking north from station MUIR1. ....	25
Figure 28. Muir Lake (February) – sampling at station MUIR3. ....	25
Figure 29. Cardiff Park Pond dissolved oxygen profiles at station CAR01. ....	29
Figure 30. Cardiff Park Pond dissolved oxygen profiles at station CAR02. ....	29
Figure 31. Cardiff Park Pond dissolved oxygen profiles at station CAR03. ....	29

Figure 32. Cardiff Park Pond water temperature profiles at station CAR01. ....	30
Figure 33. Cardiff Park Pond water temperature profiles at station CAR02. ....	30
Figure 34. Cardiff Park Pond water temperature profiles at station CAR03. ....	30
Figure 35. Cardiff Park Pond Bathymetry Map Including Water Quality Profile Locations.....	31
Figure 36. Cardiff Park Pond (August) – looking north from station CAR01.....	32
Figure 37. Cardiff Park Pond (February) – sampling at station CAR01.....	32
Figure 38. Black Nugget Mine Pit Lake dissolved oxygen profiles at station BN1.....	35
Figure 39. Black Nugget Mine Pit Lake dissolved oxygen profiles at station BN2.....	35
Figure 40. Black Nugget Mine Pit Lake dissolved oxygen profiles at station BN3.....	35
Figure 41. Black Nugget Mine Pit Lake water temperature profiles at station BN1. ....	36
Figure 42. Black Nugget Mine Pit Lake water temperature profiles at station BN2. ....	36
Figure 43. Black Nugget Mine Pit Lake water temperature profiles at station BN3. ....	36
Figure 44. Black Nugget Mine Pit Lake Bathymetry Map Including Water Quality Profile Locations.....	37
Figure 45. Black Nugget Mine Pit Lake (August) – looking north from station BN1.....	38
Figure 46. Black Nugget Mine Pit Lake (October) – sampling with YSI meter from Zodiac.....	38
Figure 47. Dillberry Lake dissolved oxygen profiles at station DL1.....	42
Figure 48. Dillberry Lake dissolved oxygen profiles at station DL2.....	42
Figure 49. Dillberry Lake dissolved oxygen profiles at station DL3.....	42
Figure 50. Dillberry Lake water temperature profiles at station DL1. ....	43
Figure 51. Dillberry Lake water temperature profiles at station DL2. ....	43
Figure 52. Dillberry Lake water temperature profiles at station DL3. ....	43
Figure 53. Dillberry Lake Bathymetry Map Including Water Quality Profile Locations.....	44
Figure 54. Dillberry Lake (August) – looking north from station DL1.....	45
Figure 55. Dillberry Lake (February) – looking south from station DL1. ....	45
Figure 56. Blood Indian Creek Reservoir dissolved oxygen profiles at station BL01.....	50
Figure 57. Blood Indian Creek Reservoir dissolved oxygen profiles at station BL02.....	50
Figure 58. Blood Indian Creek Reservoir dissolved oxygen profiles at station BL03.....	50
Figure 59. Blood Indian Creek Reservoir dissolved oxygen profiles at station BL04.....	51
Figure 60. Blood Indian Creek Reservoir water temperature profiles at station BL01. ....	51
Figure 61. Blood Indian Creek Reservoir water temperature profiles at station BL02. ....	51
Figure 62. Blood Indian Creek Reservoir water temperature profiles at station BL03. ....	52
Figure 63. Blood Indian Creek Reservoir water temperature profiles at station BL04. ....	52
Figure 64. Blood Indian Creek Reservoir Bathymetry Map Including Water Quality Profile Locations.....	53
Figure 65. Blood Indian Creek Reservoir (August) – looking north from station BL01.....	54
Figure 66. Blood Indian Creek Reservoir (February) – sampling from top of ice.....	54
Figure 67. Tyrell Lake dissolved oxygen profiles at station TYR1.....	58
Figure 68. Tyrell Lake dissolved oxygen profiles at station TYR2.....	58
Figure 69. Tyrell Lake dissolved oxygen profiles at station TYR3.....	58
Figure 70. Tyrell Lake dissolved oxygen profiles at station TYR4.....	59
Figure 71. Tyrell Lake dissolved oxygen profiles at station TYR5.....	59

Figure 72. Tyrell Lake water temperature profiles at station TYR1. ....	60
Figure 73. Tyrell Lake water temperature profiles at station TYR2. ....	60
Figure 74. Tyrell Lake water temperature profiles at station TYR3. ....	60
Figure 75. Tyrell Lake water temperature profiles at station TYR4. ....	61
Figure 76. Tyrell Lake water temperature profiles at station TYR5. ....	61
Figure 77. Tyrell Lake Bathymetry Map Including Water Quality Profile Locations. ....	62
Figure 78. Tyrell Lake (August) – looking north from station TYR5.....	63
Figure 79. Tyrell Lake (August) – sampling at station TYR2.....	63

## 1. Introduction

The objective of the project was to gather sufficient data within each of the eight water bodies to allow Alberta Environment and Parks to determine if each water body has appropriate habitat (depth and water quality) to support stocked fish throughout the year. The recorded information will also determine which fish species would be best suited for stocking based on habitat conditions. The eight lakes that were assessed included Dolberg Lake, Salter's Lake, Muir Lake, Cardiff Park Pond, Black Nugget Mine Pit Lake, Dillberry Lake, Blood Indian Creek Reservoir, and Tyrell Lake (Figure 1).

To achieve the project objective, a bathymetry survey and several water quality profiles at different seasons throughout the year were completed for each lake.

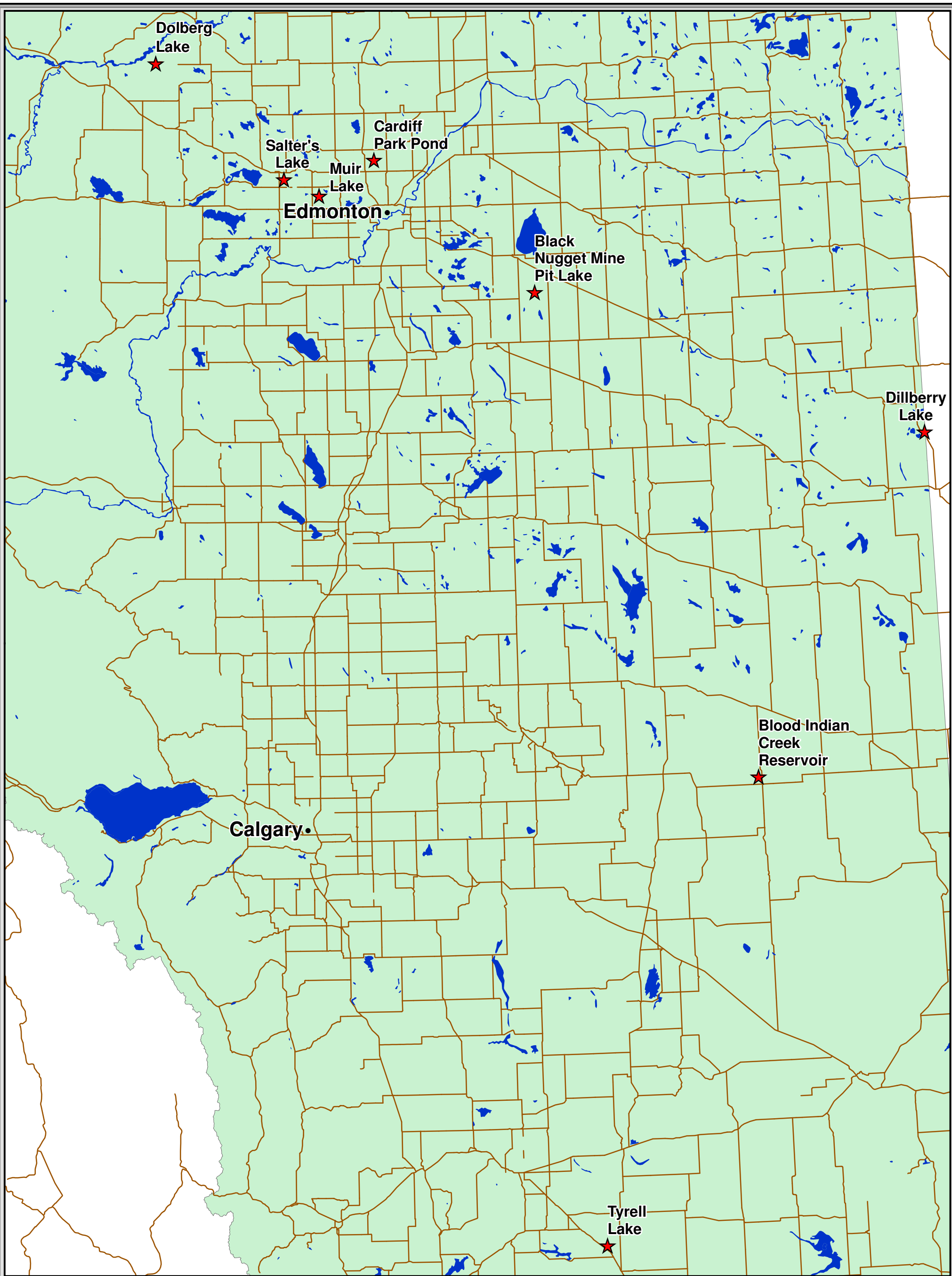
The following staff were involved in the project:

Richard Carson – project manager and field crew lead.

Sandra Babiuk – field crew member and alternate field lead.

Matthew Landgrebe – field crew member.

Z:\Projects\2015\15010\_Environment and Parks\Map\Projects\11X17\15010\_AEP\_WO\_Lakes\_Blood Indian\_17Mar2016.mxd

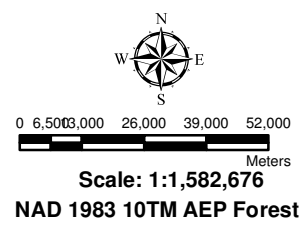


# LEGEND

- Populated Places
- ★ Sample Lake Location
- Lakes
- Roads



**Map Sources/Notes:**  
 Bathymetric Data Collected July 31, 2015 Using a Lowrance 5DS HD Sonar Unit. Lake boundary digitized using aerial photograph provided by AEP.



## Assessment of Eight Alberta Waterbodies

**Locations for 8 Alberta water bodies that were assessed for water quality and bathymetry**

Lead: Richard Carson	Date: 29 Mar 2016
Drawn By: Sandra Babiuk	Project Number: 15010

RC BioSolutions Ltd.	Figure No. 1
----------------------	--------------



## 2. Methods

### 2.1 Study sites

Table 1 summarizes the lake locations, station names and locations, and dates for each survey completed.

**Table 1. Water body location and survey dates summary.**

Water Body	Legal Land Location	Profile Station Name and Location (UTM coordinates)	Water quality profiles - dates completed	Bathymetry mapping - date completed
Dolberg Lake	SE-01-68-08-W5M	DOL1 – 626978E 6002638N 11U DOL2 – 627036E 6002755N 11U DOL3 – 627150E 6002960N 11U	July 30, 2015 August 24, 2015 October 26, 2015 February 22, 2016	July 30, 2015
Salter's Lake	SW-26-54-02-W5M	SAL1 – 685442E 5952946N 11U SAL2 – 685484E 5952730N 11U SAL3 – 685525E 5952503N 11U	July 29, 2015 August 24, 2015 October 26, 2015 February 22, 2016	July 29, 2015
Muir Lake	NW-32-53-27-W4M	MUIR1 – 304465E 5945449N 12U MUIR2 – 304480E 5945604N 12U MUIR3 – 304320E 5946164N 12U	July 29, 2015 August 25, 2015 October 26, 2015 February 22, 2016	July 29, 2015
Cardiff Park Pond	SW-24-55-25-W4M	CAR01 – 329608E 5960438N 12U CAR02 – 329678E 5960152N 12U CAR03 – 329566E 5959961N 12U	July 27, 2015 August 25, 2015 October 26, 2015 February 22, 2016	July 27, 2015
Black Nugget Mine Pit Lake	NW-11-49-18-W4M	BN1 – 397433E 5897833N 12U BN2 – 397729E 5897439N 12U BN3 – 397765E 5897289N 12U	July 28, 2015 August 26, 2015 October 27, 2015 February 18, 2016	July 28, 2015
Dillberry Lake	SW-28-26-09-W4M	DL1 – 567690E 5825483N 12U DL2 – 567359E 5825828N 12U DL3 – 567071E 5825974N 12U	July 28, 2015 August 26, 2015 October 27, 2015 February 18, 2016	July 28, 2015
Blood Indian Creek Reservoir	NE-36-41-01-W4M	BL01 – 485557E 5678199N 12U BL02 – 485218E 5677348N 12U BL03 – 485138E 5676827N 12U BL04 – 485161E 5676276N 12U	July 31, 2015 August 27, 2015 October 28, 2015 February 9, 2016	July 31, 2015
Tyrell Lake	NE-08-05-17-W4M	TYR1 – 408457E 5470990N 12U* TYR2 – 407626E 5471811N 12U TYR3 – 406926E 5472251N 12U TYR4 – 406045E 5472726N 12U TYR5 – 405394E 5473023N 12U	August 1, 2015 August 28, 2015 October 28, 2015 February 9, 2016	August 1, 2015

\* Site not sampled on February 9, 2016 due to poor ice conditions limiting access.

## 2.2 Bathymetry

All data gathered during the open water season was collected from a Zodiac inflatable boat propelled by a gas powered outboard motor, while data gathered during winter sampling was collected from the top of the ice using a gas powered auger to drill through the ice. The use of a gas powered motor is permitted for all work being done by the province. All bathymetry data was collected with a boat-mounted Lowrance 5DS HD sounding unit. A correction was made to account for the distance below water surface at which the transducer was mounted prior to each bathymetry survey. The sounding unit contained a built-in GPS that allows for logging of horizontal position and water depth. Depth measurements were collected every 2 to 3 m of horizontal travel depending on boat speed. The GPS was used in non-differential mode; with an estimated horizontal accuracy of  $\pm 5$  to 10 m. Depth points were collected by navigating a 12 ft. inflatable boat with an approximate 25 m wide grid pattern. Depths as shallow as 1 m were traversed. For large waterbodies (i.e. Tyrell Lake), a wider grid pattern was used for some portions of the lake that had little contour change.

Prior to sounding each lake, the sounder was calibrated using a weighted line to measure the actual water depth and compared to the sounder reading. Adjustments to the transducer angle were made to ensure accurate readings.

A lake surface elevation was taken using a sub cm Spectrum Precision SP80 GPS survey instrument so that the collected bathymetry data is tied to the actual water surface elevation.

A bathymetry map was generated within ArcGIS for each waterbody. The map includes the water quality sample station locations.

## 2.3 Water Quality Profiles

In-situ water quality profiles were measured at each lake, four times during the year with the first set of water quality profiles collected concurrently with the bathymetry surveys. Measurements were taken at a minimum of three stations per lake with one sample station located at the deepest part of the lake. For larger lakes (Tyrell Lake and Blood Indian Creek Reservoir), additional stations were measured to get a representative sample of the entire lake.

Physical parameters (DO, temperature, pH, and specific conductivity) were measured using an YSI Professional Plus multimeter. Salinity was calculated from temperature and specific conductivity in practical salinity units (psu).

UTM coordinates (NAD 83) at each profile location was recorded along with site photographs and depth to bottom. Measurements were recorded at the surface and at 1 m or 0.5 m intervals with the final measurement taken at bottom. In winter, the first measurement was taken under the ice at the ice/water interface.

All data was recorded on standard preprinted forms containing the WQ station number and location, parameter measurement, and corresponding depth.

Calibration of the multimeter was completed and documented before each sampling period.

## 3. Results

### 3.1 Dolberg Lake

Tables 2 to 4 contain the complete water quality profile data for each sample station. Figures 2 to 4 summarize the dissolved oxygen profiles and Figures 5 to 7 summarize the temperature profiles. Most profiles in July, August, and February exhibit a typical stratified water column pattern, while the October profile exhibits a typical fall turnover, fully mixed water column pattern.

Bathymetry data was collected on July 30, 2015 and was used to create a lake bathymetry map (Figure 8). Figures 9 and 10 are site photographs taken during the sampling.

**Table 2. Dolberg Lake water quality profile summary at station DOL1.**

Date (DD/MM/YY)	Ambient Temperature (°C)	Ice Depth (m)	Profile Depth (m)	Water Temperature (°C)	Dissolved Oxygen (mg/L)	Dissolved Oxygen (% Saturation)	Specific Conductivity (µS/cm)	Salinity (psu)	pH
30/07/15	17	N/a	0	20.2	8.34	92.1	270.5	0.14	8.51
			1	20.2	8.31	91.7	270.6	0.14	8.51
			2	20.2	8.25	91.2	270.7	0.14	8.52
			3	20.2	8.33	92.0	270.6	0.14	8.52
			4	20.2	8.32	91.8	270.7	0.14	8.51
			5	18.9	4.17	44.9	292.0	0.16	7.79
			6	14.6	0.76	7.5	316.1	0.19	7.45
7	11.3	0.35	3.2	324.3	0.21	7.36			
24/08/15	16	N/a	0	18.8	7.96	84.6	266.0	0.15	8.50
			1	18.5	7.71	80.6	266.1	0.15	8.48
			2	18.4	7.56	79.9	266.5	0.15	8.46
			3	18.3	7.58	80.5	266.5	0.15	8.45
			4	18.3	7.45	79.0	266.6	0.15	8.43
			5	18.2	7.29	77.2	267.2	0.15	8.36
			6	17.0	2.88	29.6	283.5	0.16	7.83
26/10/15	1	N/a	0	7.5	10.31	86.1	264.4	0.19	8.34
			1	7.5	10.17	84.8	264.4	0.19	8.32
			2	7.5	10.04	83.7	264.4	0.19	8.31
			3	7.5	9.99	83.2	264.4	0.19	8.30
			4	7.5	9.94	82.9	264.4	0.19	8.29
			5	7.5	9.85	82.1	264.4	0.19	8.28
			6	7.5	9.87	82.3	264.5	0.19	8.29
7	7.5	2.29	19.1	265.2	0.19	7.97			
22/02/16	-1	0.37	0	0.6	7.11	49.4	203.5	0.18	8.10
			1	2.7	5.50	40.4	195.7	0.16	8.00
			2	3.4	4.25	31.9	194.2	0.16	7.93
			3	3.9	2.51	19.1	195.9	0.15	7.83
			4	4.0	1.37	10.5	198.8	0.16	7.77
			5	4.1	0.53	3.9	201.4	0.16	7.70
6	4.1	0.52	3.9	203.0	0.16	7.67			

**Table 3. Dolberg Lake water quality profile summary at station DOL2.**

Date (DD/MM/YY)	Ambient Temperature (°C)	Ice Depth (m)	Profile Depth (m)	Water Temperature (°C)	Dissolved Oxygen (mg/L)	Dissolved Oxygen (% Saturation)	Specific Conductivity (µS/cm)	Salinity (psu)	pH
30/07/15	17	N/a	0	20.2	8.30	91.5	270.3	0.14	8.51
			1	20.2	8.41	92.9	270.6	0.14	8.52
			2	20.2	8.47	93.6	270.5	0.14	8.52
			3	20.2	8.49	93.9	270.4	0.14	8.53
			4	20.2	8.48	93.7	270.4	0.14	8.53
			5	19.1	4.31	46.6	290.5	0.16	7.82
			6	15.1	0.75	7.4	314.8	0.19	7.46
			7	11.1	1.19	10.9	323.4	0.21	7.40
			8	9.4	0.10	0.9	342.2	0.24	7.22
			9	8.8	0.08	0.7	363.2	0.25	7.25
24/08/15	16	N/a	0	18.6	7.58	80.7	266.7	0.15	8.48
			1	18.5	7.65	81.6	266.8	0.15	8.47
			2	18.4	7.55	80.8	266.7	0.15	8.45
			3	18.3	7.21	76.3	267.0	0.15	8.40
			4	18.3	6.62	70.4	267.1	0.15	8.27
			5	18.0	4.51	48.0	271.4	0.15	7.96
			6	17.1	2.93	30.5	279.8	0.16	7.73
			7	12.5	0.30	3.0	329.7	0.21	7.48
			8	10.4	0.40	3.5	340.6	0.23	7.42
			9	9.5	0.50	4.8	373.3	0.26	7.35
26/10/15	1	N/a	0	7.5	9.99	83.3	264.2	0.19	8.31
			1	7.5	10.01	83.4	264.2	0.19	8.32
			2	7.5	9.96	83.0	264.3	0.19	8.32
			3	7.5	9.96	82.9	264.3	0.19	8.32
			4	7.4	9.97	83.1	264.4	0.19	8.32
			5	7.4	9.97	83.1	264.4	0.19	8.31
			6	7.4	9.93	82.7	264.4	0.19	8.32
			7	7.4	9.73	80.9	264.6	0.19	8.30
			8	7.3	9.73	80.8	264.7	0.19	8.29
			9	7.3	9.75	80.9	264.6	0.19	8.29
22/02/16	-1	0.33	0	0.7	6.52	45.4	205.7	0.18	7.83
			1	2.7	4.88	35.8	197.0	0.16	7.79
			2	3.3	3.98	29.8	195.2	0.16	7.77
			3	3.7	2.88	21.8	196.0	0.16	7.73
			4	4.0	1.85	13.9	198.6	0.16	7.70
			5	4.1	0.48	3.6	201.3	0.16	7.65
			6	4.4	0.34	2.6	204.6	0.16	7.62
			7	4.5	0.31	2.4	208.1	0.16	7.61
			8	4.8	0.28	2.2	219.3	0.17	7.57

**Table 4. Dolberg Lake water quality profile summary at station DOL3.**

Date (DD/MM/YY)	Ambient Temperature (°C)	Ice Depth (m)	Profile Depth (m)	Water Temperature (°C)	Dissolved Oxygen (mg/L)	Dissolved Oxygen (% Saturation)	Specific Conductivity (µS/cm)	Salinity (psu)	pH
30/07/15	17	N/a	0	20.2	8.28	91.5	269.7	0.14	8.53
			1	20.2	8.40	92.9	270.0	0.14	8.53
			2	20.2	8.33	91.9	270.4	0.14	8.52
			3	20.2	8.34	92.1	270.7	0.14	8.51
			4	20.1	8.31	91.8	270.5	0.14	8.51
			5	19.3	4.34	47.1	288.2	0.16	7.84
			6	15.3	0.54	5.4	314.9	0.19	7.45
24/08/15	16	N/a	0	18.5	7.52	79.5	266.4	0.15	8.47
			1	18.5	7.43	79.4	266.5	0.15	8.46
			2	18.3	7.13	75.9	266.9	0.15	8.41
			3	18.2	6.59	69.9	267.9	0.15	8.30
			4	18.1	5.97	63.0	268.9	0.15	8.21
			5	18.0	5.50	57.9	269.4	0.15	8.12
			6	17.3	3.49	36.4	278.8	0.16	7.94
26/10/15	1	N/a	0	7.5	9.92	82.6	263.5	0.19	8.33
			1	7.4	9.97	83.0	264.2	0.19	8.33
			2	7.4	9.98	83.1	264.3	0.19	8.33
			3	7.4	9.94	82.7	264.3	0.19	8.33
			4	7.4	10.00	83.3	264.3	0.19	8.33
			5	7.4	9.98	83.1	264.3	0.19	8.33
			6	7.4	9.83	81.8	264.4	0.19	8.32
22/02/16	-1	0.34	0	0.6	6.67	46.3	202.7	0.18	7.86
			1	2.8	5.10	37.8	195.2	0.16	7.81
			2	3.5	3.86	29.0	194.4	0.15	7.78
			3	3.8	2.00	15.2	196.7	0.16	7.72
			4	3.7	1.95	14.8	199.5	0.16	7.68
			5	3.9	1.45	11.0	201.4	0.16	7.66

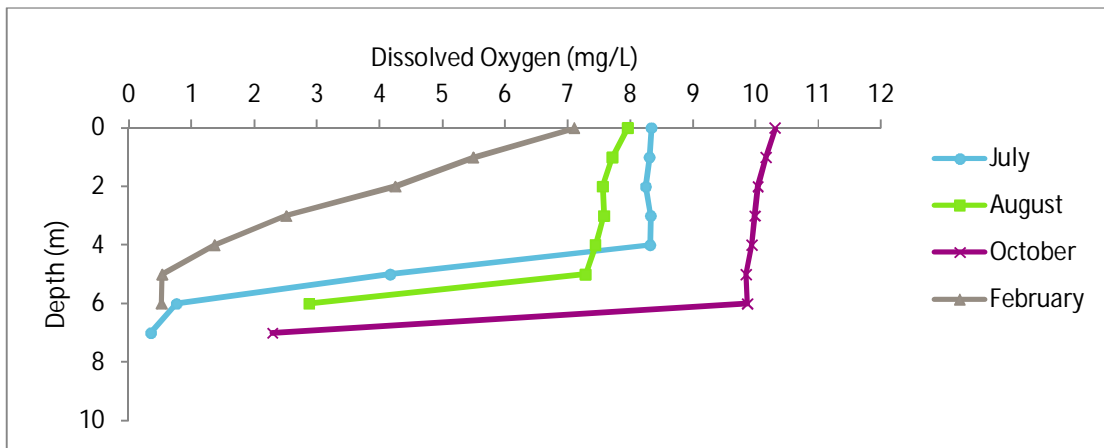


Figure 2. Dolberg Lake dissolved oxygen profiles at station DOL1.

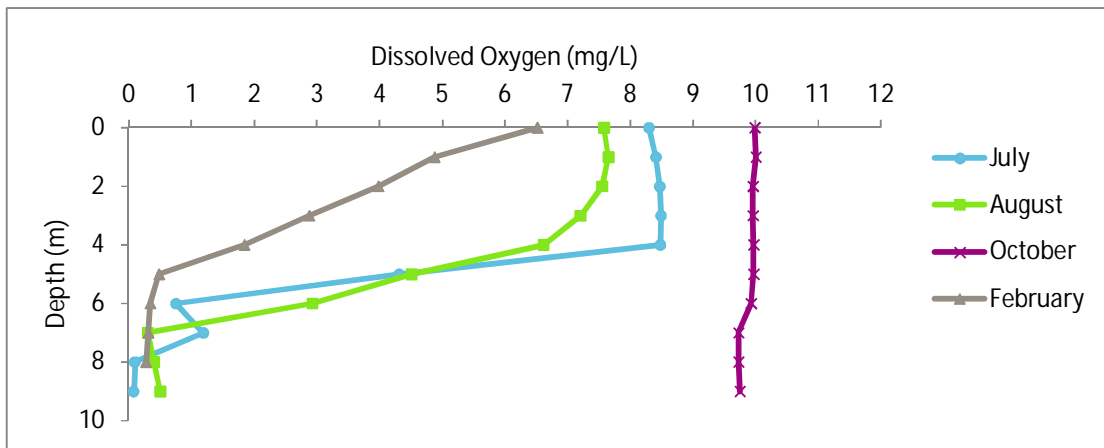


Figure 3. Dolberg Lake dissolved oxygen profiles at station DOL2.

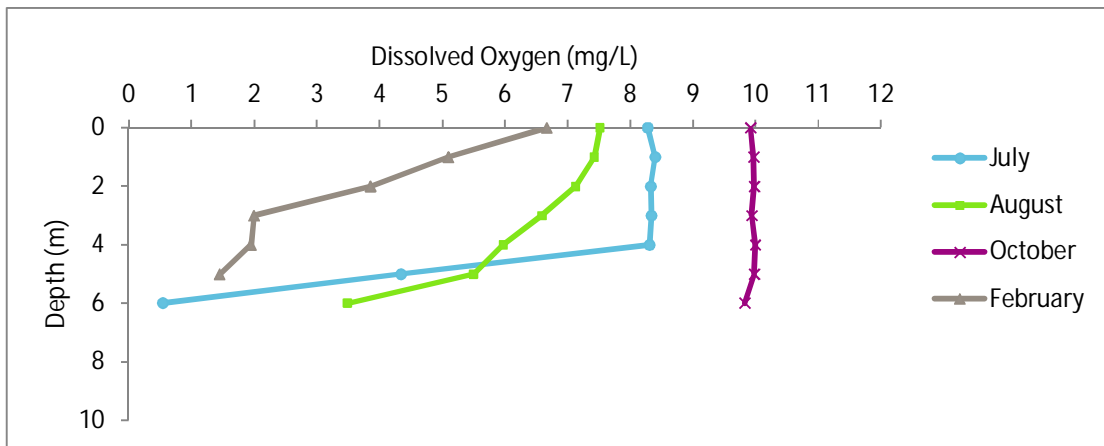


Figure 4. Dolberg Lake dissolved oxygen profiles at station DOL3.

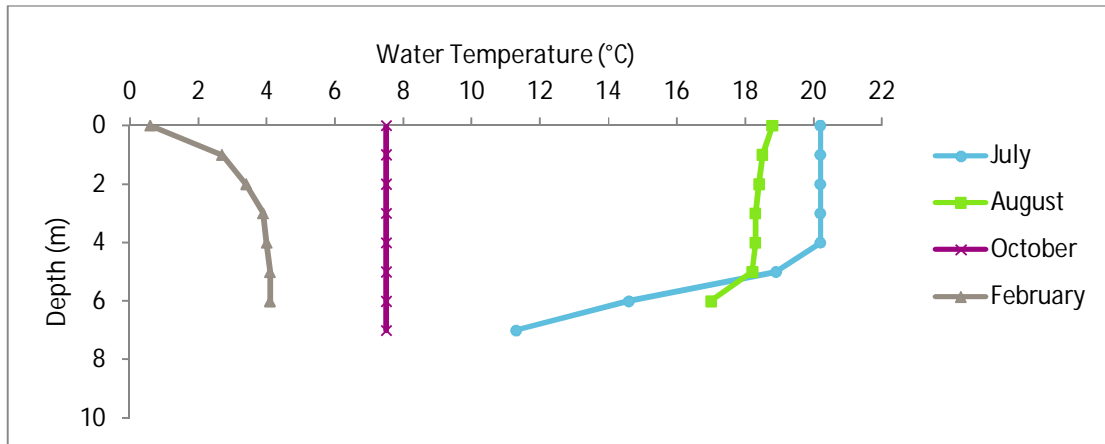


Figure 5. Dolberg Lake water temperature profiles at station DOL1.

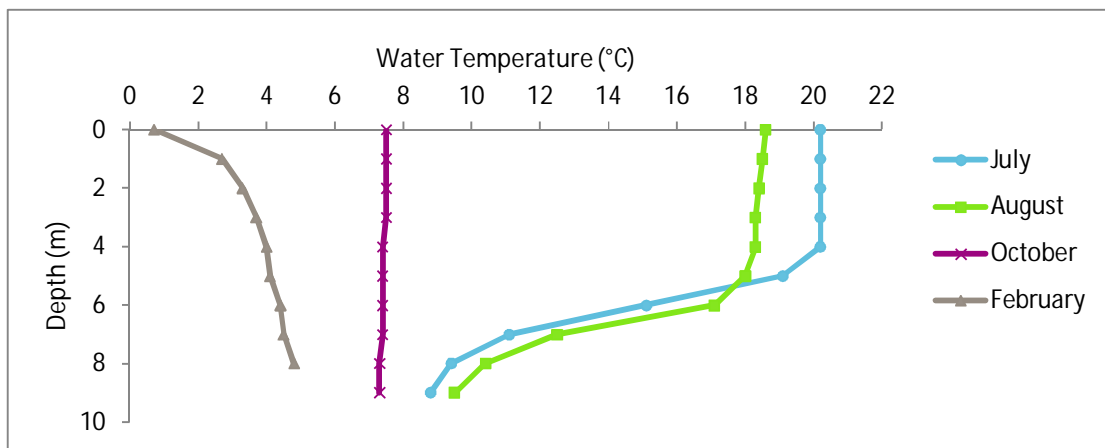


Figure 6. Dolberg Lake water temperature profiles at station DOL2.

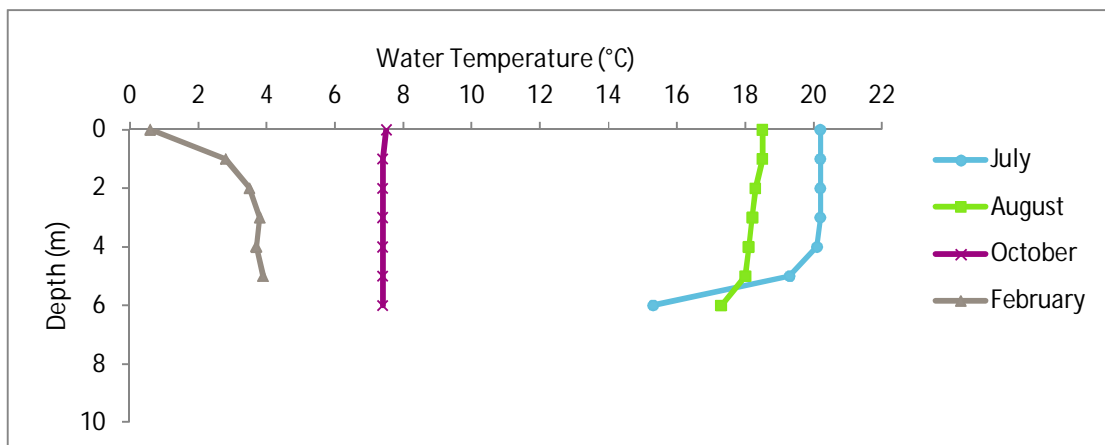


Figure 7. Dolberg Lake water temperature profiles at station DOL3.



496250

496500

496750

5998500

5998500

5998750

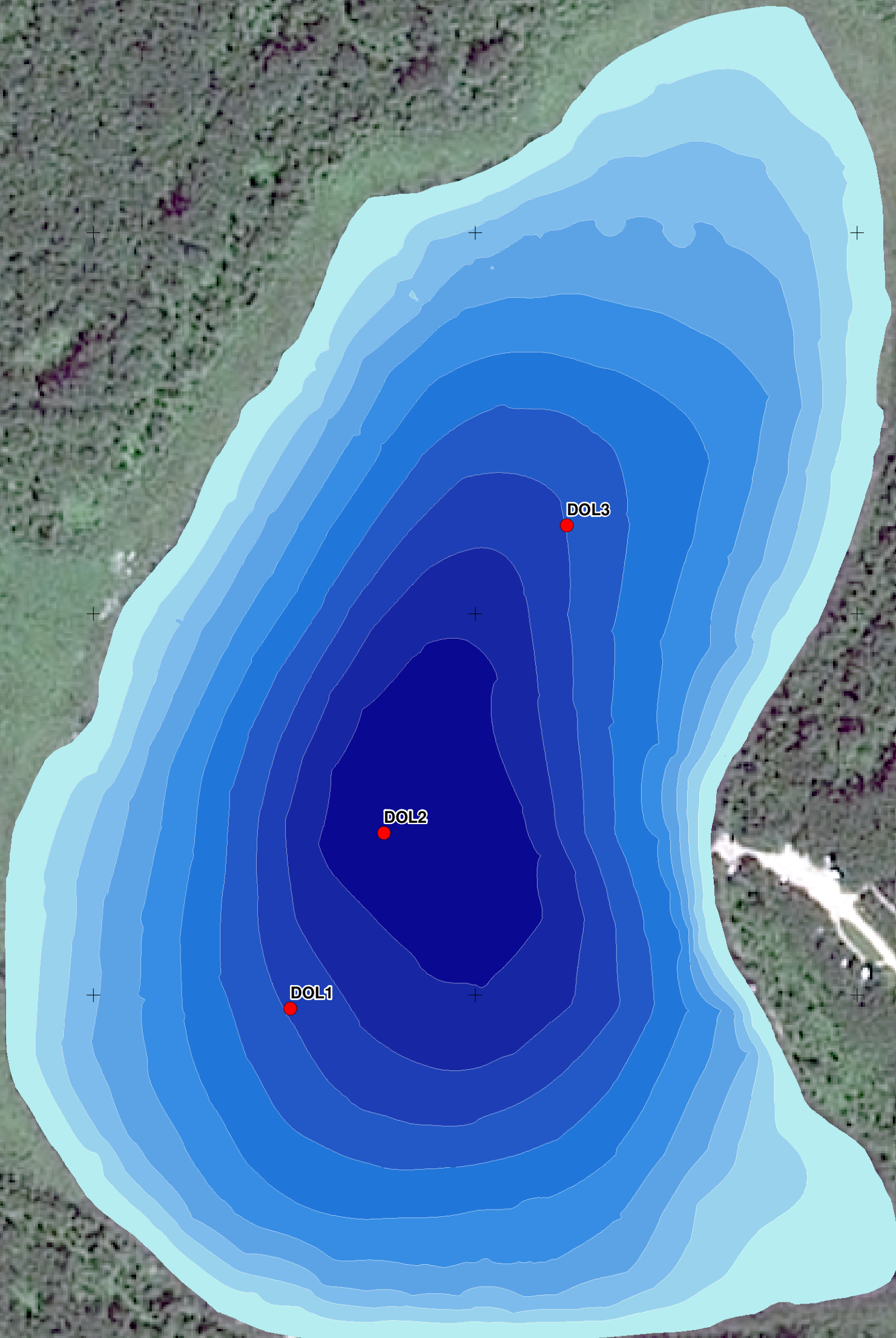
5998750

5998500

5998500

5998250

5998250



### LEGEND

● Water Quality Sample Location

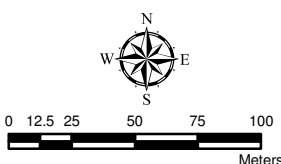
#### Depth

- 0 - 1 m
- 1 - 2 m
- 2 - 3 m
- 3 - 4 m
- 4 - 5 m
- 5 - 6 m
- 6 - 7 m
- 7 - 8 m
- 8 - 9 m
- 9 - 10 m



**Map Sources/Notes:**  
 Bathymetric Data Collected July 30, 2015 Using a Lowrance 5DS HD Sonar Unit. Lake boundary digitized using aerial photograph provided by AEP.

Dolberg Lake  
 Surface Elevation: 742.35 m



Scale: 1:3,000  
 NAD 1983 10TM AEP Forest



### Assessment of Eight Alberta Waterbodies

## Dolberg Lake Bathymetry Map Including Water Quality Profile Locations

Lead: Richard Carson	Date: 31 Mar 2016
Drawn By: Sandra Babiuk	Project Number: 15010

RC BioSolutions Ltd. Figure No. 8

Z:\Projects\2015\15010\_Environment and Parks\_WO3-Mapping\_surveys\Map Projects\11X17\15010\_AEP\_WO Lakes\_Dolberg\_Lake\_15Mar2016.mxd



**Figure 9. Dolberg Lake (August) – looking north from station DOL1.**



**Figure 10. Dolberg Lake (February) – sampling at station DOL1.**

### 3.2 Salter's Lake

Tables 5 to 7 contain the complete water quality profile data for each sample station. Figures 11 to 13 summarize the dissolved oxygen profiles and Figures 14 to 16 summarize the temperature profiles. Most profiles in July, August, and February exhibit a typical stratified water column pattern, while the October profile exhibits a typical fall turnover, fully mixed water column pattern.

Bathymetry data was collected on July 29, 2015 and was used to create a lake bathymetry map (Figure 17). Figures 18 and 19 are site photographs taken during the sampling.

**Table 5. Salter's Lake water quality profile summary at station SAL1.**

Date (DD/MM/YY)	Ambient Temperature (°C)	Ice Depth (m)	Profile Depth (m)	Water Temperature (°C)	Dissolved Oxygen (mg/L)	Dissolved Oxygen (% Saturation)	Specific Conductivity (µS/cm)	Salinity (psu)	pH
29/07/15	22	N/a	0	22.5	8.43	97.5	557	0.28	8.58
			1	22.0	8.55	97.9	556	0.29	8.58
			2	21.9	8.60	98.3	557	0.29	8.59
			3	21.8	7.70	88.5	558	0.29	8.50
			4	19.3	0.25	2.8	557	0.31	7.67
			5	11.7	0.11	1.1	623.2	0.41	7.46
			6	8.5	0.07	0.7	634.5	0.46	7.33
			7	6.5	0.00	0.0	666.3	0.51	7.25
			8	5.6	0.00	0.0	760.7	0.60	7.05
24/08/15	22	N/a	0	19.6	6.55	71.4	562.0	0.31	8.72
			1	19.0	6.47	69.7	561.8	0.31	8.73
			2	18.8	6.19	66.2	562.2	0.31	8.69
			3	18.6	5.74	60.5	563.2	0.31	8.65
			4	18.2	4.23	44.4	566.7	0.32	8.45
			5	13.4	0.15	1.5	631.3	0.40	7.47
			6	8.7	0.20	1.9	646.7	0.46	7.41
			7	6.7	0.32	2.7	686.8	0.52	7.32
			8	6.0	0.40	3.1	789.0	0.62	7.13
26/10/15	5	N/a	0	8.0	2.83	24.0	569.8	0.42	7.78
			1	8.0	2.66	22.5	570.1	0.42	7.70
			2	8.0	2.55	21.6	570.2	0.42	7.67
			3	8.0	2.44	20.6	570.3	0.42	7.65
			4	8.0	2.30	19.4	570.7	0.42	7.62
			5	8.0	2.14	18.1	571.6	0.42	7.61
			6	8.0	2.07	17.5	572.2	0.42	7.59
			7	8.0	1.75	14.8	574.3	0.42	7.54
			8	7.9	0.64	5.4	608.6	0.45	7.29
22/02/16	-1	0.34	0	0.5	1.48	10.3	417.6	0.38	7.90
			1	2.0	0.97	7.0	413.9	0.36	7.83
			2	3.0	0.75	5.6	413.0	0.34	7.76
			3	3.2	0.63	4.7	412.7	0.34	7.73
			4	3.4	0.54	4.0	412.8	0.34	7.70
			5	3.5	0.48	3.6	414.5	0.34	7.67
			6	3.6	0.44	3.3	418.8	0.34	7.62
			7	3.7	0.40	3.0	424.2	0.35	7.58

**Table 6. Salter's Lake water quality profile summary at station SAL2.**

Date (DD/MM/YY)	Ambient Temperature (°C)	Ice Depth (m)	Profile Depth (m)	Water Temperature (°C)	Dissolved Oxygen (mg/L)	Dissolved Oxygen (% Saturation)	Specific Conductivity (µS/cm)	Salinity (psu)	pH
29/07/15	22	N/a	0	22.5	8.21	94.6	554	0.28	8.58
			1	22.1	8.28	95.1	554	0.29	8.58
			2	21.9	8.33	95.3	557	0.29	8.58
			3	21.7	7.19	81.9	559	0.29	8.47
			4	19.4	0.44	4.8	575	0.31	7.71
			5	11.7	0.11	1.1	626.2	0.41	7.42
			5.5	9.4	0.04	0.4	634.7	0.45	7.33
24/08/15	22	N/a	0	19.5	6.63	72.3	562.0	0.31	8.72
			1	19.0	6.54	70.1	561.3	0.31	8.72
			2	18.9	6.32	67.9	561.4	0.31	8.70
			3	18.7	5.69	61.1	562.4	0.31	8.64
			4	18.3	4.38	46.3	566.2	0.32	8.47
			5	13.8	0.35	3.3	627.1	0.39	7.51
			5.5	11.5	0.50	4.6	645.4	0.43	7.41
26/10/15	5	N/a	0	8.0	2.55	21.6	568.8	0.41	7.67
			1	8.0	2.44	20.6	569.1	0.41	7.64
			2	8.0	2.35	19.9	569.9	0.42	7.64
			3	8.0	2.35	19.9	569.9	0.42	7.63
			4	8.0	2.35	19.9	570.0	0.42	7.62
			5	8.0	2.32	19.6	570.0	0.42	7.61
			5.5	7.9	2.30	19.4	570.1	0.42	7.62
22/02/16	-1	0.34	0	0.4	0.78	5.3	419.6	0.38	7.77
			1	2.3	0.46	3.4	414.6	0.35	7.68
			2	2.9	0.41	3.1	413.2	0.34	7.66
			3	3.2	0.36	2.7	413.3	0.34	7.65
			4	3.3	0.34	2.5	413.1	0.34	7.65
			5	3.4	0.30	2.3	414.4	0.34	7.63

**Table 7. Salter's Lake water quality profile summary at station SAL3.**

Date (DD/MM/YY)	Ambient Temperature (°C)	Ice Depth (m)	Profile Depth (m)	Water Temperature (°C)	Dissolved Oxygen (mg/L)	Dissolved Oxygen (% Saturation)	Specific Conductivity (µS/cm)	Salinity (psu)	pH
29/07/15	22	N/a	0	22.7	8.24	95.9	558	0.28	8.57
			1	22.5	8.27	95.7	558	0.29	8.58
			2	22.0	8.33	95.4	557	0.29	8.57
			3	21.9	8.29	95.0	557	0.29	8.57
			3.5	21.3	5.76	64.5	562	0.29	8.40
24/08/15	22	N/a	0	20.8	6.69	73.7	563.0	0.30	8.70
			1	19.7	6.72	73.4	563.0	0.31	8.70
			2	19.6	6.54	70.8	562.0	0.31	8.68
			3	19.0	6.30	67.5	562.8	0.31	8.65
26/10/15	5	N/a	3.5	18.8	6.18	66.4	563.1	0.31	8.66
			0	7.9	3.13	26.4	568.8	0.42	7.71
			1	7.9	3.17	26.8	568.9	0.42	7.69
			2	7.9	3.41	28.8	568.9	0.42	7.68
22/02/16	-1	0.4	3	7.9	3.35	28.3	568.9	0.42	7.67
			3.5	7.9	3.26	27.5	569.0	0.42	7.67
			0	0.7	0.83	5.7	419.3	0.38	7.71
			1	2.1	0.52	3.8	416.0	0.36	7.69
			2	2.8	0.42	3.1	414.8	0.35	7.67
			3	3.1	0.38	2.8	414.7	0.34	7.65

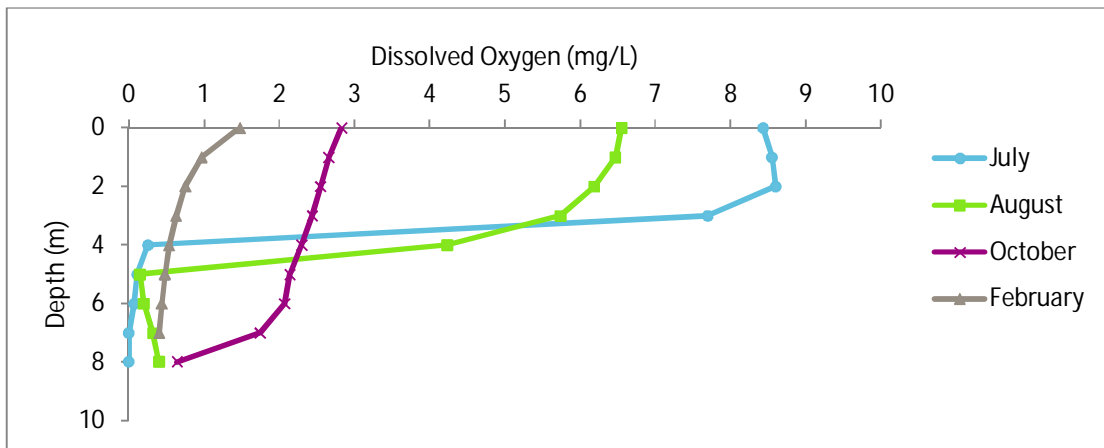


Figure 11. Salter's Lake dissolved oxygen profiles at station SAL1.

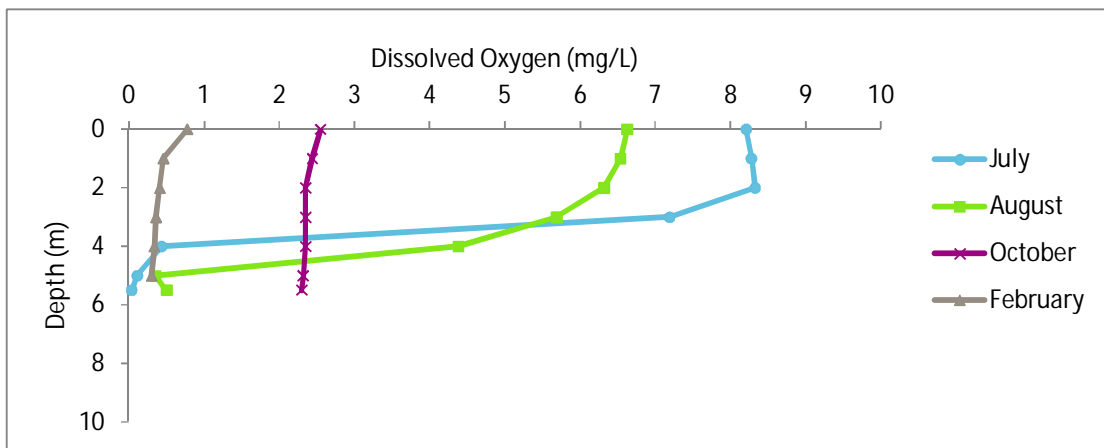


Figure 12. Salter's Lake dissolved oxygen profiles at station SAL2.

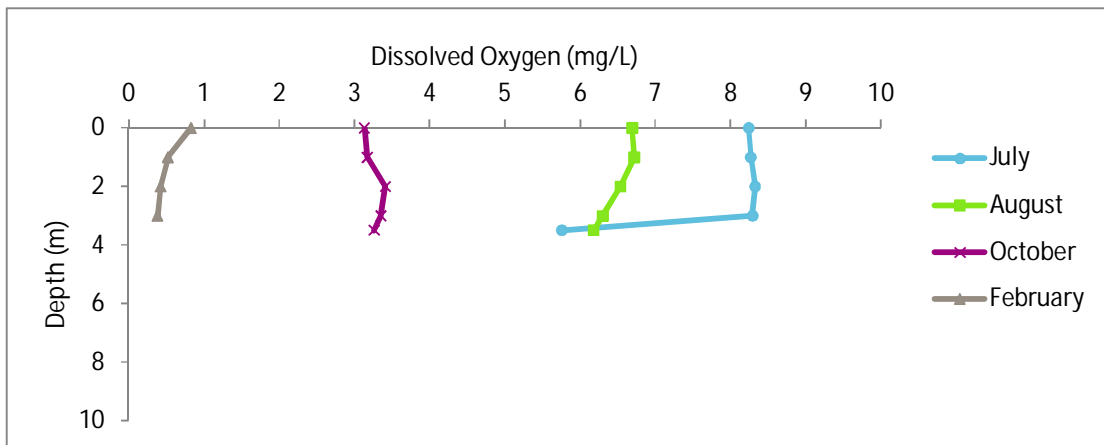


Figure 13. Salter's Lake dissolved oxygen profiles at station SAL3.

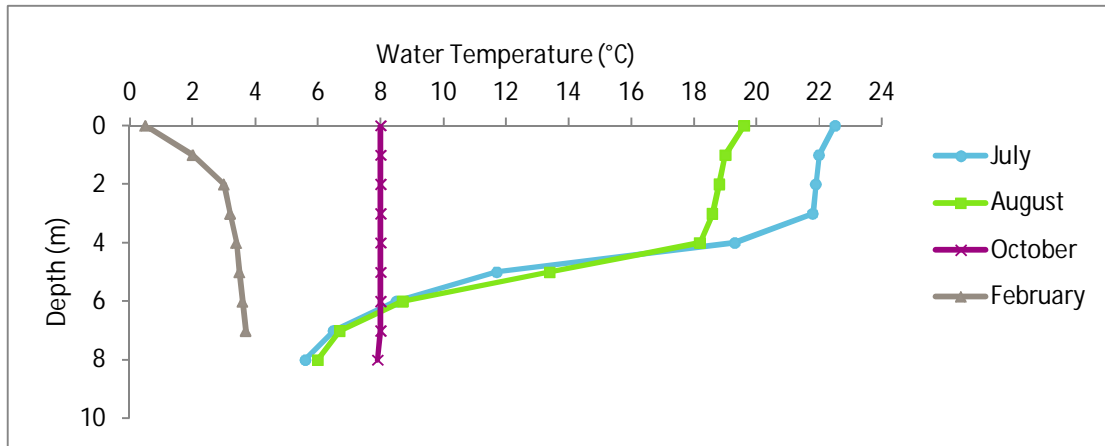


Figure 14. Salter's Lake water temperature profiles at station SAL1.

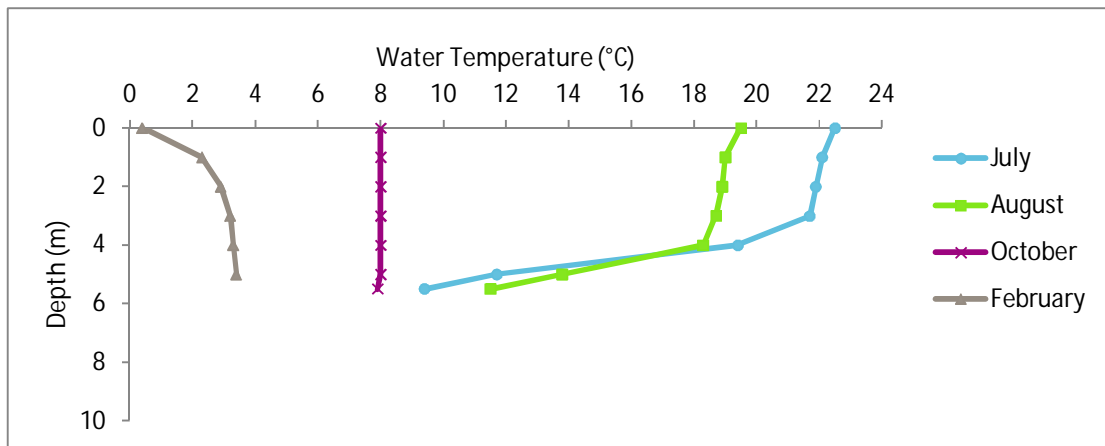


Figure 15. Salter's Lake water temperature profiles at station SAL2.

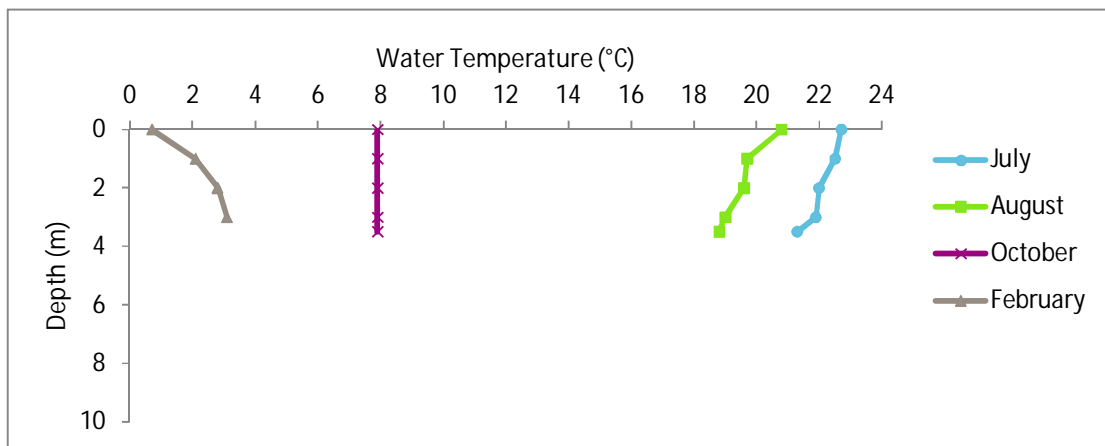
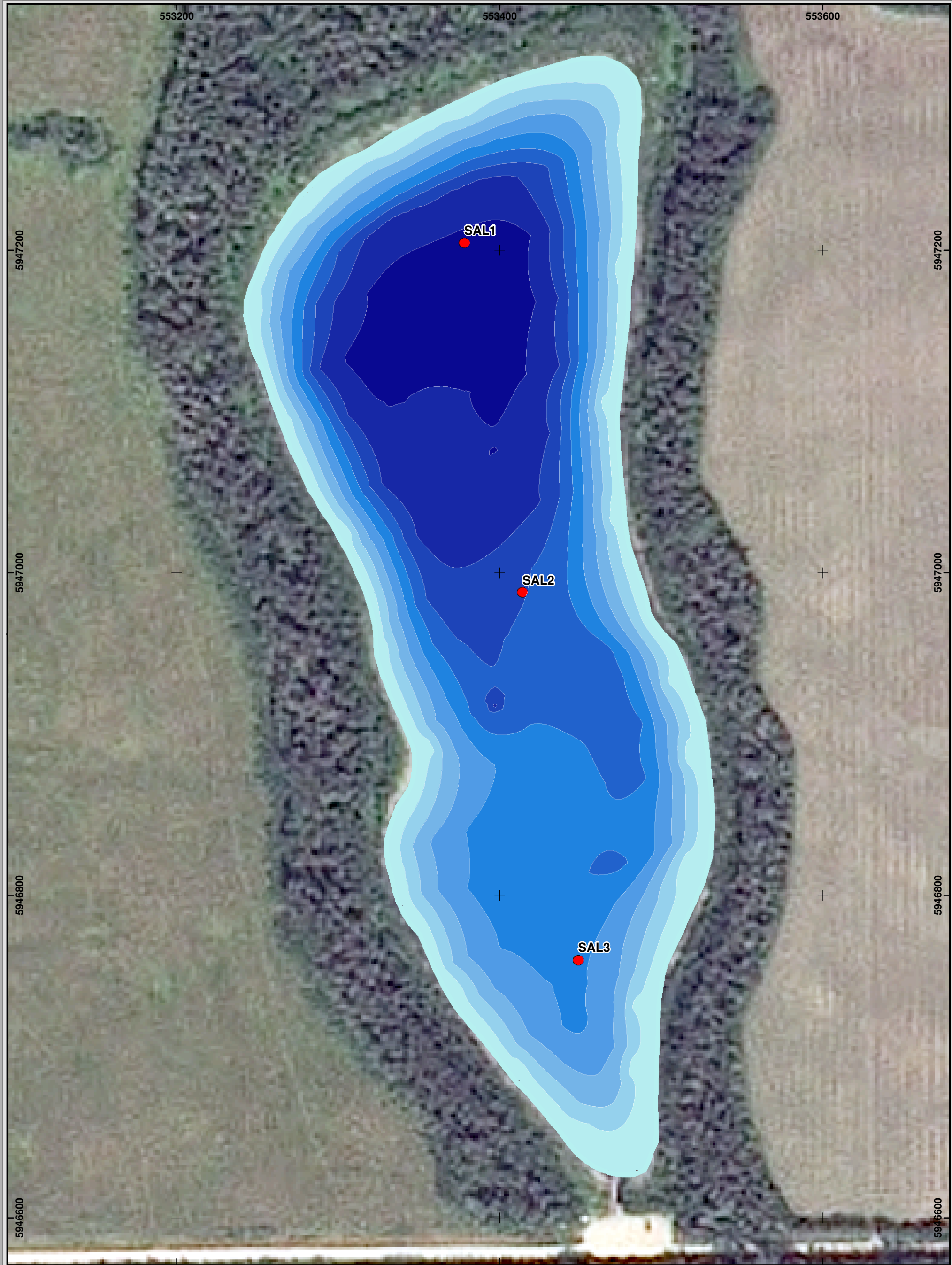


Figure 16. Salter's Lake water temperature profiles at station SAL3.

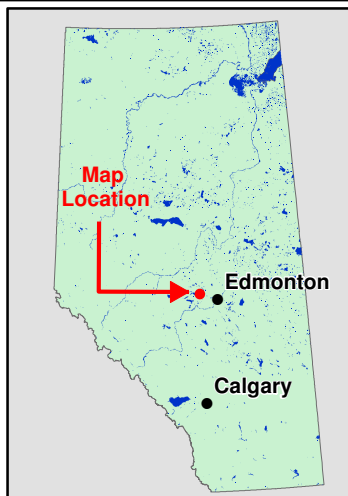
Z:\Projects\2015\15010\_Environment and Parks\Map Projects\11X17\15010\_AEP WO Lakes\_Salters Lake\_16Mar2016.mxd



- Depth**
- 0 - 1 m
  - 1 - 2 m
  - 2 - 3 m
  - 3 - 4 m
  - 4 - 5 m
  - 5 - 6 m
  - 6 - 7 m
  - 7 - 8 m
  - 8 - 9 m

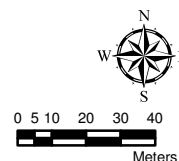
**LEGEND**

● Water Quality Sample Location



**Map Sources/Notes:**  
 Bathymetric Data Collected July 29, 2015 Using a Lowrance 5DS HD Sonar Unit. Lake boundary digitized using aerial photograph provided by AEP.

Salter's Lake  
 Surface Elevation: 688.01 m



Scale: 1:2,200  
 NAD 1983 10TM AEP Forest

Alberta Environment and Parks

Assessment of Eight Alberta Waterbodies

**Salter's Lake Bathymetry Map Including Water Quality Profile Locations**

Lead: Richard Carson	Date: 31 Mar 2016
Drawn By: Sandra Babiuk	Project Number: 15010

RC BioSolutions Ltd.	Figure No. 17
----------------------	---------------



**Figure 18. Salter's Lake (August) – looking north from station SAL1.**



**Figure 19. Salter's Lake (February) – sampling at station SAL2.**



### 3.3 Muir Lake

Tables 8 to 10 contain the complete water quality profile data for each sample station. Figures 20 to 22 summarize the dissolved oxygen profiles and Figures 23 to 25 summarize the temperature profiles. Most profiles in July, August, and February exhibit a typical stratified water column pattern, while the October profile exhibits a typical fall turnover, fully mixed water column pattern.

Bathymetry data was collected on July 29, 2015 and was used to create a lake bathymetry map (Figure 26). Figures 27 and 28 are site photographs taken during the sampling.

**Table 8. Muir Lake water quality profile summary at station MUIR1.**

Date (DD/MM/YY)	Ambient Temperature (°C)	Ice Depth (m)	Profile Depth (m)	Water Temperature (°C)	Dissolved Oxygen (mg/L)	Dissolved Oxygen (% Saturation)	Specific Conductivity (µS/cm)	Salinity (psu)	pH
29/07/15	18	N/a	0	20.9	7.94	89.0	432.4	0.23	8.57
			0.5	20.9	7.32	81.9	432.9	0.23	8.58
			1	20.8	6.82	76.4	434.5	0.23	8.43
			1.5	20.7	7.13	79.5	433.6	0.23	8.55
			2	20.6	7.08	78.8	434.1	0.23	8.54
			2.5	20.3	4.68	52.0	436.2	0.23	8.17
25/08/15	22	N/a	0	19.9	9.84	107.6	444.0	0.24	8.98
			0.5	19.4	9.51	104.0	445.5	0.24	8.94
			1	18.8	9.17	97.3	446.3	0.25	8.91
			1.5	17.6	9.11	95.1	446.9	0.25	8.90
			2	17.2	8.70	90.6	447.9	0.26	8.86
			2.5	16.9	8.26	85.1	449.5	0.26	8.77
26/10/15	7	N/a	0	5.8	11.23	89.9	437.3	0.34	8.75
			0.5	5.8	11.16	89.3	437.4	0.34	8.76
			1	5.8	11.14	89.2	437.6	0.34	8.76
			1.5	5.8	11.20	89.7	437.6	0.34	8.76
			2	5.8	11.21	89.7	437.7	0.34	8.76
			2.5	5.8	11.16	89.3	437.6	0.34	8.76
22/02/16	-5	0.32	0	0.7	1.74	12.1	373.4	0.33	8.14
			0.5	2.1	1.15	8.3	367.7	0.31	7.89
			1	3.2	0.81	6.1	367.5	0.30	7.82
			1.5	4.2	0.68	5.2	378.9	0.30	7.74
			2	4.4	0.63	4.8	385.1	0.31	7.69

**Table 9. Muir Lake water quality profile summary at station MUIR2.**

Date (DD/MM/YY)	Ambient Temperature (°C)	Ice Depth (m)	Profile Depth (m)	Water Temperature (°C)	Dissolved Oxygen (mg/L)	Dissolved Oxygen (% Saturation)	Specific Conductivity (µS/cm)	Salinity (psu)	pH
29/07/15	18	N/a	0	20.8	7.42	83.0	432.5	0.23	8.63
			0.5	20.8	7.56	84.5	433.2	0.23	8.63
			1	20.7	7.50	83.8	433.4	0.23	8.62
			1.5	20.7	7.35	82.1	433.5	0.23	8.61
			2	20.7	7.29	81.3	433.6	0.23	8.60
			2.5	20.3	6.12	67.8	434.9	0.23	8.43
			3	20.3	5.85	64.6	435.3	0.23	8.39
			3.5	20.2	4.72	52.2	435.9	0.23	8.14
			4	19.8	1.04	11.5	439.5	0.24	7.76
25/08/15	22	N/a	0	19.4	8.76	95.1	447.9	0.24	8.90
			0.5	19.2	9.02	96.7	447.8	0.24	8.90
			1	18.1	9.27	97.6	449.5	0.25	8.91
			1.5	17.7	9.00	93.6	447.2	0.25	8.90
			2	17.3	8.34	86.6	448.0	0.26	8.84
			2.5	17.1	7.89	81.3	449.5	0.26	8.75
			3	16.8	6.98	72.2	450.2	0.26	8.55
			3.5	16.6	5.30	54.2	453.0	0.26	8.25
			4	16.5	4.00	40.8	455.0	0.26	8.12
26/10/15	7	N/a	0	5.8	11.09	88.7	437.5	0.34	8.76
			0.5	5.8	11.08	88.8	437.6	0.34	8.76
			1	5.8	11.11	88.7	437.8	0.34	8.76
			1.5	5.7	11.11	88.7	437.8	0.34	8.76
			2	5.7	11.08	88.4	438.0	0.34	8.76
			2.5	5.7	11.08	88.4	437.9	0.34	8.77
			3	5.6	11.15	88.8	437.8	0.34	8.76
			3.5	5.6	11.12	88.7	438.0	0.34	8.77
			4	5.6	11.11	88.6	437.9	0.34	8.76
22/02/16	-5	0.37	0	0.8	0.97	6.8	376.0	0.33	7.85
			0.5	1.9	0.76	5.5	371.2	0.32	7.78
			1	3.1	0.63	4.7	376.2	0.31	7.76
			1.5	3.1	0.55	4.1	381.3	0.32	7.75
			2	3.4	0.49	3.7	390.4	0.32	7.73
			2.5	3.5	0.46	3.5	392.4	0.32	7.73
			3	3.6	0.42	3.2	398.5	0.33	7.71
			3.5	3.6	0.41	3.1	405.8	0.33	7.70

**Table 10. Muir Lake water quality profile summary at station MUIR3.**

Date (DD/MM/YY)	Ambient Temperature (°C)	Ice Depth (m)	Profile Depth (m)	Water Temperature (°C)	Dissolved Oxygen (mg/L)	Dissolved Oxygen (% Saturation)	Specific Conductivity (µS/cm)	Salinity (psu)	pH
29/07/15	18	N/a	0	20.5	5.99	66.6	437.8	0.23	8.38
			0.5	20.5	6.09	67.7	438.1	0.23	8.36
			1	20.5	5.95	66.1	438.3	0.23	8.37
			1.5	20.3	6.00	66.3	437.8	0.23	8.38
			2	20.1	3.83	42.2	444.1	0.24	8.03
25/08/15	22	N/a	0	19.9	9.69	105.4	457.1	0.25	8.86
			0.5	19.0	9.80	105.6	454.2	0.25	8.89
			1	17.9	9.82	103.2	455.9	0.26	8.86
			1.5	17.5	9.43	98.9	458.0	0.26	8.85
26/10/15	7	N/a	0	5.2	12.06	95.0	438.1	0.34	8.78
			0.5	5.2	11.99	94.5	438.1	0.34	8.79
			1	5.2	11.90	93.8	438.3	0.34	8.79
			1.5	5.2	11.79	93.0	438.2	0.34	8.79
			2	5.2	10.77	85.0	438.9	0.34	8.75
22/02/16	-5	0.39	0	1.3	1.89	13.3	410.0	0.36	7.69
			0.5	1.9	1.67	12.1	404.5	0.35	7.65
			1	2.0	1.51	10.8	402.7	0.35	7.63
			1.5	1.9	1.31	9.6	401.3	0.35	7.61

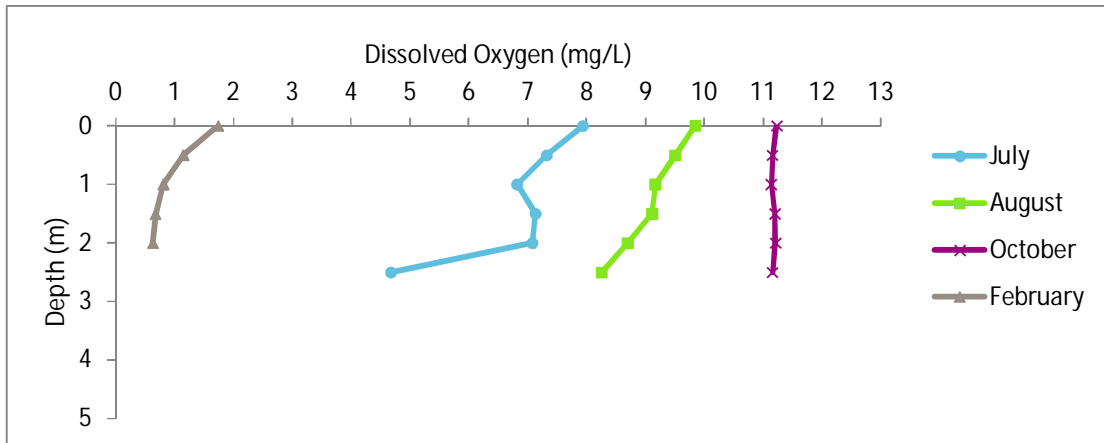


Figure 20. Muir Lake dissolved oxygen profiles at station MUIR1.

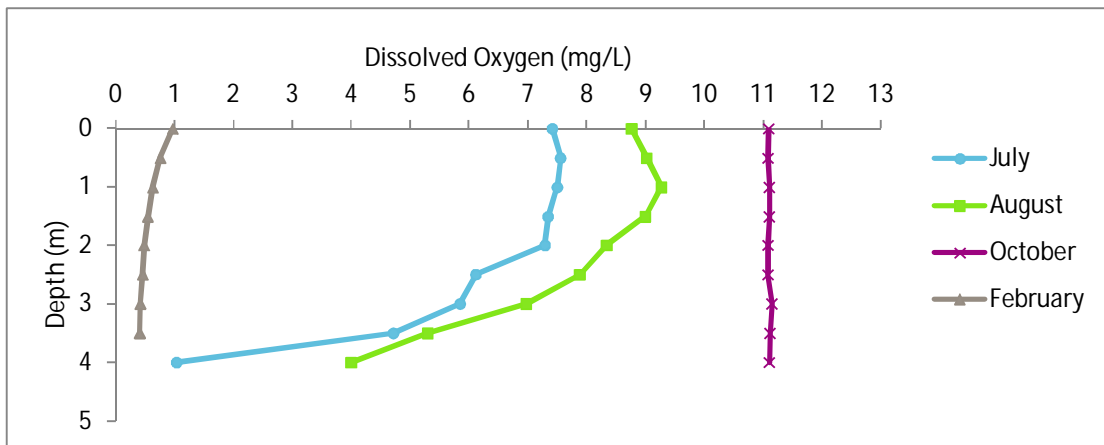


Figure 21. Muir Lake dissolved oxygen profiles at station MUIR2.

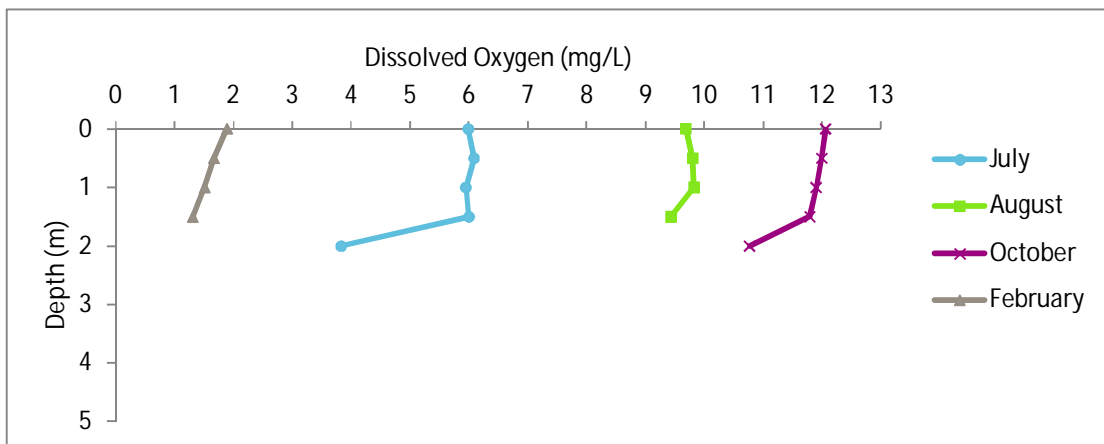


Figure 22. Muir Lake dissolved oxygen profiles at station MUIR3.

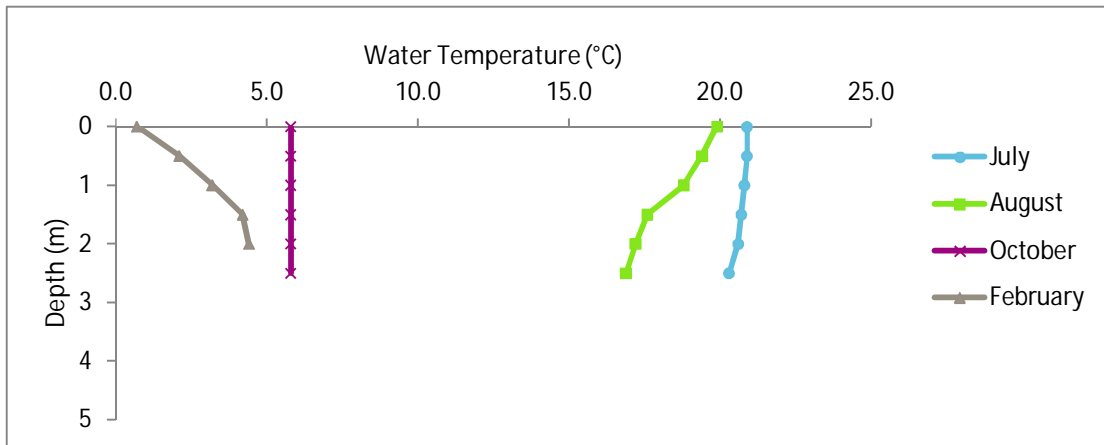


Figure 23. Muir Lake water temperature profiles at station MUIR1.

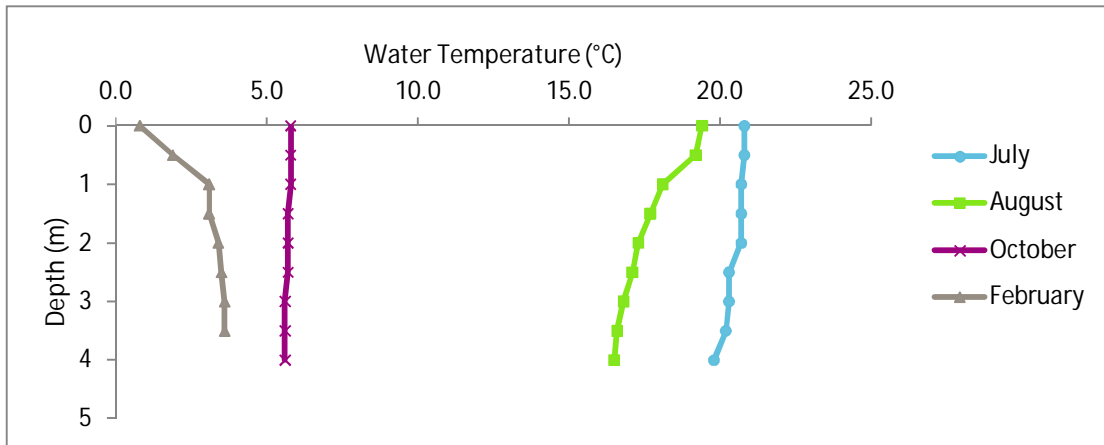


Figure 24. Muir Lake water temperature profiles at station MUIR2.

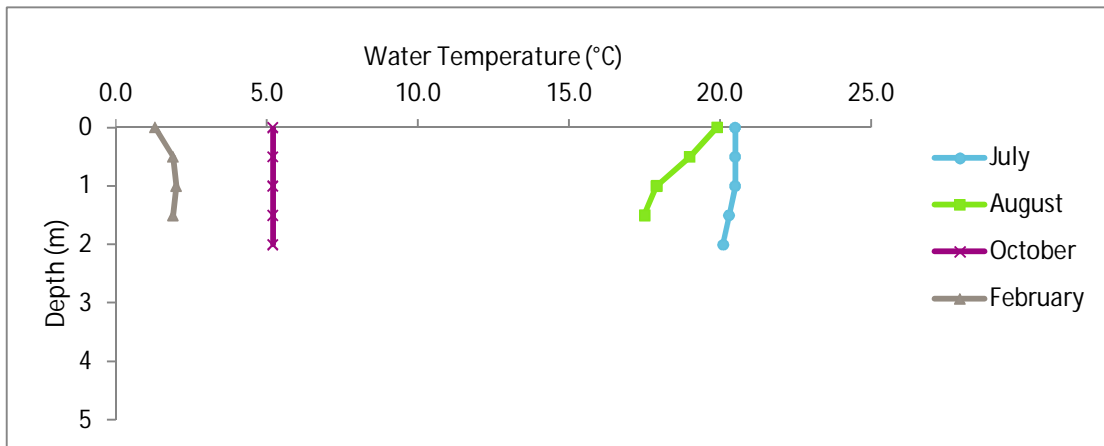
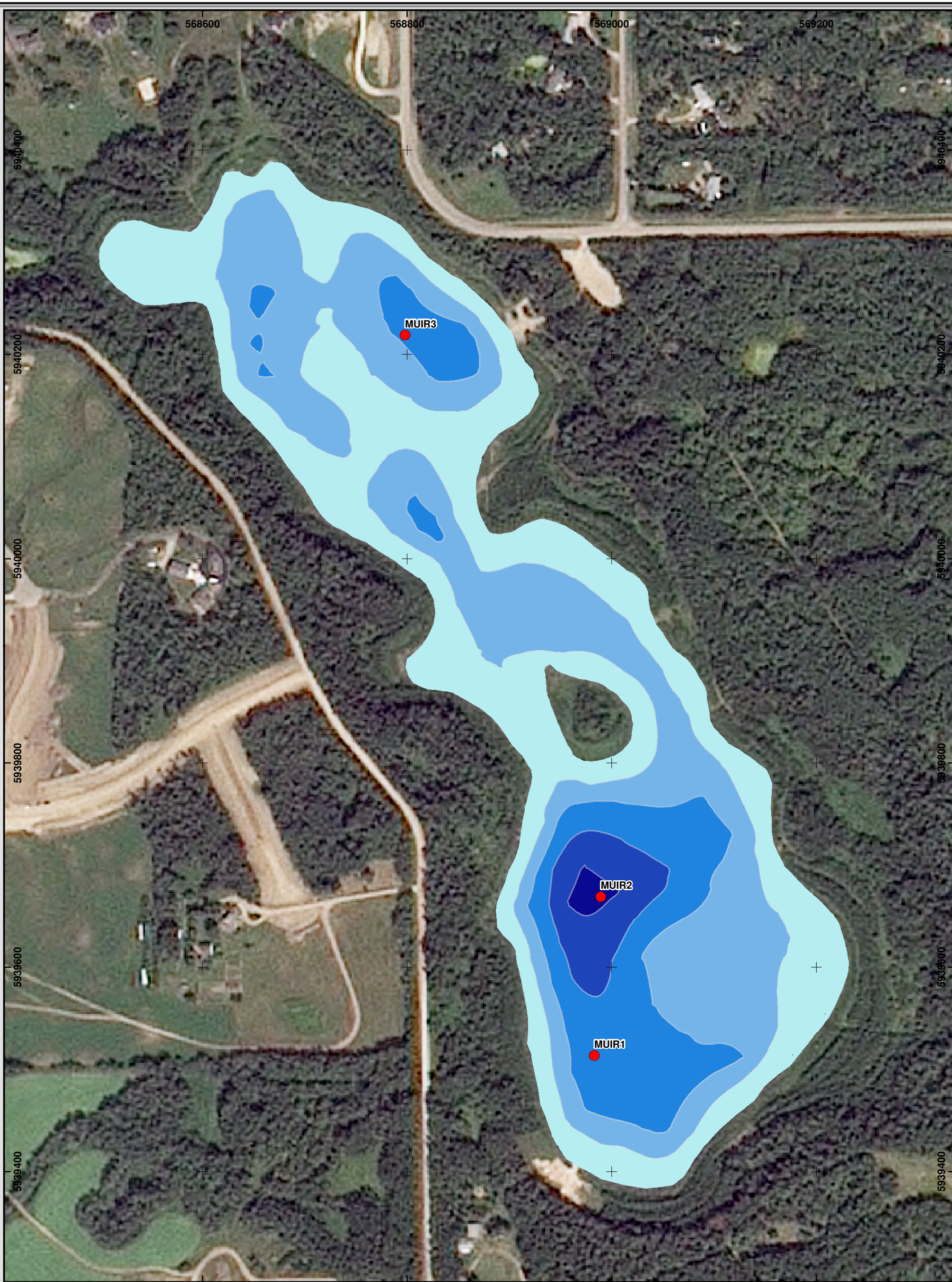


Figure 25. Muir Lake water temperature profiles at station MUIR3.



**Depth**

0 - 1 m
1 - 2 m
2 - 3 m
3 - 4 m
4 - 5 m

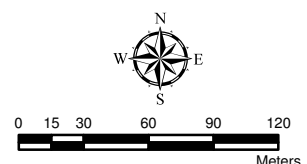
**LEGEND**

● Water Quality Sample Location



**Map Sources/Notes:**  
 Bathymetric Data Collected July 29, 2015 Using a Lowrance 5DS HD Sonar Unit. Lake boundary digitized using aerial photograph provided by AEP.

Muir Lake  
 Surface Elevation: 707.92 m



Scale: 1:3,500  
 NAD 1983 10TM AEP Forest

Alberta Environment and Parks

Assessment of Eight Alberta Waterbodies

**Muir Lake Bathymetry Map Including Water Quality Profile Locations**

Lead: Richard Carson	Date: 31 Mar 2016
Drawn By: Sandra Babiuk	Project Number: 15010

RC BioSolutions Ltd.	Figure No. 26
----------------------	---------------



**Figure 27. Muir Lake (August) – looking north from station MUIR1.**



**Figure 28. Muir Lake (February) – sampling at station MUIR3.**

### 3.4 Cardiff Park Pond

Tables 11 to 13 contain the complete water quality profile data for each sample station. Figures 29 to 31 summarize the dissolved oxygen profiles and Figures 32 to 34 summarize the temperature profiles. Most profiles in July, August, and February exhibit a typical stratified water column pattern, while the October profile exhibits a typical fall turnover, fully mixed water column pattern.

Bathymetry data was collected on July 27, 2015 and was used to create a lake bathymetry map (Figure 35). Figures 36 to 37 are site photographs taken during the sampling.

**Table 11. Cardiff Park Pond water quality profile summary at station CAR01.**

Date (DD/MM/YY)	Ambient Temperature (°C)	Ice Depth (m)	Profile Depth (m)	Water Temperature (°C)	Dissolved Oxygen (mg/L)	Dissolved Oxygen (% Saturation)	Specific Conductivity (µS/cm)	Salinity (psu)	pH
27/07/15	24	N/a	0	21.7	9.76	111.9	1147	0.61	8.38
			1	21.5	10.16	116.1	1148	0.61	8.37
			2	21.0	9.87	111.0	1147	0.62	8.34
			3	20.8	9.87	110.7	1151	0.63	8.18
			4	20.2	6.50	72.1	1179	0.65	7.58
			5	16.4	4.22	44.3	1372	0.83	6.89
			6	9.6	0.04	0.4	1553	1.13	6.70
25/08/15	23	N/a	0	19.9	8.98	99.0	1166	0.65	8.45
			1	18.0	8.86	92.6	1164	0.68	8.34
			2	17.6	8.48	88.9	1167	0.68	8.17
			3	17.4	7.85	82.1	1177	0.69	7.90
			4	17.1	6.26	65.2	1187	0.70	7.64
			5	16.4	3.84	39.2	1209	0.73	7.43
			6	11.4	0.25	2.3	1547	1.07	6.89
26/10/15	3	N/a	0	6.5	11.01	89.8	1129	0.88	8.54
			1	6.5	11.02	90.1	1134	0.89	8.50
			2	6.5	10.88	88.8	1135	0.89	8.49
			3	6.5	10.76	87.8	1136	0.89	8.48
			4	6.5	10.69	87.3	1136	0.89	8.48
			5	6.5	10.58	86.4	1136	0.89	8.47
			6	6.5	10.52	85.9	1136	0.89	8.47
22/02/16	4	0.38	0	0.4	4.65	32.2	861.1	0.80	8.21
			1	2.1	0.88	6.4	863.2	0.76	8.04
			2	3.2	0.68	5.1	863.0	0.74	7.92
			3	3.3	0.59	4.4	865.0	0.74	7.88
			4	3.6	0.53	4.0	868.0	0.73	7.86
			5	3.7	0.46	3.5	872.0	0.73	7.84



**Table 12. Cardiff Park Pond water quality profile summary at station CAR02.**

Date (DD/MM/YY)	Ambient Temperature (°C)	Ice Depth (m)	Profile Depth (m)	Water Temperature (°C)	Dissolved Oxygen (mg/L)	Dissolved Oxygen (% Saturation)	Specific Conductivity (µS/cm)	Salinity (psu)	pH
27/07/15	24	N/a	0	21.5	9.30	106.1	1131	0.61	8.66
			1	21.4	9.27	105.2	1132	0.61	8.65
			2	21.2	9.11	103.1	1133	0.61	8.65
			3	21.0	8.99	101.1	1134	0.61	8.64
			4	20.3	7.49	81.3	1138	0.63	8.52
			5	17.7	3.71	39.1	1166	0.68	8.08
			6	12.6	1.07	10.1	1230	0.82	7.77
			7	8.3	0.21	1.7	1311	0.98	7.66
			8	5.7	0.18	1.4	1336	1.08	7.58
			9	5.4	0.14	1.1	1337	1.09	7.54
			10	5.1	0.15	1.3	1342	1.11	7.53
25/08/15	23	N/a	0	19.4	8.72	94.7	1145	0.64	8.80
			1	18.2	8.88	94.4	1143	0.66	8.83
			2	17.7	8.62	90.5	1142	0.67	8.82
			3	17.5	8.01	84.0	1143	0.67	8.79
			4	17.4	8.00	83.1	1143	0.67	8.77
			5	17.3	7.14	74.7	1145	0.68	8.71
			6	15.7	4.28	42.8	1160	0.71	8.41
			7	9.7	0.30	2.7	1286	0.93	7.75
			8	6.5	0.29	2.4	1314	1.04	7.69
			9	5.7	0.34	2.7	1323	1.07	7.65
			10	5.4	0.43	3.4	1332	1.09	7.61
26/10/15	3	N/a	0	7.1	10.09	83.6	1133	0.87	8.52
			1	7.1	10.08	83.5	1133	0.87	8.52
			2	7.1	10.01	83.0	1137	0.88	8.51
			3	7.1	9.98	82.7	1136	0.87	8.51
			4	7.1	9.94	82.4	1136	0.87	8.51
			5	7.1	9.92	82.2	1136	0.87	8.50
			6	7.1	9.93	82.3	1136	0.87	8.50
			7	7.1	9.90	82.1	1136	0.87	8.51
			8	7.1	9.94	82.3	1137	0.88	8.50
			9	7.1	9.90	82.1	1137	0.88	8.50
			10	7.1	9.91	82.1	1137	0.88	8.52
22/02/16	4	0.35	0	0.5	5.04	35.0	848.4	0.79	8.14
			1	2.2	3.55	25.9	836.2	0.74	8.08
			2	2.5	3.09	22.7	835.9	0.73	8.06
			3	2.6	1.85	13.5	837.3	0.73	8.03
			4	2.6	1.56	11.5	838.6	0.73	8.00
			5	2.7	1.34	9.9	838.9	0.73	7.98
			6	2.5	0.47	3.4	844.7	0.74	7.96
			7	2.6	0.36	2.6	845.5	0.73	7.94
			8	2.8	0.31	2.2	846.6	0.73	7.93
			9	2.8	0.29	2.1	851.1	0.73	7.91

**Table 13. Cardiff Park Pond water quality profile summary at station CAR03.**

Date (DD/MM/YY)	Ambient Temperature (°C)	Ice Depth (m)	Profile Depth (m)	Water Temperature (°C)	Dissolved Oxygen (mg/L)	Dissolved Oxygen (% Saturation)	Specific Conductivity (µS/cm)	Salinity (psu)	pH
27/07/15	24	N/a	0	21.7	8.35	95.4	1139	0.61	8.66
			1	21.7	8.89	101.4	1139	0.61	8.66
			2	21.4	8.83	100.1	1139	0.61	8.66
			3	20.9	8.77	98.5	1138	0.62	8.66
			4	20.6	7.72	86.4	1139	0.62	8.57
			5	17.2	1.65	17.2	1180	0.70	7.84
			6	12.0	0.44	4.1	1290	0.87	7.45
			7	7.8	0.03	0.2	2071	1.61	6.76
			8	6.1	0.06	0.5	2176	1.78	6.70
			8.5	5.8	0.07	0.6	2195	1.82	6.69
25/08/15	23	N/a	0	19.7	8.82	96.6	1144	0.64	8.84
			1	18.8	8.63	92.3	1139	0.65	8.83
			2	17.8	8.69	91.3	1141	0.66	8.83
			3	17.6	8.53	89.5	1142	0.67	8.81
			4	17.4	7.56	78.8	1141	0.67	8.78
			5	17.3	6.63	69.2	1141	0.67	8.73
			6	15.7	3.53	35.7	1197	0.74	8.04
			7	9.8	0.36	3.2	1848	1.35	7.03
26/10/15	3	N/a	0	7.0	10.22	84.4	1129	0.87	8.54
			1	7.0	10.06	83.1	1136	0.88	8.53
			2	7.0	10.06	83.1	1137	0.88	8.52
			3	7.0	10.06	83.1	1137	0.88	8.52
			4	7.0	10.05	83.0	1138	0.88	8.52
			5	6.9	9.97	82.2	1138	0.88	8.51
			6	6.9	9.99	82.4	1139	0.88	8.52
			7	6.9	9.97	82.1	1139	0.88	8.52
			8	6.9	9.94	82.0	1139	0.88	8.51
			8.5	6.9	9.96	82.1	1140	0.88	8.50
22/02/16	4	0.38	0	0.7	5.22	36.5	843.0	0.78	8.18
			1	2.4	4.49	32.8	832.8	0.73	8.14
			2	2.8	4.06	30.1	831.8	0.72	8.11
			3	3.0	3.61	26.8	832.5	0.71	8.08
			4	3.0	3.29	24.5	833.3	0.71	8.06
			5	3.1	3.02	22.4	833.4	0.71	8.04
			6	3.3	1.97	14.8	832.9	0.71	8.01
			7	3.5	0.75	5.6	834.3	0.70	7.93

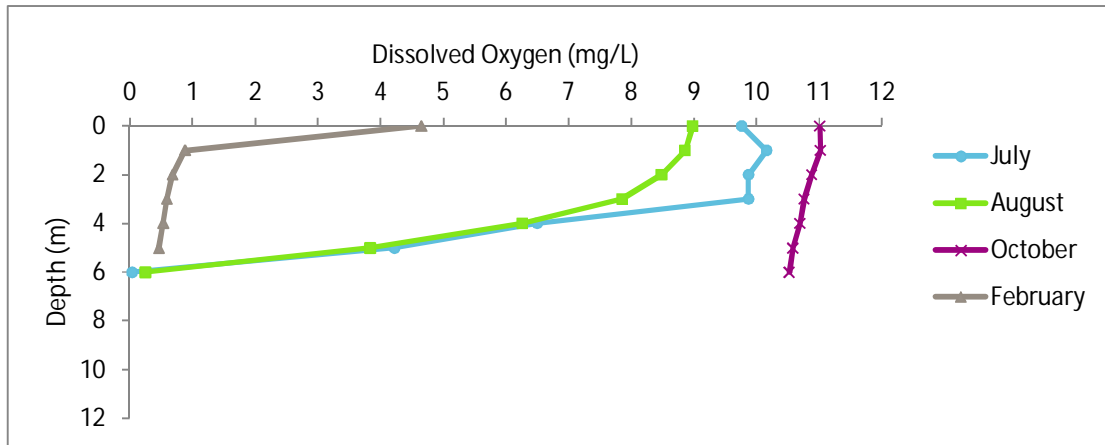


Figure 29. Cardiff Park Pond dissolved oxygen profiles at station CAR01.

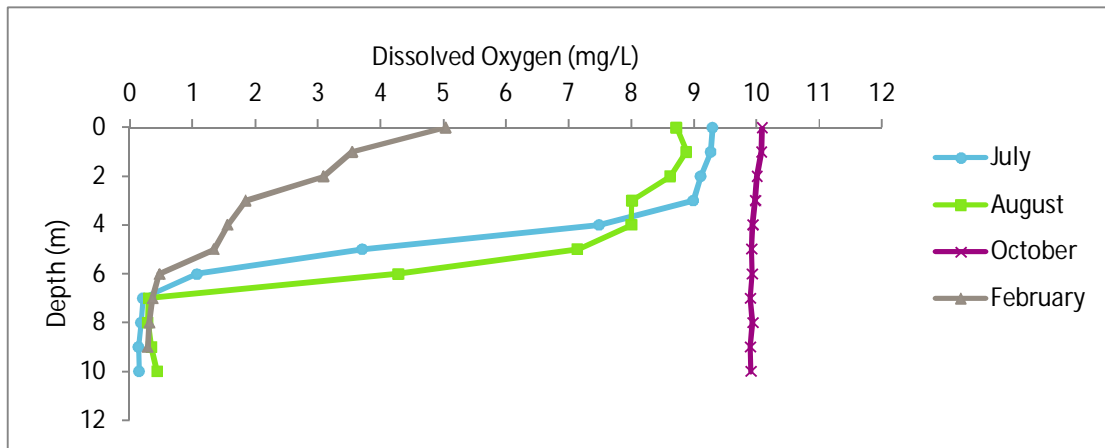


Figure 30. Cardiff Park Pond dissolved oxygen profiles at station CAR02.

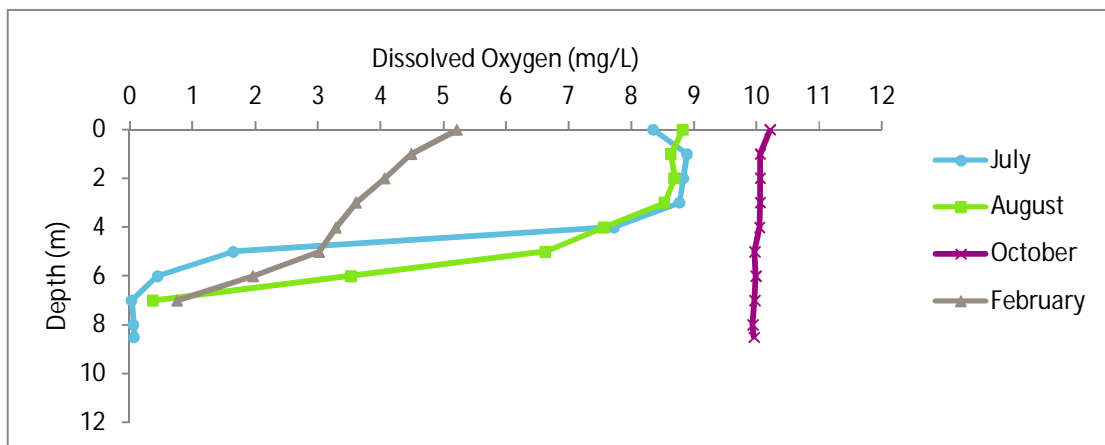


Figure 31. Cardiff Park Pond dissolved oxygen profiles at station CAR03.

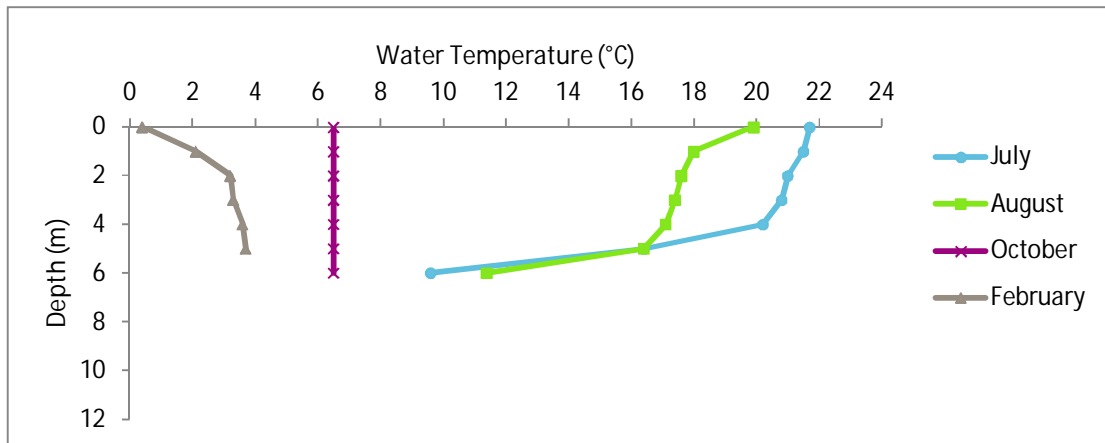


Figure 32. Cardiff Park Pond water temperature profiles at station CAR01.

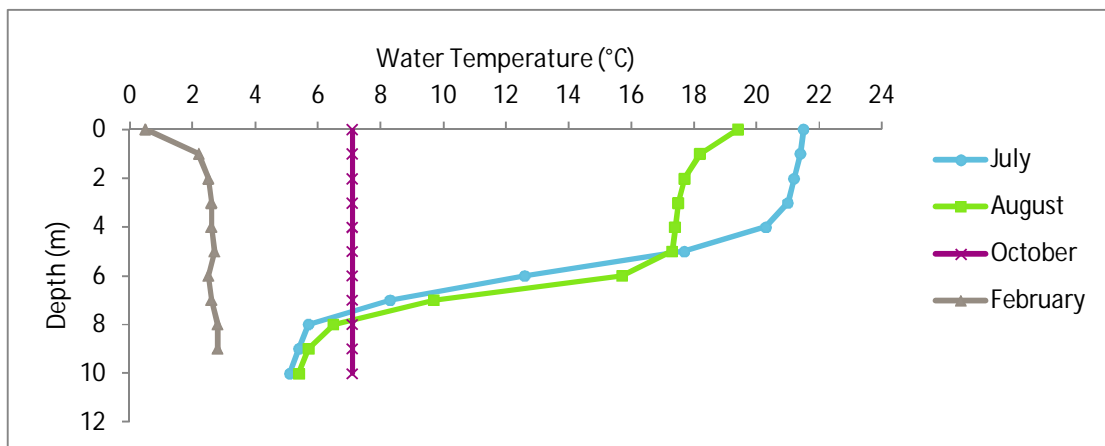


Figure 33. Cardiff Park Pond water temperature profiles at station CAR02.

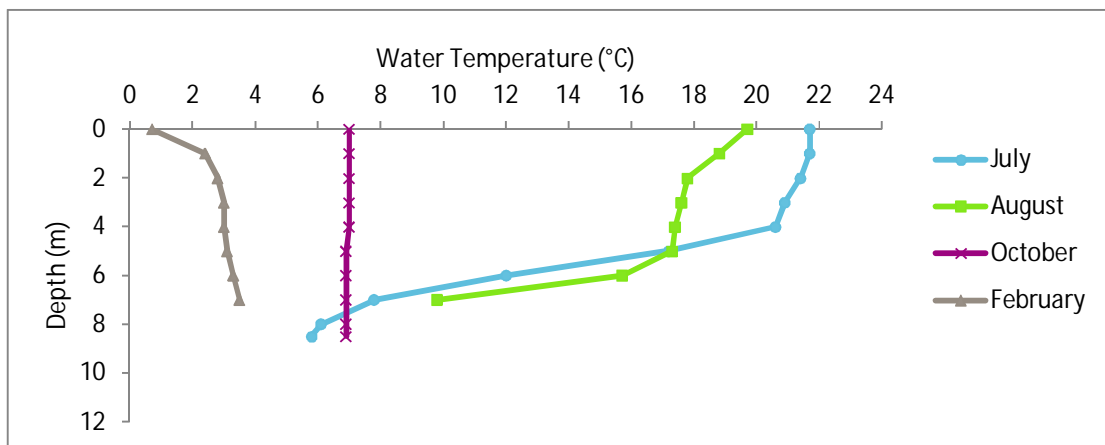


Figure 34. Cardiff Park Pond water temperature profiles at station CAR03.



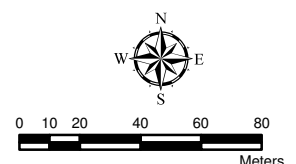
**LEGEND**

- Water Quality Sample Location
- Depth**
- 0 - 1 m
- 1 - 2 m
- 2 - 3 m
- 3 - 4 m
- 4 - 5 m
- 5 - 6 m
- 6 - 7 m
- 7 - 8 m
- 8 - 9 m
- 9 - 10 m
- 10 - 11 m



**Map Sources/Notes:**  
 Bathymetric Data Collected July 27, 2015 Using a Lowrance 5DS HD Sonar Unit. Lake boundary digitized using aerial photograph provided by AEP.

Cardiff Park Pond  
 Surface Elevation: 675.92 m



Scale: 1:2,500  
 NAD 1983 10TM AEP Forest



**Assessment of Eight Alberta Waterbodies**

**Cardiff Park Pond Bathymetry Map Including Water Quality Profile Locations**

Lead: Richard Carson	Date: 31 Mar 2016
Drawn By: Sandra Babiuk	Project Number: 15010

RC BioSolutions Ltd.	Figure No. <b>35</b>
----------------------	----------------------



**Figure 36. Cardiff Park Pond (August) – looking north from station CAR01.**



**Figure 37. Cardiff Park Pond (February) – sampling at station CAR01.**

### 3.5 Black Nugget Mine Pit Lake

Tables 14 to 16 contain the complete water quality profile data for each sample station. Figures 38 to 40 summarize the dissolved oxygen profiles and Figures 41 to 43 summarize the temperature profiles. Most profiles in July, August, and February exhibit a typical stratified water column pattern, while the October profile exhibits a typical fall turnover, fully mixed water column pattern.

Bathymetry data was collected on July 28, 2015 and was used to create a lake bathymetry map (Figure 44). Figures 45 and 46 are site photographs taken during the sampling.

**Table 14. Black Nugget Lake water quality profile summary at station BN1.**

Date (DD/MM/YY)	Ambient Temperature (°C)	Ice Depth (m)	Profile Depth (m)	Water Temperature (°C)	Dissolved Oxygen (mg/L)	Dissolved Oxygen (% Saturation)	Specific Conductivity (µS/cm)	Salinity (psu)	pH
28/07/15	18	N/a	0	20.4	8.40	93.3	1104	0.60	9.31
			1	20.3	8.37	93.1	1111	0.61	9.31
			2	19.5	5.47	59.9	1107	0.62	9.25
			3	19.1	2.93	31.6	1107	0.62	9.17
			4	15.6	0.21	2.2	1096	0.67	8.91
			5	11.6	0.15	1.5	1069	0.73	8.01
			6	9.7	0.13	1.2	1067	0.76	7.80
			7	8.7	0.12	1.0	1074	0.79	7.67
			8	8.4	0.10	0.9	1081	0.80	7.60
26/08/15	22	N/a	0	19.7	12.84	140.1	1118	0.62	9.57
			1	17.5	11.86	124.4	1112	0.65	9.56
			2	16.5	5.92	60.9	1107	0.66	9.44
			3	16.2	3.70	37.8	1106	0.67	9.40
			4	16.0	2.53	25.6	1104	0.67	9.36
			5	12.6	0.20	1.9	1076	0.71	7.96
			6	9.7	0.24	2.1	1072	0.77	7.77
			7	8.9	0.30	2.5	1082	0.79	7.68
27/10/15	-1	N/a	0	5.1	12.14	95.6	1082	0.88	9.41
			1	5.1	12.02	94.7	1083	0.88	9.40
			2	5.1	11.84	93.3	1083	0.88	9.38
			3	5.1	11.60	91.5	1083	0.88	9.37
			4	5.1	11.51	91.0	1082	0.88	9.60
			5	5.1	11.45	90.3	1082	0.88	9.36
			6	5.1	11.38	89.7	1082	0.88	9.34
			7	5.1	11.35	89.4	1083	0.88	9.34
			8	5.1	11.25	88.6	1083	0.88	9.34
18/02/16	1	0.43	0	0.8	4.31	30.2	849.4	0.78	9.01
			1	1.0	3.15	22.3	845.0	0.77	8.96
			2	1.4	2.28	16.2	841.1	0.76	8.92
			3	1.7	1.19	8.5	838.7	0.75	8.87
			4	1.8	0.98	7.0	839.7	0.75	8.85
			5	1.9	0.85	6.1	840.6	0.75	8.83
			6	2.0	0.75	5.4	841.1	0.74	8.82
			7	2.4	0.66	4.9	841.5	0.74	8.74

**Table 15. Black Nugget Lake water quality profile summary at station BN2.**

Date (DD/MM/YY)	Ambient Temperature (°C)	Ice Depth (m)	Profile Depth (m)	Water Temperature (°C)	Dissolved Oxygen (mg/L)	Dissolved Oxygen (% Saturation)	Specific Conductivity (µS/cm)	Salinity (psu)	pH
28/07/15	18	N/a	0	20.5	8.30	92.6	1106	0.60	9.33
			1	20.5	8.43	94.0	1108	0.61	9.33
			2	20.5	8.45	94.4	1108	0.61	9.33
			3	20.5	8.35	92.8	1108	0.61	9.33
			4	19.3	4.13	45.1	1105	0.62	9.26
26/08/15	22	N/a	0	20.4	15.23	169.6	1128	0.62	9.63
			1	17.2	8.17	84.7	1108	0.65	9.50
			2	16.3	3.54	36.2	1105	0.67	9.40
			3	16.1	1.43	14.5	1105	0.67	9.35
			4	16.0	0.27	2.7	1105	0.67	9.32
27/10/15	-1	N/a	0	4.9	10.54	82.6	1085	0.89	9.33
			1	4.9	10.64	83.3	1086	0.89	9.33
			2	4.9	10.63	83.2	1086	0.89	9.32
			3	4.9	10.69	83.7	1086	0.89	9.32
			4	4.8	10.68	83.4	1086	0.89	9.31
18/02/16	1	0.43	0	0.7	5.10	35.6	837.7	0.77	8.97
			1	1.2	2.67	18.9	838.5	0.76	8.92
			2	1.3	2.09	14.9	843.1	0.76	8.89
			3	1.8	1.79	12.9	838.7	0.75	8.89
			4	2.3	0.96	7.0	843.5	0.74	8.79

**Table 16. Black Nugget Lake water quality profile summary at station BN3.**

Date (DD/MM/YY)	Ambient Temperature (°C)	Ice Depth (m)	Profile Depth (m)	Water Temperature (°C)	Dissolved Oxygen (mg/L)	Dissolved Oxygen (% Saturation)	Specific Conductivity (µS/cm)	Salinity (psu)	pH
28/07/15	18	N/a	0	20.7	8.84	98.8	1109	0.60	9.35
			1	20.6	8.84	98.7	1109	0.60	9.35
			2	20.5	8.74	97.5	1109	0.61	9.35
			3	20.5	8.43	93.9	1108	0.61	9.34
			4	18.3	0.17	1.8	1101	0.63	9.10
			5	13.7	0.11	1.0	1096	0.71	8.05
			6	10.9	0.05	0.5	1117	0.77	7.56
26/08/15	22	N/a	0	19.9	14.14	155.4	1125	0.62	9.63
			1	17.1	7.59	79.1	1105	0.65	9.49
			2	16.3	4.13	42.1	1106	0.67	9.42
			3	16.1	0.35	3.7	1103	0.67	9.34
			4	15.9	0.14	1.4	1103	0.67	9.31
			5	14.7	0.17	1.7	1102	0.69	8.72
			6	12.1	0.24	2.1	1167	0.78	7.40
27/10/15	-1	N/a	0	5.4	10.20	81.2	1082	0.87	9.33
			1	5.5	10.06	80.0	1082	0.87	9.34
			2	5.4	10.16	80.8	1082	0.87	9.35
			3	5.5	10.17	80.9	1082	0.87	9.34
			4	5.5	10.14	80.6	1082	0.87	9.33
			5	5.5	10.15	80.8	1082	0.87	9.33
			6	5.5	10.12	80.3	1082	0.87	9.33
18/02/16	1	0.35	0	0.6	3.75	24.7	819.4	0.76	8.95
			1	1.3	2.80	20.0	823.9	0.74	8.92
			2	1.4	2.40	17.1	829.1	0.75	8.91
			3	1.8	2.01	14.3	828.1	0.74	8.89
			4	2.1	1.23	9.0	831.7	0.73	8.86
			5	2.5	1.03	7.6	838.6	0.73	8.72



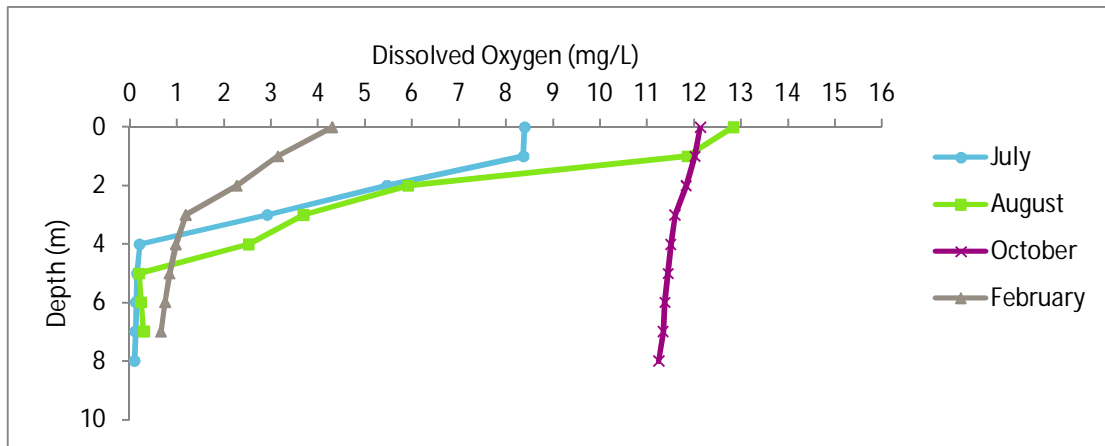


Figure 38. Black Nugget Mine Pit Lake dissolved oxygen profiles at station BN1.

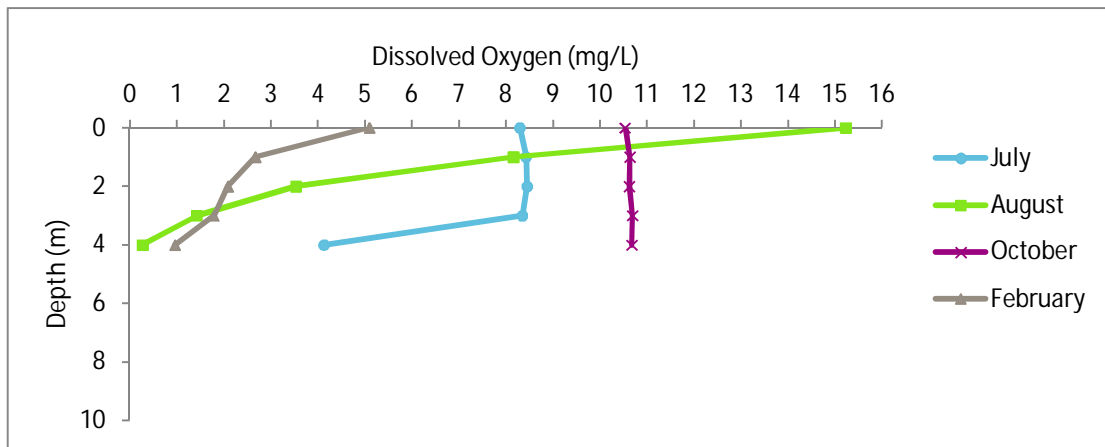


Figure 39. Black Nugget Mine Pit Lake dissolved oxygen profiles at station BN2.

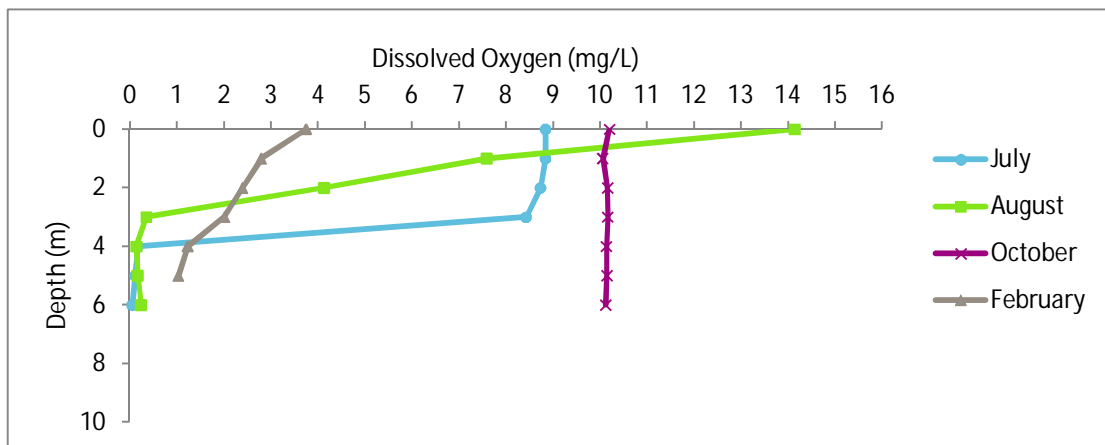


Figure 40. Black Nugget Mine Pit Lake dissolved oxygen profiles at station BN3.

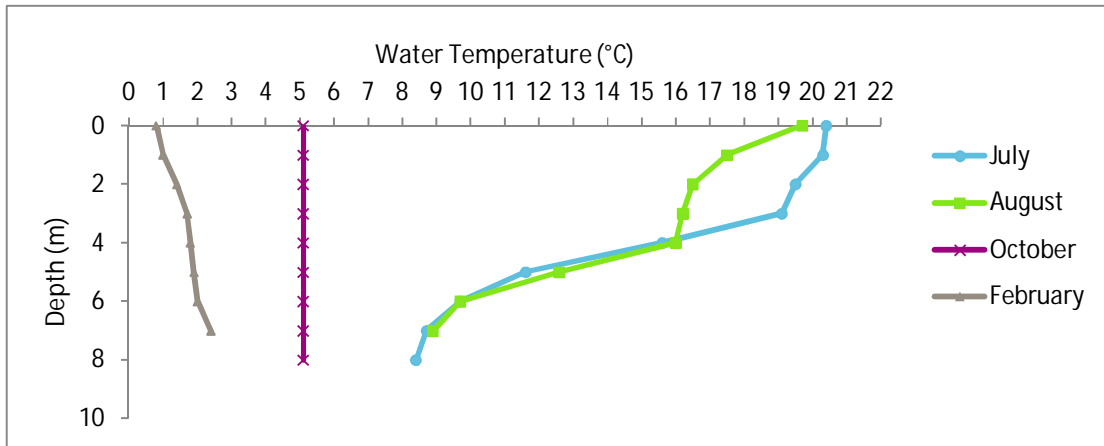


Figure 41. Black Nugget Mine Pit Lake water temperature profiles at station BN1.

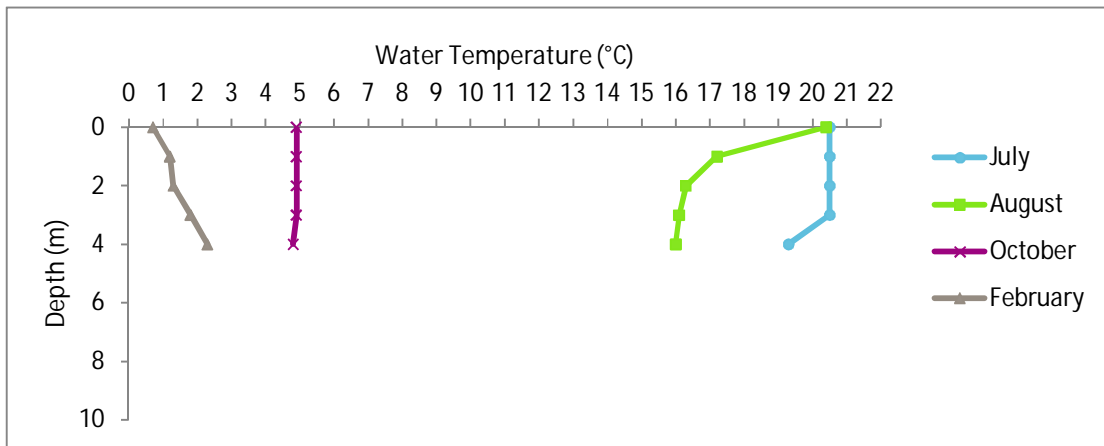


Figure 42. Black Nugget Mine Pit Lake water temperature profiles at station BN2.

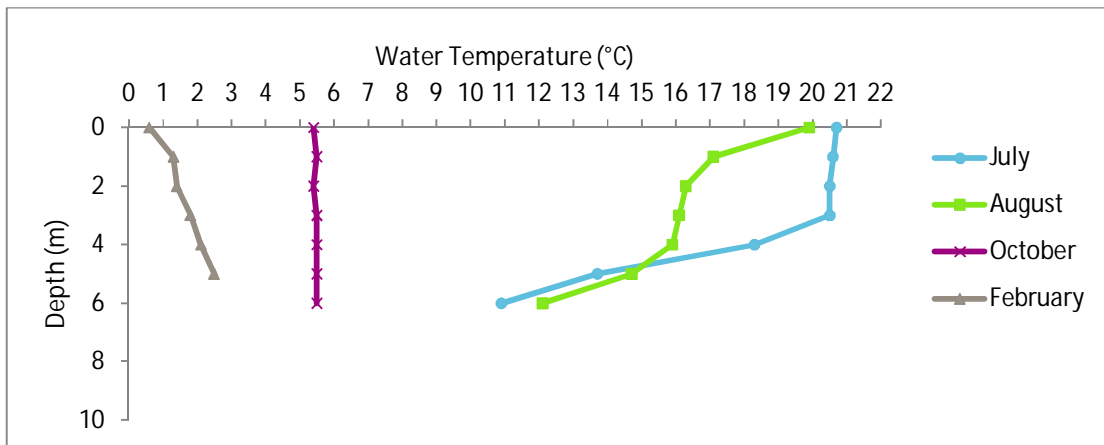
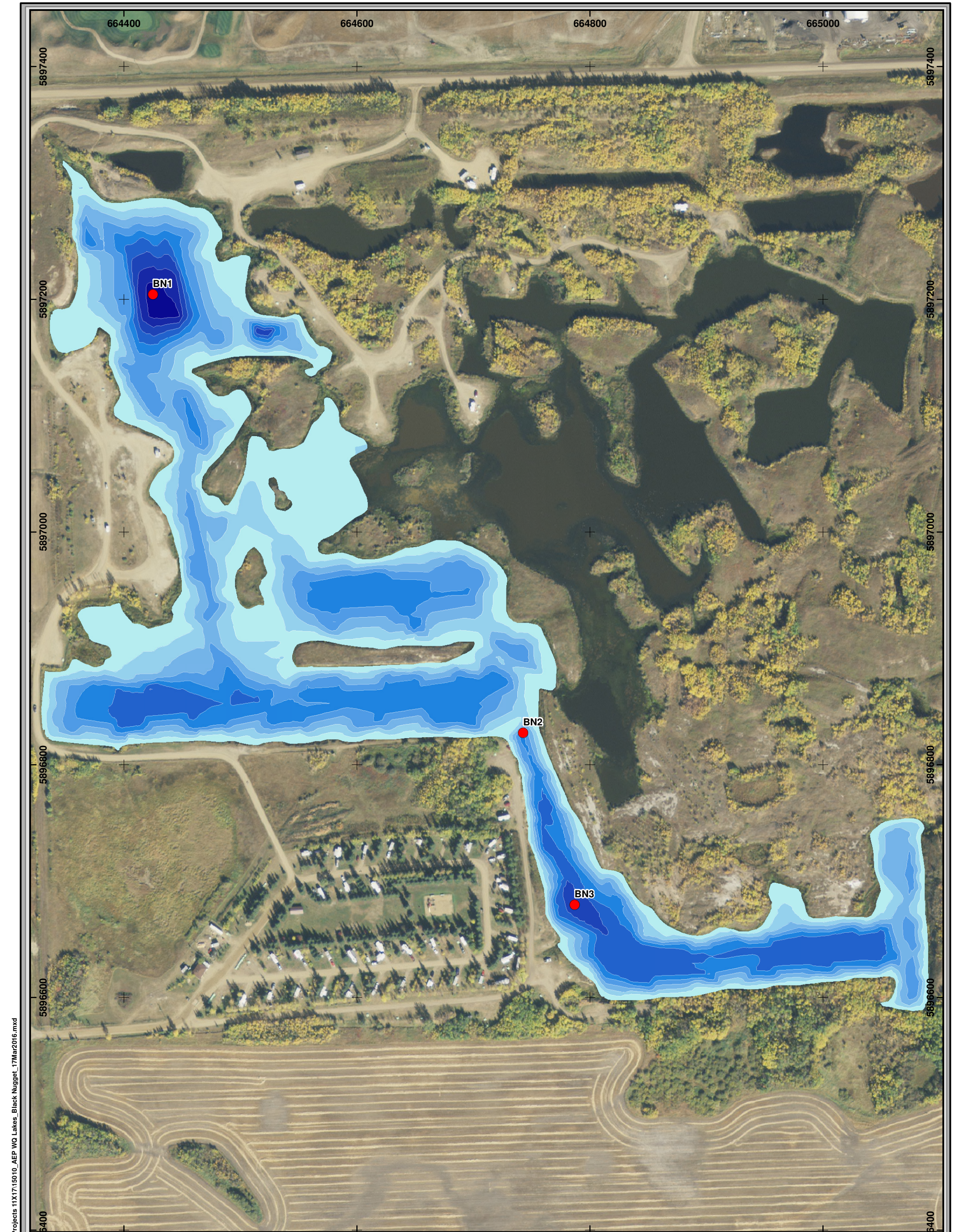
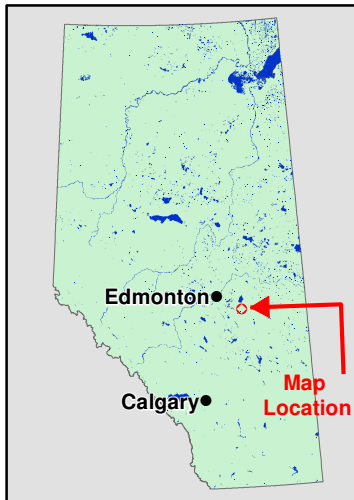


Figure 43. Black Nugget Mine Pit Lake water temperature profiles at station BN3.



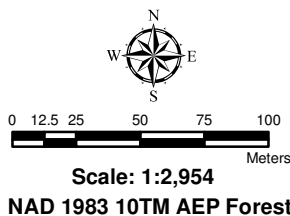
**LEGEND**

- Depth**
- 0 - 1 m
  - 1 - 2 m
  - 2 - 3 m
  - 3 - 4 m
  - 4 - 5 m
  - 5 - 6 m
  - 6 - 7 m
  - 7 - 8 m
  - 8 - 9 m
- Water Quality Sample Location



**Map Sources/Notes:**  
 Bathymetric Data Collected July 28, 2015 Using a Lowrance 5DS HD Sonar Unit. Lake boundary digitized using aerial photograph provided by AEP.

Black Nugget Mine Pit Lake  
 Surface Elevation: 685.69 m



**Assessment of Eight Alberta Waterbodies**

**Black Nugget Mine Pit Lake Bathymetry Map Including Water Quality Profile Locations**

Lead: Richard Carson      Date: 31 Mar 2016  
 Drawn By: Sandra Babiuk      Project Number: 15010

RC BioSolutions Ltd.

Figure No.  
**44**



**Figure 45. Black Nugget Mine Pit Lake (August) – looking north from station BN1.**



**Figure 46. Black Nugget Mine Pit Lake (October) – sampling with YSI meter from Zodiac.**

### 3.6 Dillberry Lake

Tables 17 to 19 contain the complete water quality profile data for each sample station. Figures 47 to 49 summarize the dissolved oxygen profiles and Figures 50 to 52 summarize the temperature profiles. Most profiles in July, August, and February exhibit a typical stratified water column pattern, while the October profile exhibits a typical fall turnover, fully mixed water column pattern.

Bathymetry data was collected on July 28, 2015 and was used to create a lake bathymetry map (Figure 53). Figures 54 and 55 are site photographs taken during the sampling.

**Table 17. Dillberry Lake water quality profile summary at station DL1.**

Date (DD/MM/YY)	Ambient Temperature (°C)	Ice Depth (m)	Profile Depth (m)	Water Temperature (°C)	Dissolved Oxygen (mg/L)	Dissolved Oxygen (% Saturation)	Specific Conductivity (µS/cm)	Salinity (psu)	pH
28/07/15	15	N/a	0	20.5	7.82	87.0	400.0	0.21	8.68
			1	20.8	7.82	87.4	399.9	0.21	8.69
			2	20.5	7.81	86.9	399.9	0.21	8.68
			3	20.5	7.82	87.0	402.2	0.21	8.68
			4	20.5	7.81	86.8	401.0	0.21	8.68
			5	20.5	7.72	85.5	400.5	0.21	8.67
			6	20.1	6.09	63.1	404.6	0.22	8.47
			7	20.0	3.34	36.0	412.5	0.22	8.27
			8	18.8	0.16	1.7	422.5	0.23	7.98
26/08/15	20	N/a	0	19.0	8.57	92.1	401.2	0.22	8.81
			1	18.4	8.58	91.1	399.8	0.22	8.81
			2	17.7	8.12	85.3	399.8	0.23	8.77
			3	17.4	7.83	81.5	400.1	0.23	8.74
			4	17.0	7.25	74.7	401.1	0.23	8.68
			5	16.8	7.02	72.1	400.9	0.23	8.66
			6	16.7	6.47	66.5	401.6	0.23	8.61
			7	16.6	5.93	60.6	402.9	0.23	8.55
			8	16.5	5.33	55.1	404.6	0.23	8.48
27/10/15	1	N/a	0	7.4	10.85	91.4	376.6	0.27	8.75
			1	7.0	11.21	92.1	378.2	0.28	8.72
			2	7.0	10.93	90.3	378.1	0.28	8.73
			3	6.9	10.92	91.0	378.2	0.28	8.72
			4	6.9	10.80	89.4	378.4	0.28	8.73
			5	7.0	10.76	88.8	377.2	0.28	8.74
			6	6.9	10.64	87.6	377.7	0.28	8.74
			7	7.0	10.50	87.8	378.4	0.28	8.75
			8	6.9	10.74	88.6	378.5	0.28	8.74
18/02/16	-1	0.56	0	0.8	12.36	86.3	333.3	0.29	8.46
			1	2.6	6.38	47.0	333.4	0.28	8.16
			2	3.1	2.51	18.7	334.5	0.28	7.94
			3	3.1	0.89	6.7	340.1	0.28	7.83
			4	3.2	0.71	5.2	343.0	0.28	7.78
			5	3.2	0.68	5.0	347.4	0.29	7.75
			6	3.3	0.59	4.4	351.1	0.29	7.76
			7	3.4	0.56	4.2	355.3	0.29	7.74
			8	3.5	0.52	3.9	361.2	0.29	7.73

**Table 18. Dillberry Lake water quality profile summary at station DL2.**

Date (DD/MM/YY)	Ambient Temperature (°C)	Ice Depth (m)	Profile Depth (m)	Water Temperature (°C)	Dissolved Oxygen (mg/L)	Dissolved Oxygen (% Saturation)	Specific Conductivity (µS/cm)	Salinity( psu)	pH
28/07/15	15	N/a	0	20.5	8.05	89.7	399.9	0.21	8.73
			1	20.5	8.17	90.9	399.7	0.21	8.74
			2	20.5	8.21	91.4	399.6	0.21	8.74
			3	20.5	8.11	90.3	399.7	0.21	8.73
			4	20.5	8.15	90.6	399.9	0.21	8.73
			5	20.0	6.56	72.2	405.2	0.22	8.58
			6	19.7	5.92	64.7	407.2	0.22	8.52
			7	18.5	1.45	15.5	420.5	0.23	7.99
			8	15.5	0.14	1.4	438.8	0.26	7.68
			9	14.1	0.10	1.0	447.9	0.28	7.59
			10	13.5	0.09	0.8	452.7	0.28	7.52
26/08/15	20	N/a	0	19.2	8.49	91.6	401.0	0.22	8.81
			1	18.5	8.72	93.2	401.7	0.22	8.82
			2	18.1	7.99	85.6	402.0	0.22	8.78
			3	18.0	7.88	83.0	402.1	0.23	8.76
			4	17.7	7.92	82.6	402.5	0.23	8.68
			5	17.3	6.70	69.7	403.4	0.23	8.67
			6	17.1	5.86	60.8	405.0	0.23	8.58
			7	17.1	5.88	60.6	406.0	0.23	8.55
			8	16.9	4.64	47.8	411.0	0.24	8.43
			9	16.8	3.92	40.3	413.6	0.24	8.29
27/10/15	1	N/a	0	6.7	11.18	91.5	385.1	0.29	8.82
			1	6.7	11.30	92.5	385.3	0.29	8.82
			2	6.7	11.33	92.7	385.3	0.29	8.82
			3	6.7	11.35	92.9	385.1	0.29	8.82
			4	6.7	11.39	93.3	385.1	0.29	8.81
			5	6.7	11.90	93.0	385.2	0.29	8.81
			6	6.7	11.48	94.1	385.1	0.29	8.80
			7	6.7	11.39	93.3	385.1	0.29	8.81
			8	6.7	11.34	92.8	385.1	0.29	8.81
			9	6.7	11.31	92.6	384.9	0.29	8.81
			10	6.7	11.30	92.5	385.0	0.29	8.81
18/02/16	-1	0.52	0	1.3	11.68	82.9	316.2	0.27	8.52
			1	3.0	9.04	67.3	314.0	0.26	8.40
			2	3.1	8.48	63.3	314.5	0.26	8.34
			3	3.0	5.21	38.8	317.8	0.26	8.18
			4	3.1	4.32	32.2	319.1	0.26	8.06
			5	3.1	3.98	29.7	320.4	0.26	8.01
			6	3.2	3.31	24.7	322.0	0.26	7.97
			7	3.3	2.72	20.3	323.4	0.26	7.94
			8	3.4	1.98	14.9	325.4	0.26	7.91
			9	3.5	0.63	4.7	327.0	0.27	7.86
			10	4.1	0.47	3.5	336.5	0.27	7.81

**Table 19. Dillberry Lake water quality profile summary at station DL3.**

Date (DD/MM/YY)	Ambient Temperature (°C)	Ice Depth (m)	Profile Depth (m)	Water Temperature (°C)	Dissolved Oxygen (mg/L)	Dissolved Oxygen (% Saturation)	Specific Conductivity (µS/cm)	Salinity (psu)	pH
28/07/15	15	N/a	0	20.5	7.94	88.6	400.7	0.21	8.72
			1	20.6	7.97	88.7	400.7	0.21	8.72
			2	20.6	7.99	88.9	400.8	0.21	8.72
			3	20.6	7.98	88.8	400.9	0.21	8.72
			4	20.6	7.91	88.1	401.0	0.21	8.72
			5	20.2	6.19	68.4	406.5	0.22	8.57
			6	18.8	1.86	17.9	420.5	0.23	8.06
			7	16.1	0.13	1.3	438.0	0.26	7.69
			8	14.4	0.09	0.9	451.3	0.28	7.55
			9	13.6	0.08	0.8	458.5	0.29	7.47
			10	13.0	0.07	0.6	468.0	0.30	7.37
26/08/15	20	N/a	0	19.4	8.50	92.5	403.4	0.22	8.80
			1	18.7	8.18	87.4	402.6	0.22	8.78
			2	18.3	8.43	89.8	402.8	0.22	8.79
			3	18.0	7.43	78.2	404.0	0.23	8.71
			4	17.7	6.78	71.2	404.8	0.23	8.66
			5	17.5	6.10	63.8	405.9	0.23	8.60
			6	17.4	5.62	58.5	406.7	0.23	8.56
			7	17.1	4.61	48.0	411.3	0.24	8.38
			8	16.7	2.21	22.8	425.7	0.25	7.93
			9	15.8	0.19	2.0	455.4	0.27	7.50
			10	14.5	0.23	2.3	491.6	0.30	7.38
27/10/15	1	N/a	0	6.8	11.15	91.5	384.9	0.29	8.81
			1	6.9	11.19	92.0	385.1	0.29	8.83
			2	6.9	11.18	91.9	385.1	0.29	8.84
			3	6.9	11.25	92.5	385.0	0.29	8.83
			4	6.9	11.28	92.7	385.1	0.29	8.82
			5	6.9	11.27	92.6	385.1	0.29	8.81
			6	6.9	11.30	92.8	385.0	0.29	8.82
			7	6.9	11.32	93.0	385.1	0.29	8.81
			8	6.8	11.26	92.5	385.1	0.29	8.81
			9	6.8	11.28	92.7	385.1	0.29	8.81
			10	6.8	11.24	92.4	385.2	0.29	8.81
18/02/16	-1	0.51	0	1.3	11.81	83.8	300.5	0.26	8.74
			1	3.0	11.06	82.2	297.8	0.24	8.63
			2	2.9	10.00	74.2	300.4	0.25	8.53
			3	3.0	9.68	72.0	301.6	0.25	8.47
			4	3.1	9.75	72.8	304.3	0.25	8.46
			5	3.2	8.73	65.2	305.9	0.25	8.39
			6	3.2	8.21	61.5	307.8	0.25	8.34
			7	3.4	2.92	22.1	309.6	0.25	8.08
			8	3.8	1.01	7.6	311.6	0.25	7.93
			9	4.1	0.83	6.3	316.4	0.25	7.84

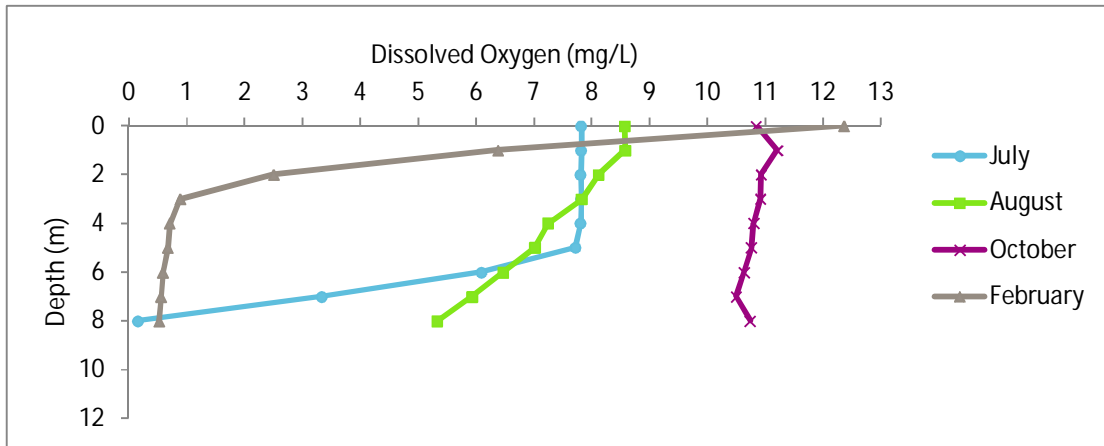


Figure 47. Dillberry Lake dissolved oxygen profiles at station DL1.

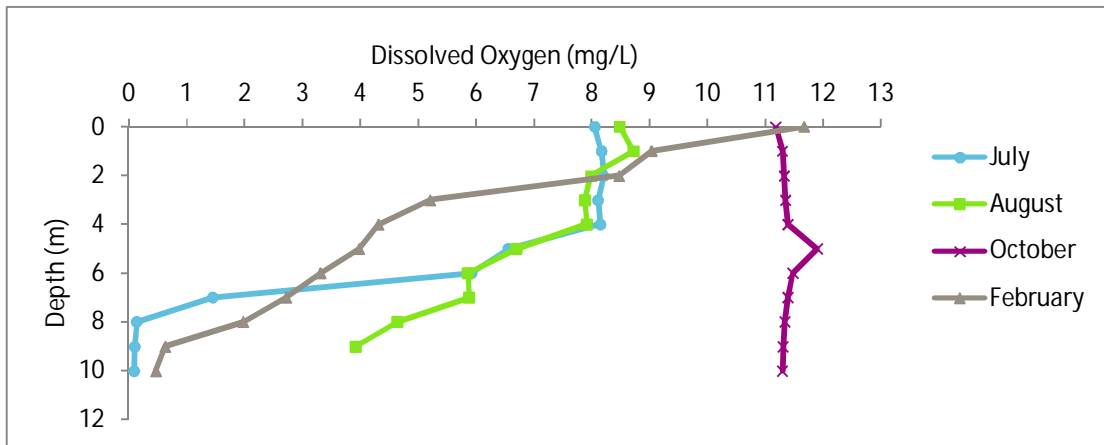


Figure 48. Dillberry Lake dissolved oxygen profiles at station DL2.

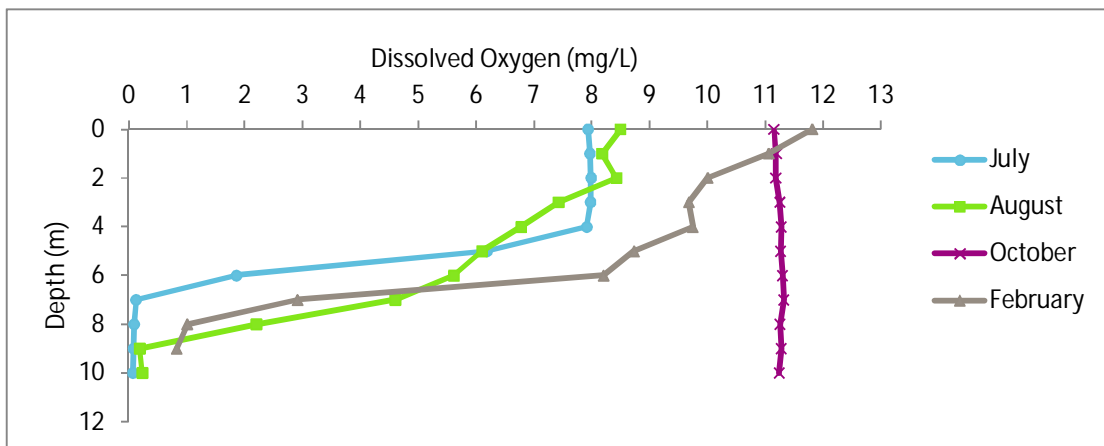


Figure 49. Dillberry Lake dissolved oxygen profiles at station DL3.



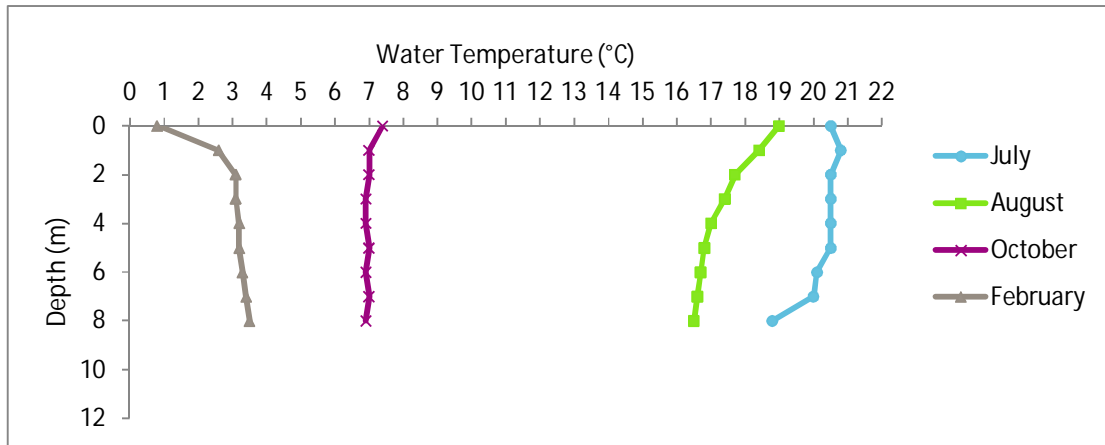


Figure 50. Dillberry Lake water temperature profiles at station DL1.

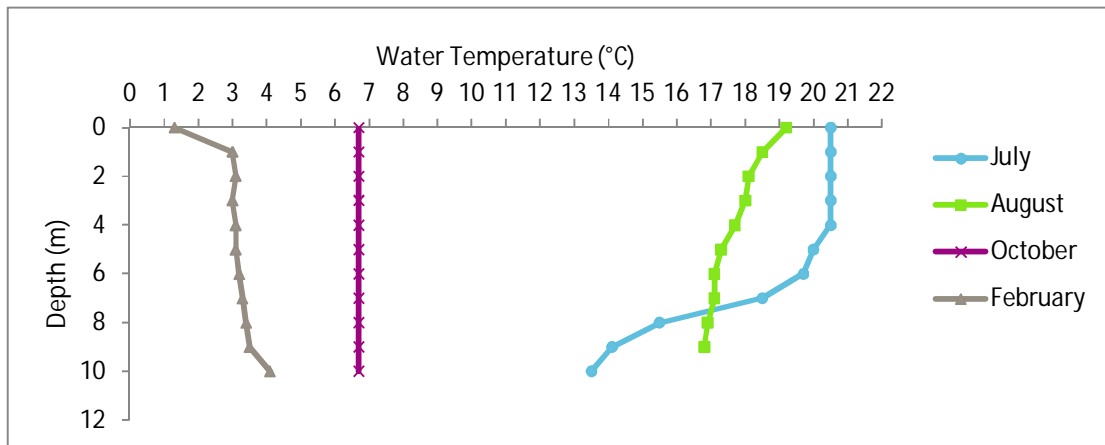


Figure 51. Dillberry Lake water temperature profiles at station DL2.

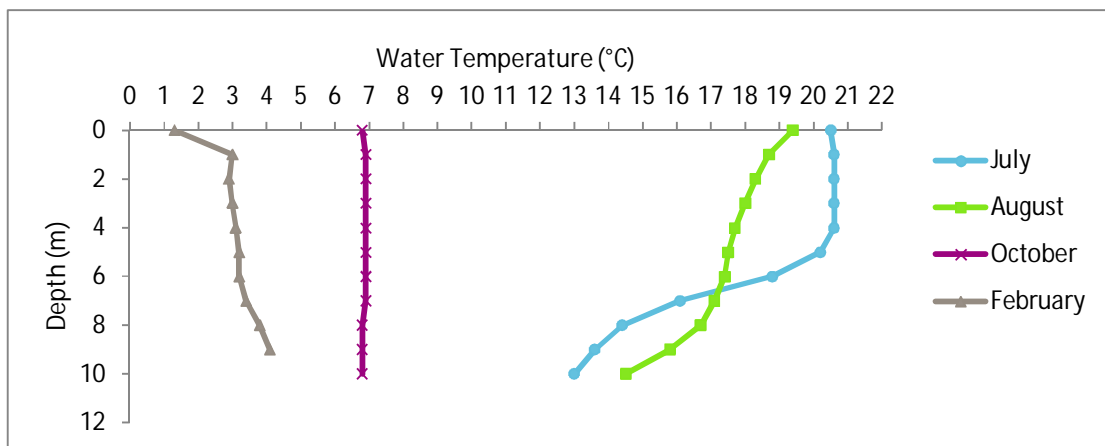
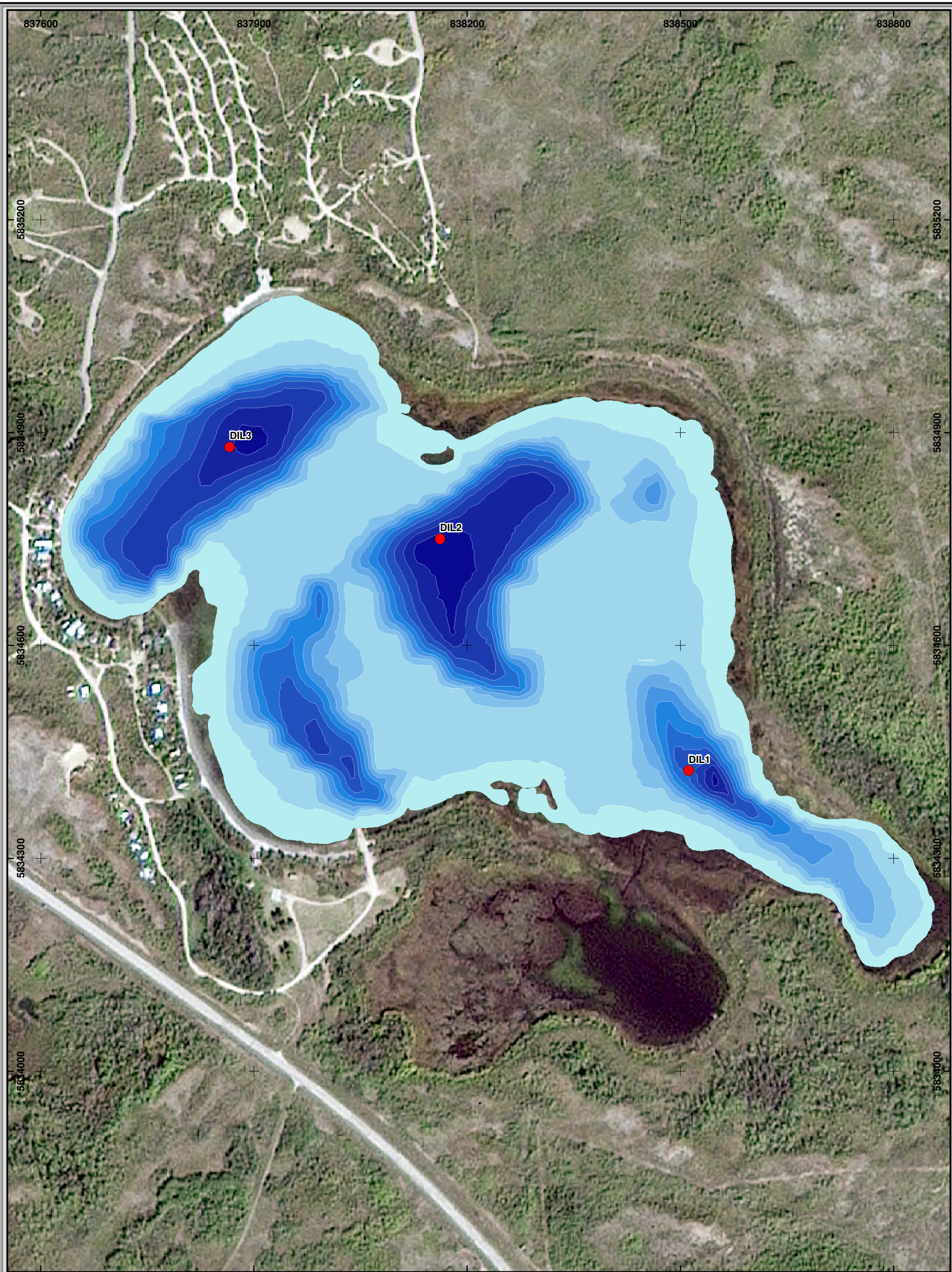


Figure 52. Dillberry Lake water temperature profiles at station DL3.

Z:\Projects\2015\15010\_Environment and Parks\_WQ3-Mapping\_surveys\Map Projects\11X17\15010\_AEP\_WQ Lakes\_Dillberry\_Lake\_17Mar2016.mxd

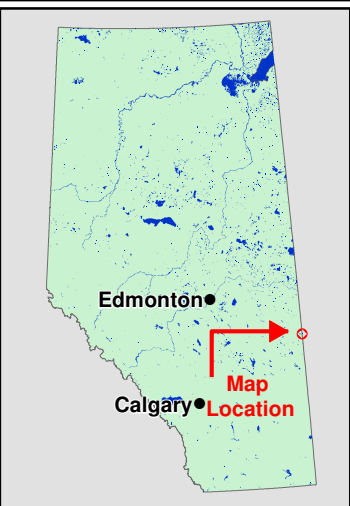


### LEGEND

**Depth**

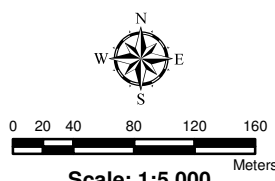
0 - 1
1 - 2 m
2 - 3 m
3 - 4 m
4 - 5 m
5 - 6 m
6 - 7 m
7 - 8 m
8 - 9 m
9 - 10 m
10 - 11 m

● Water Quality Sample Location



**Map Sources/Notes:**  
 Bathymetric Data Collected July 28, 2015 Using a Lowrance 5DS HD Sonar Unit. Lake boundary digitized using aerial photograph provided by AEP.

Dillberry Lake  
 Surface Elevation: 599.92 m



Scale: 1:5,000  
 NAD 1983 10TM AEP Forest

Alberta Environment and Parks

### Assessment of Eight Alberta Waterbodies

## Dillberry Lake Bathymetry Map Including Water Quality Profile Locations

Lead: Richard Carson	Date: 31 Mar 2016
Drawn By: Sandra Babiuk	Project Number: 15010

RC BioSolutions Ltd.	Figure No. 53
----------------------	---------------



**Figure 54. Dillberry Lake (August) – looking north from station DL1.**



**Figure 55. Dillberry Lake (February) – looking south from station DL1.**

### 3.7 Blood Indian Creek Reservoir

Tables 20 to 23 contain the complete water quality profile data for each sample station. Figures 56 to 59 summarize the dissolved oxygen profiles and Figures 60 to 63 summarize the temperature profiles. Most profiles in July, August, and February exhibit a typical stratified water column pattern, while the October profile exhibits a typical fall turnover, fully mixed water column pattern.

Bathymetry data was collected on July 31, 2015 and was used to create a lake bathymetry map (Figure 64). Figures 65 to 66 are site photographs taken during the sampling.

**Table 20. Blood Indian Creek Reservoir water quality profile summary at station BL01.**

Date (DD/MM/YY)	Ambient Temperature (°C)	Ice Depth (m)	Profile Depth (m)	Water Temperature (°C)	Dissolved Oxygen (mg/L)	Dissolved Oxygen (% Saturation)	Specific Conductivity (µS/cm)	Salinity (psu)	pH
31/07/15	25	N/a	0	19.7	8.19	90.4	2338	1.35	8.88
			1	19.5	8.23	90.5	2337	1.36	8.88
			2	19.4	7.95	87.4	2336	1.36	8.88
			3	19.2	7.70	83.4	2336	1.36	8.87
			4	19.1	7.51	83.0	2335	1.37	8.86
			5	19.0	7.50	82.5	2335	1.37	8.86
			6	18.8	6.81	74.2	2334	1.38	8.83
			7	18.5	5.41	57.4	2331	1.38	8.78
27/08/15	22	N/a	0	18.5	8.15	87.9	2358	1.40	8.93
			1	17.1	8.03	83.7	2345	1.44	8.91
			2	16.7	7.83	80.7	2345	1.45	8.91
			3	16.5	7.44	76.6	2344	1.46	8.89
			4	16.3	6.92	71.0	2344	1.47	8.87
			5	16.3	6.36	65.5	2344	1.47	8.84
			6	16.2	5.81	59.5	2345	1.47	8.81
28/10/15	1	N/a	0	6.1	11.00	89.9	2314	1.90	8.91
			1	5.9	11.02	89.1	2317	1.92	8.88
			2	5.9	10.94	88.3	2316	1.92	8.88
			3	5.8	10.93	88.1	2317	1.92	8.87
			4	5.8	10.70	86.3	2317	1.92	8.87
			5	5.8	10.61	85.5	2317	1.92	8.87
			6	5.8	10.60	85.4	2317	1.92	8.86
			7	5.8	10.47	84.3	2318	1.92	8.86
09/02/16	1	0.49	0	1.1	7.75	55.4	1755	1.66	8.56
			1	1.4	7.97	57.3	1750	1.64	8.55
			2	1.6	7.76	55.9	1747	1.62	8.55
			3	1.6	7.80	56.0	1749	1.63	8.54
			4	1.3	8.51	60.7	1761	1.65	8.56
			5	1.3	8.58	61.4	1764	1.66	8.58
			6	1.4	8.42	60.3	1769	1.66	8.58
			7	1.8	6.97	50.6	1773	1.64	8.50

**Table 21. Blood Indian Creek Reservoir water quality profile summary at station BL02.**

Date (DD/MM/YY)	Ambient Temperature (°C)	Ice Depth (m)	Profile Depth (m)	Water Temperature (°C)	Dissolved Oxygen (mg/L)	Dissolved Oxygen (% Saturation)	Specific Conductivity (µS/cm)	Salinity (psu) <sup>1</sup>	pH
31/07/15	25	N/a	0	20.4	8.45	94.2	2336	1.33	8.90
			1	20.1	8.01	88.6	2334	1.33	8.88
			2	19.5	7.97	87.1	2332	1.35	8.88
			3	19.0	7.75	84.5	2332	1.37	8.88
			4	18.8	7.46	80.5	2332	1.37	8.87
			5	18.8	7.32	78.6	2331	1.37	8.87
			6	18.7	6.77	72.6	2330	1.38	8.85
			7	18.5	6.36	69.2	2331	1.38	8.83
			8	18.5	6.04	64.5	2329	1.38	8.82
27/08/15	22	N/a	0	19.6	8.66	94.8	2362	1.37	8.98
			1	17.7	8.73	92.0	2345	1.42	8.98
			2	17.0	7.47	77.6	2346	1.44	8.92
			3	16.8	7.22	74.5	2345	1.45	8.92
			4	16.6	7.08	73.5	2344	1.46	8.89
			5	16.3	6.06	62.4	2342	1.47	8.84
			6	16.2	5.64	57.6	2342	1.47	8.82
			7	16.1	5.37	54.5	2342	1.47	8.81
			8	16.1	4.85	49.2	2343	1.47	8.78
8.8	16.0	2.87	29.4	2345	1.48	8.68			
28/10/15	1	N/a	0	6.4	10.67	87.2	2305	1.88	8.86
			1	6.2	10.57	86.0	2311	1.90	8.85
			2	6.1	10.50	85.2	2312	1.90	8.86
			3	6.0	10.52	85.1	2313	1.91	8.85
			4	5.9	10.49	84.7	2314	1.92	8.86
			5	5.8	10.43	84.1	2315	1.92	8.85
			6	5.8	10.33	83.2	2314	1.92	8.85
			7	5.8	10.27	82.7	2315	1.92	8.86
			8	5.7	10.27	82.6	2315	1.93	8.85
09/02/16	1	0.44	0	1.3	9.38	66.8	1730	1.62	8.82
			1	1.8	7.73	55.9	1726	1.59	8.75
			2	1.9	7.41	53.8	1726	1.59	8.70
			3	1.8	7.41	53.8	1741	1.61	8.66
			4	1.8	7.12	51.6	1745	1.61	8.61
			5	1.8	7.09	51.4	1748	1.61	8.61
			6	2.0	6.55	47.7	1750	1.61	8.57
			7	1.9	6.87	49.9	1761	1.62	8.55

**Table 22. Blood Indian Creek Reservoir water quality profile summary at station BL03.**

Date (DD/MM/YY)	Ambient Temperature (°C)	Ice Depth (m)	Profile Depth (m)	Water Temperature (°C)	Dissolved Oxygen (mg/L)	Dissolved Oxygen (% Saturation)	Specific Conductivity (µS/cm)	Salinity (psu)	pH
31/07/15	25	N/a	0	20.1	8.23	91.7	2336	1.34	8.90
			1	19.8	8.21	90.1	2334	1.34	8.90
			2	19.5	8.11	88.8	2332	1.35	8.89
			3	19.3	8.02	87.2	2332	1.36	8.89
			4	19.1	7.71	83.7	2331	1.36	8.88
			5	19.0	7.39	81.2	2331	1.37	8.87
			6	18.7	5.85	63.2	2328	1.38	8.80
			7	18.4	4.76	51.0	2327	1.38	8.75
			8	18.3	4.37	47.0	2328	1.39	8.73
			8.8	18.3	3.60	38.7	2328	1.39	8.69
27/08/15	22	N/a	0	19.0	8.25	89.2	2358	1.38	9.00
			1	17.9	8.83	93.5	2346	1.41	8.99
			2	17.3	8.21	85.6	2347	1.43	8.96
			3	17.1	7.28	75.5	2344	1.44	8.93
			4	16.5	6.20	63.4	2342	1.46	8.86
			5	16.3	6.12	62.5	2341	1.47	8.85
			6	16.2	5.66	57.8	2340	1.47	8.84
			7	16.1	4.68	47.7	2341	1.47	8.79
			8	16.1	4.10	41.9	2343	1.47	8.76
			8.6	16.1	4.45	45.6	2342	1.47	8.77
28/10/15	1	N/a	0	6.5	9.98	81.9	2307	1.88	8.85
			1	6.4	9.98	81.5	2308	1.88	8.85
			2	6.3	10.01	81.7	2309	1.89	8.85
			3	6.3	10.00	81.5	2309	1.89	8.84
			4	6.3	9.99	81.4	2309	1.89	8.84
			5	6.3	9.97	81.3	2309	1.89	8.84
			6	6.3	9.96	81.2	2309	1.89	8.84
			7	6.3	9.96	81.2	2309	1.89	8.84
			8	6.3	9.95	81.1	2309	1.89	8.84
			8.5	6.2	10.05	81.8	2309	1.89	8.83
09/02/16	1	0.43	0	1.8	6.83	49.5	1675	1.54	8.57
			1	2.7	6.60	49.2	1675	1.50	8.57
			2	2.9	6.49	48.5	1680	1.50	8.55
			3	3.1	6.25	47.0	1680	1.49	8.53
			4	3.2	5.84	43.9	1689	1.49	8.49
			5	3.1	5.70	43.2	1685	1.49	8.50
			6	3.2	5.56	41.8	1690	1.49	8.46
			7	3.4	5.08	38.6	1695	1.49	8.43
			8	3.6	5.03	38.5	1708	1.49	8.42

**Table 23. Blood Indian Creek Reservoir water quality profile summary at station BL04.**

Date (DD/MM/YY)	Ambient Temperature (°C)	Ice Depth (m)	Profile Depth (m)	Water Temperature (°C)	Dissolved Oxygen (mg/L)	Dissolved Oxygen (% Saturation)	Specific Conductivity (µS/cm)	Salinity (psu)	pH
31/07/15	25	N/a	0	19.8	7.72	85.3	2328	1.34	8.89
			1	19.5	7.72	84.3	2327	1.35	8.88
			2	19.0	7.18	76.7	2325	1.36	8.86
			3	18.8	6.28	68.3	2324	1.37	8.83
			4	18.7	6.02	65.1	2323	1.37	8.81
			5	18.6	4.68	50.5	2324	1.38	8.75
			6	18.5	4.72	50.6	2325	1.38	8.75
			7	18.5	4.31	46.3	2325	1.38	8.73
			8	18.4	4.10	44.6	2326	1.38	8.72
			9	18.4	3.66	39.6	2326	1.38	8.70
			10	18.4	3.39	36.3	2326	1.38	8.68
27/08/15	22	N/a	0	19.1	9.50	102.0	2351	1.38	9.03
			1	18.2	9.13	97.2	2347	1.40	9.02
			2	17.5	8.05	84.3	2348	1.43	8.96
			3	17.0	7.30	76.0	2342	1.44	8.92
			4	16.5	5.85	60.1	2340	1.46	8.84
			5	16.2	5.32	54.3	2341	1.47	8.82
			6	16.1	4.46	45.6	2341	1.47	8.78
			7	16.1	3.94	40.0	2342	1.47	8.77
			8	16.1	3.55	36.2	2343	1.47	8.73
			9	16.1	3.23	32.7	2343	1.47	8.70
28/10/15	1	N/a	0	6.5	10.07	82.5	2308	1.88	8.86
			1	6.3	10.00	81.5	2308	1.89	8.86
			2	6.2	10.04	81.7	2309	1.89	8.85
			3	6.2	9.98	81.2	2309	1.89	8.84
			4	6.2	9.98	81.1	2309	1.89	8.84
			5	6.1	10.50	85.3	2309	1.90	8.84
			6	6.1	10.43	84.7	2309	1.90	8.83
			7	6.1	10.38	84.3	2310	1.90	8.83
			8	6.1	10.33	83.9	2309	1.90	8.84
			9	6.1	10.29	83.5	2310	1.90	8.84
			10	5.9	10.25	82.8	2311	1.91	8.83
09/02/16	1	0.48	0	1.1	9.97	70.6	1743	1.65	8.38
			1	1.6	7.86	56.5	1742	1.62	8.47
			2	1.6	7.80	56.1	1743	1.62	8.48
			3	1.7	7.56	54.5	1742	1.61	8.49
			4	1.8	7.15	51.8	1741	1.61	8.47
			5	2.3	6.50	47.7	1735	1.58	8.45
			6	2.6	5.90	43.5	1736	1.56	8.41
			7	3.0	4.67	34.9	1736	1.54	8.34
			8	3.1	3.91	29.2	1743	1.54	8.29
			9	3.4	3.09	23.4	1743	1.53	8.22

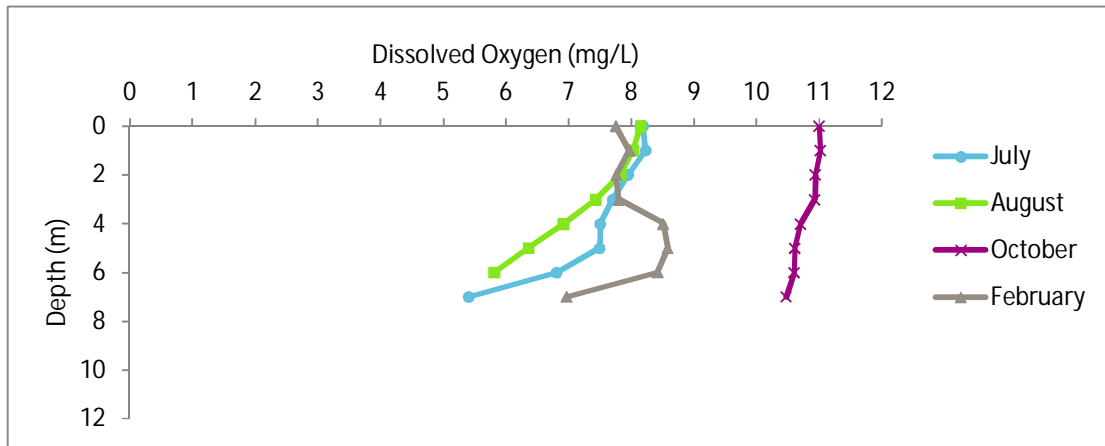


Figure 56. Blood Indian Creek Reservoir dissolved oxygen profiles at station BL01.

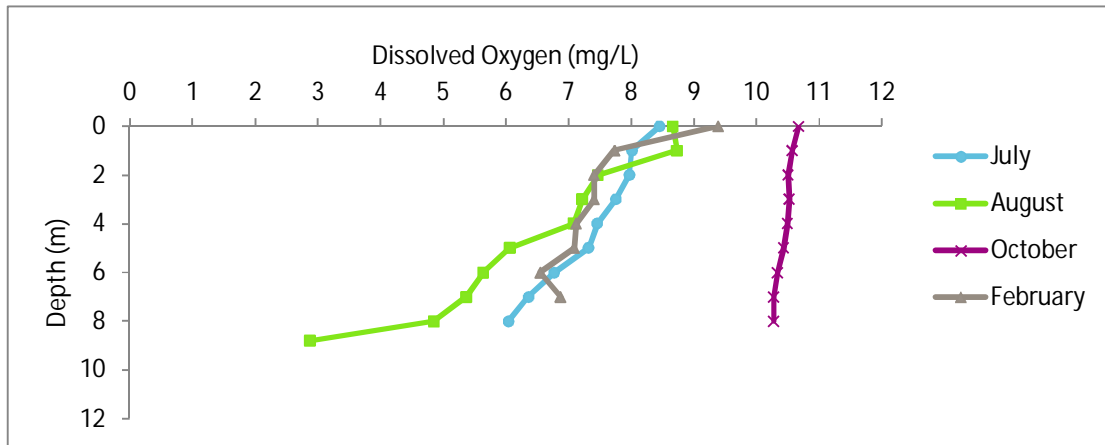


Figure 57. Blood Indian Creek Reservoir dissolved oxygen profiles at station BL02.

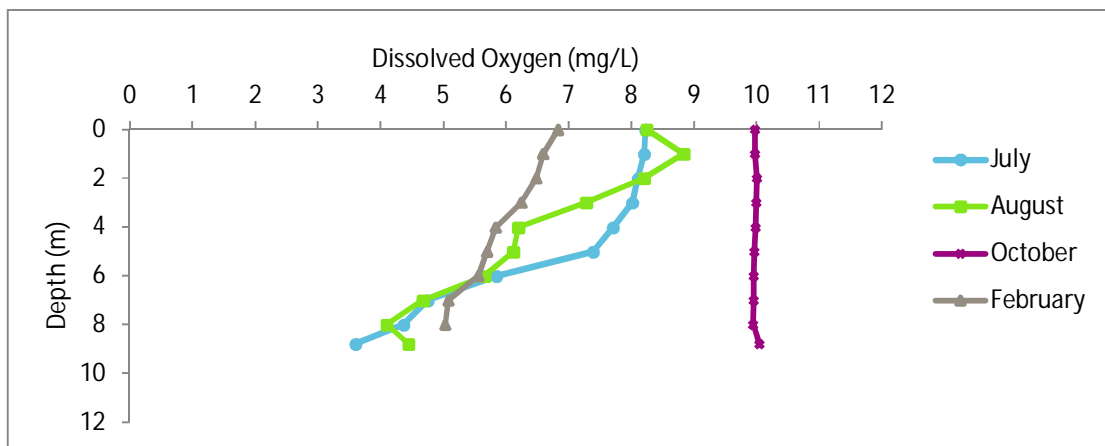


Figure 58. Blood Indian Creek Reservoir dissolved oxygen profiles at station BL03.



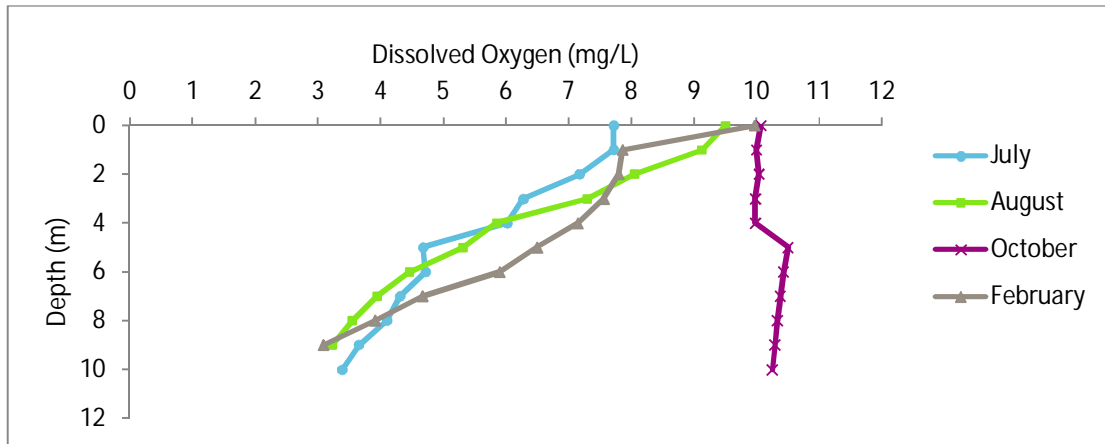


Figure 59. Blood Indian Creek Reservoir dissolved oxygen profiles at station BL04.

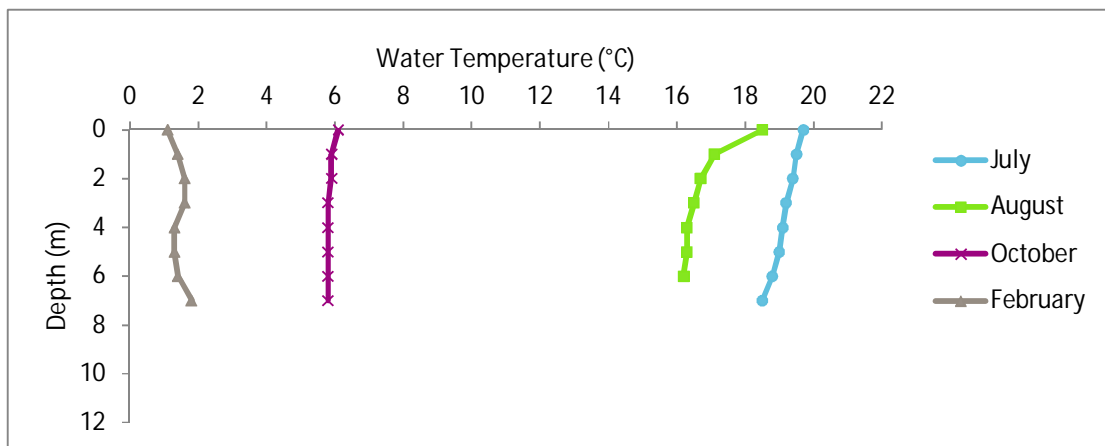


Figure 60. Blood Indian Creek Reservoir water temperature profiles at station BL01.

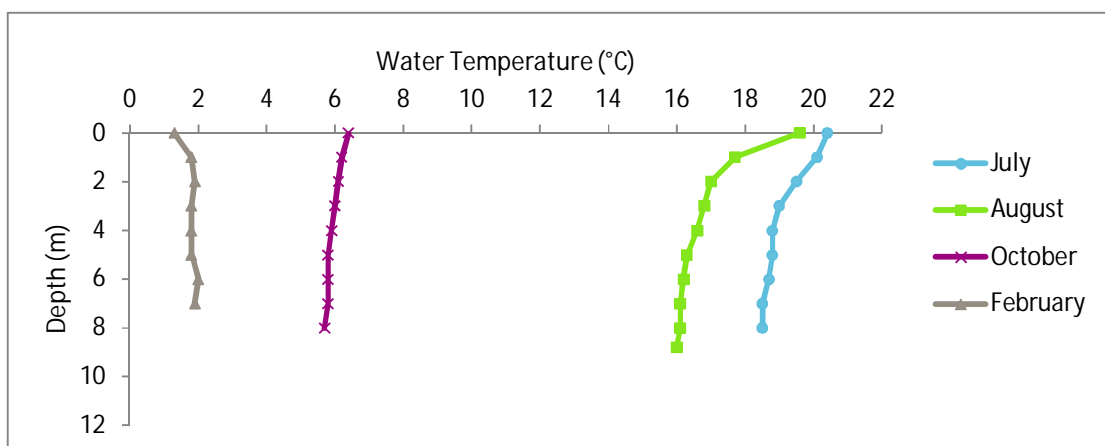


Figure 61. Blood Indian Creek Reservoir water temperature profiles at station BL02.

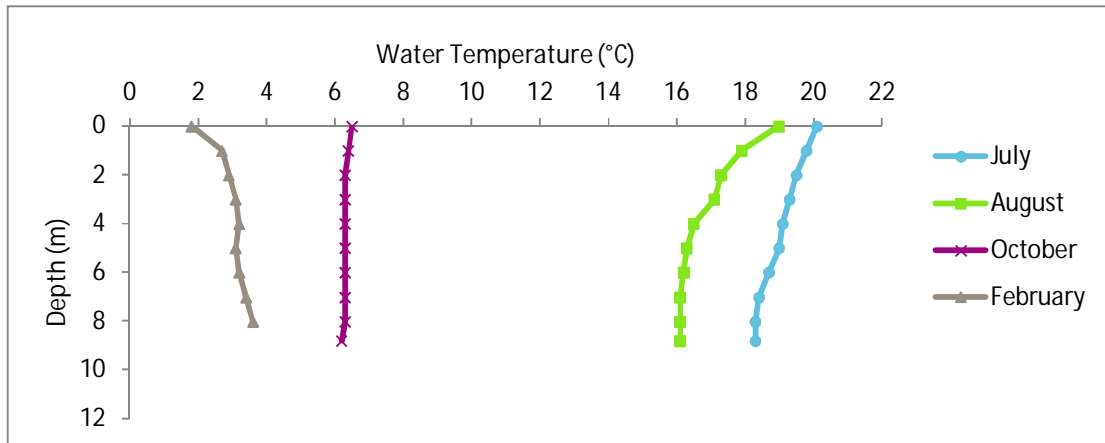


Figure 62. Blood Indian Creek Reservoir water temperature profiles at station BL03.

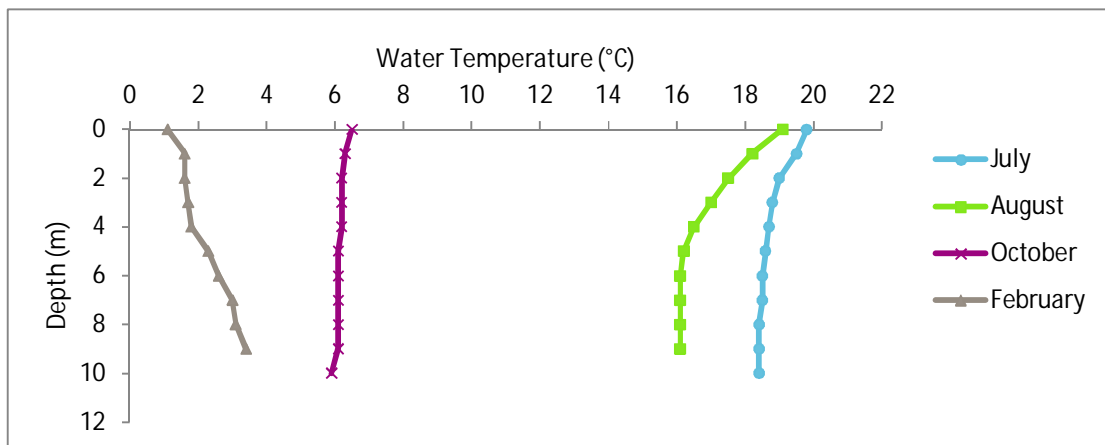
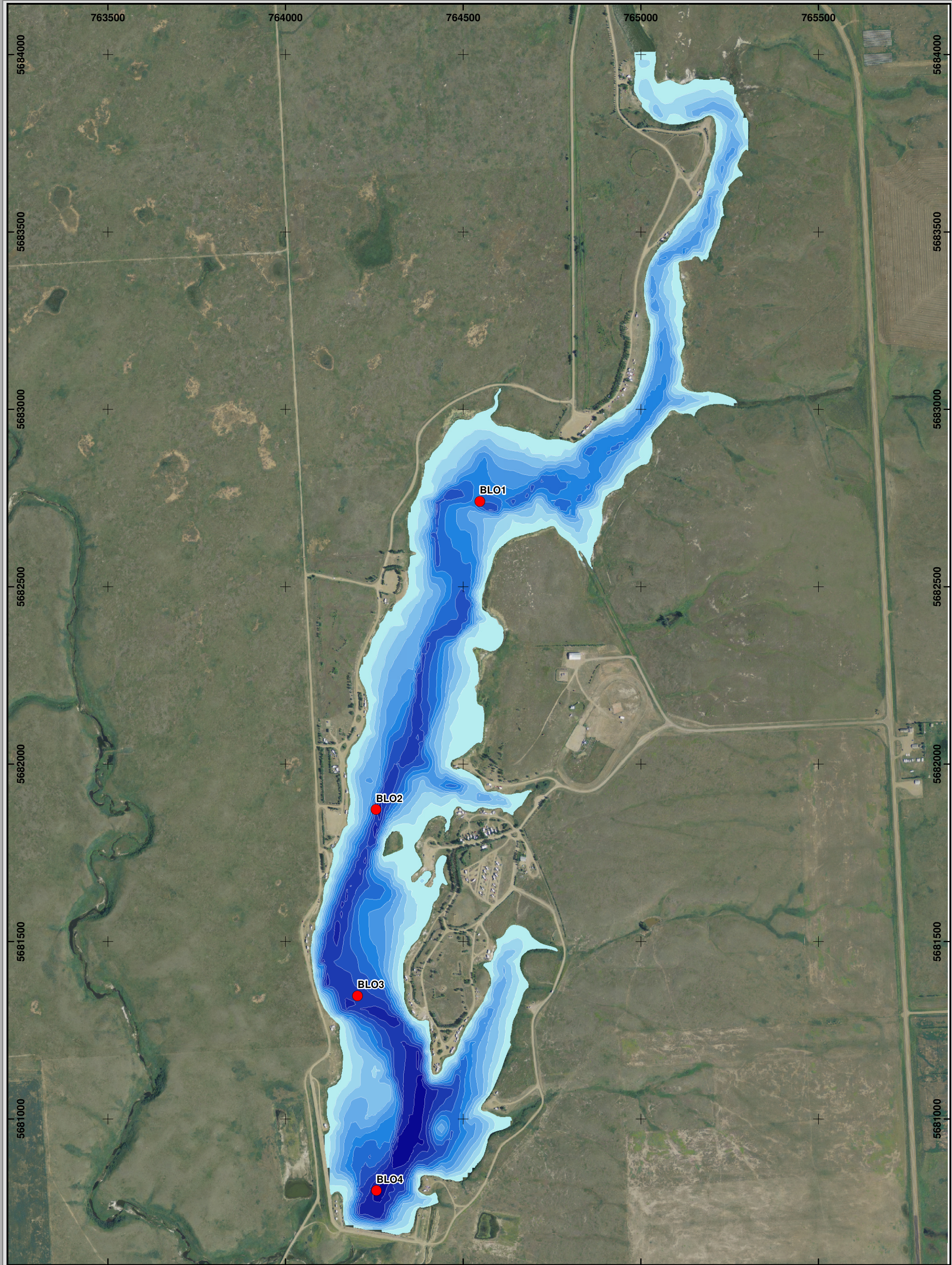


Figure 63. Blood Indian Creek Reservoir water temperature profiles at station BL04.

Z:\Projects\2015\15010\_Environment and Parks\Map Projects\11X17\15010\_AEP\_WQ Lakes\_Map\_Blood Indian\_17Mar2016.mxd



**Depth**

0 - 1 m
1 - 2 m
2 - 3 m
3 - 4 m
4 - 5 m
5 - 6 m
6 - 7 m
7 - 8 m
8 - 9 m
9 - 10 m
10 - 11 m

**LEGEND**

● Water Quality Sample Location



**Map Sources/Notes:**  
 Bathymetric Data Collected July 31, 2015 Using a Lowrance 5DS HD Sonar Unit. Lake boundary digitized using aerial photograph provided by AEP.

Blood Indian Creek Reservoir  
 Surface Elevation: 742.42 m

Scale: 1:10,000  
 NAD 1983 10TM AEP Forest

**Alberta Environment and Parks**

**Assessment of Eight Alberta Waterbodies**

**Blood Indian Creek Reservoir Bathymetry Map Including Water Quality Profile Locations**

Lead: Richard Carson	Date: 31 Mar 2016
Drawn By: Sandra Babiuk	Project Number: 15010

**RC BioSolutions Ltd.** Figure No. **64**



**Figure 65. Blood Indian Creek Reservoir (August) – looking north from station BL01.**



**Figure 66. Blood Indian Creek Reservoir (February) – sampling from top of ice.**

### 3.8 Tyrell Lake

Tables 24 to 28 contain the complete water quality profile data for each sample station. Figures 67 to 71 summarize the dissolved oxygen profiles and Figures 72 to 76 summarize the temperature profiles. Most profiles in July, August, and February exhibit a typical stratified water column pattern, while the October profile exhibits a typical fall turnover, fully mixed water column pattern.

Bathymetry data was collected on August 1, 2015 and was used to create a lake bathymetry map (Figure 77). Figures 78 and 79 are site photographs taken during the sampling.

**Table 24. Tyrell Lake water quality profile summary at station TYR1.**

Date (DD/MM/YY)	Ambient Temperature (°C)	Ice Depth (m)	Profile Depth (m)	Water Temperature (°C)	Dissolved Oxygen (mg/L)	Dissolved Oxygen (% Saturation)	Specific Conductivity (µS/cm)	Salinity (psu)	pH
01/08/15	29	N/a	0	22.2	11.80	141.0	9200	5.48	9.19
			1	21.7	11.86	140.1	9230	5.56	9.18
			2	19.8	11.48	130.4	9268	5.83	9.18
			3	19.4	10.39	116.2	9285	5.90	9.17
			4	18.5	2.97	32.9	9274	6.02	9.11
28/08/15	17	N/a	0	19.0	9.91	110.7	9117	5.84	9.31
			1	18.2	9.08	99.6	9286	6.07	9.30
			2	17.7	8.01	86.6	9309	6.16	9.30
			3	17.6	7.48	81.0	9380	6.23	9.29
			4	17.2	0.95	10.0	9393	6.30	9.24
28/10/15	6	N/a	0	7.4	11.24	96.7	8952	7.76	9.33
			1	7.4	11.26	96.9	8966	7.77	9.31
			2	7.4	11.23	96.5	8969	7.77	9.31
			3	7.3	11.11	95.4	8971	7.80	9.30
			4	7.1	10.75	91.6	8980	7.85	9.30
09/02/16	16	N/a <sup>1</sup>	N/a	N/a	N/a	N/a	N/a	N/a	N/a

<sup>1</sup>N/a – not completed due to unsafe ice conditions

**Table 25. Tyrell Lake water quality profile summary at station TYR2.**

Date (DD/MM/YY)	Ambient Temperature (°C)	Ice Depth (m)	Profile Depth (m)	Water Temperature (°C)	Dissolved Oxygen (mg/L)	Dissolved Oxygen (% Saturation)	Specific Conductivity (µS/cm)	Salinity (psu)	pH
01/08/15	29	N/a	0	21.1	11.40	133.5	9435	5.77	9.18
			1	20.0	12.05	137.7	9425	5.91	9.19
			2	19.5	11.66	132.2	9419	5.98	9.19
			3	19.2	10.99	123.0	9427	6.03	9.18
			4	18.3	3.68	40.2	9417	6.15	9.13
			5	18.2	1.77	19.1	9422	6.17	9.11
28/08/15	17	N/a	0	18.3	7.59	83.5	9368	6.12	9.29
			1	17.7	7.12	76.5	9348	6.19	9.29
			2	17.5	5.96	64.1	9353	6.22	9.27
			3	17.4	3.86	41.3	9371	6.25	9.26
			4	17.1	1.41	14.9	9401	6.32	9.24
			5	16.6	0.24	2.5	9430	6.42	9.21
28/10/15	6	N/a	0	7.5	11.39	98.3	8981	7.76	9.30
			1	7.5	11.48	99.0	8982	7.76	9.29
			2	7.5	11.53	99.4	8984	7.76	9.29
			3	7.5	11.50	99.2	8985	7.77	9.29
			4	7.5	11.47	98.9	8984	7.76	9.29
			5	7.5	11.41	98.3	8988	7.77	9.28
09/02/16	16	0.22	0	1.7	7.52	55.2	6413	6.44	9.14
			1	1.4	9.44	68.8	6431	6.53	9.22
			2	0.9	7.33	52.6	6460	6.66	9.22
			3	0.7	6.54	46.9	6473	6.72	9.22
			4	1.4	2.79	20.5	6469	6.57	9.19

**Table 26. Tyrell Lake water quality profile summary at station TYR3.**

Date (DD/MM/YY)	Ambient Temperature (°C)	Ice Depth (m)	Profile Depth (m)	Water Temperature (°C)	Dissolved Oxygen (mg/L)	Dissolved Oxygen (% Saturation)	Specific Conductivity (µS/cm)	Salinity (psu)	pH
01/08/15	29	N/a	0	19.8	10.39	117.7	9457	5.96	9.17
			1	19.7	10.40	117.2	9460	5.98	9.17
			2	18.9	8.93	99.1	9446	6.08	9.16
			3	18.5	6.00	66.5	9420	6.12	9.15
			4	18.3	3.62	39.2	9419	6.15	9.13
			5	18.2	1.28	14.0	9425	6.17	9.11
28/08/15	17	N/a	0	18.5	8.25	90.1	9412	6.12	9.29
			1	17.7	7.69	82.3	9421	6.24	9.29
			2	17.7	7.13	77.5	9444	6.26	9.28
			3	17.1	3.18	34.4	9405	6.32	9.25
			4	16.9	1.25	13.4	9421	6.37	9.23
			5	16.5	0.21	2.2	9469	6.46	9.20
28/10/15	6	N/a	0	7.5	11.36	98.0	8979	7.76	9.28
			1	7.5	11.38	98.2	8985	7.77	9.28
			2	7.5	11.38	98.2	8985	7.77	9.28
			3	7.5	11.38	98.2	8985	7.77	9.28
			4	7.5	11.34	97.8	8984	7.76	9.28
			5	7.5	11.04	95.1	8983	7.76	9.28
09/02/16	16	0.22	0	1.5	8.10	59.2	6341	6.41	9.36
			1	1.4	8.02	58.3	6455	6.55	9.33
			2	1.2	7.48	54.1	6472	6.61	9.31
			3	1.3	6.39	46.3	6478	6.60	9.28
			4	1.5	4.37	32.0	6483	6.56	9.25

**Table 27. Tyrell Lake water quality profile summary at station TYR4.**

Date (DD/MM/YY)	Ambient Temperature (°C)	Ice Depth (m)	Profile Depth (m)	Water Temperature (°C)	Dissolved Oxygen (mg/L)	Dissolved Oxygen (% Saturation)	Specific Conductivity (µS/cm)	Salinity (psu)	pH
01/08/15	29	N/a	0	19.4	9.93	112.1	9427	6.00	9.17
			1	19.3	10.20	113.7	9464	6.04	9.17
			2	19.2	10.49	116.5	9456	6.05	9.18
			3	18.7	8.74	95.0	9457	6.12	9.16
			4	18.0	1.44	15.8	9454	6.22	9.09
			5	17.8	0.07	0.8	9484	6.27	9.05
28/08/15	17	N/a	0	18.4	7.55	83.2	9469	6.17	9.27
			1	17.4	7.06	76.1	9453	6.31	9.28
			2	17.3	7.69	82.5	9452	6.33	9.29
			3	17.1	6.57	70.4	9449	6.35	9.28
			4	16.9	1.85	20.1	9456	6.39	9.24
			5	16.5	0.21	2.1	9487	6.48	9.21
28/10/15	6	N/a	0	7.5	11.21	96.6	8985	7.77	9.28
			1	7.5	11.29	97.3	8985	7.77	9.28
			2	7.5	11.28	97.3	8988	7.77	9.28
			3	7.5	11.29	97.3	8985	7.77	9.28
			4	7.5	11.23	96.8	8985	7.77	9.27
			5	7.5	11.16	96.2	8986	7.77	9.27
09/02/16	16	0.16	0	1.5	8.44	61.6	6376	6.45	9.36
			1	1.5	7.73	56.3	6452	6.53	9.33
			2	1.5	7.56	55.2	6463	6.54	9.31
			3	1.4	5.97	43.6	6472	6.57	9.29
			4	2.0	1.47	10.9	6477	6.45	9.22
			5	3.5	0.44	3.3	7016	6.71	8.53

**Table 28. Tyrell Lake water quality profile summary at station TYR5.**

Date (DD/MM/YY)	Ambient Temperature (°C)	Ice Depth (m)	Profile Depth (m)	Water Temperature (°C)	Dissolved Oxygen (mg/L)	Dissolved Oxygen (% Saturation)	Specific Conductivity (µS/cm)	Salinity (psu)	pH
01/08/15	29	N/a	0	18.8	7.75	85.9	9449	6.10	9.14
			1	18.7	7.69	84.4	9446	6.11	9.15
			2	18.2	5.30	54.5	9447	6.19	9.13
			3	18.1	1.78	18.4	9439	6.20	9.10
			4	17.9	0.91	9.8	9456	6.24	9.09
28/08/15	17	N/a	0	17.7	6.89	74.6	9475	6.28	9.27
			1	17.5	6.89	74.9	9473	6.31	9.27
			2	17.2	6.73	72.0	9470	6.35	9.27
			3	17.1	6.39	68.6	9464	6.37	9.27
			4	17.0	4.90	52.3	9468	6.38	9.26
28/10/15	6	N/a	0	7.7	11.27	97.5	8985	7.72	9.28
			1	7.7	11.28	97.5	8986	7.72	9.28
			2	7.7	11.31	97.9	8985	7.72	9.28
			3	7.6	11.31	97.9	8986	7.74	9.27
			4	7.5	10.95	94.5	8990	7.77	9.27
09/02/16	16	0.22	0	2.7	11.11	80.4	6232	6.06	9.36
			1	2.3	10.32	76.5	6170	6.07	9.33
			2	2.4	7.39	53.6	6263	6.15	9.28
			3	1.3	4.69	34.1	6427	6.54	9.25
			4	2.0	1.15	8.5	6422	6.39	9.20

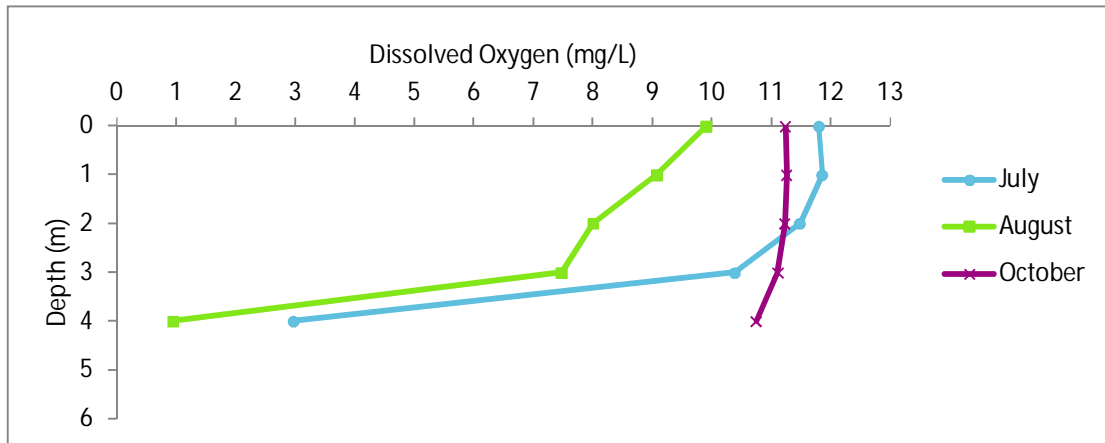


Figure 67. Tyrell Lake dissolved oxygen profiles at station TYR1.

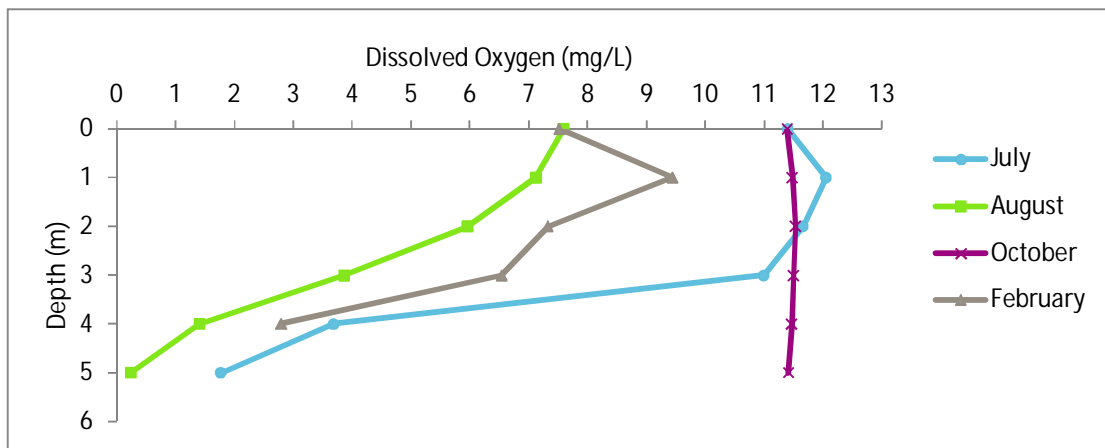


Figure 68. Tyrell Lake dissolved oxygen profiles at station TYR2.

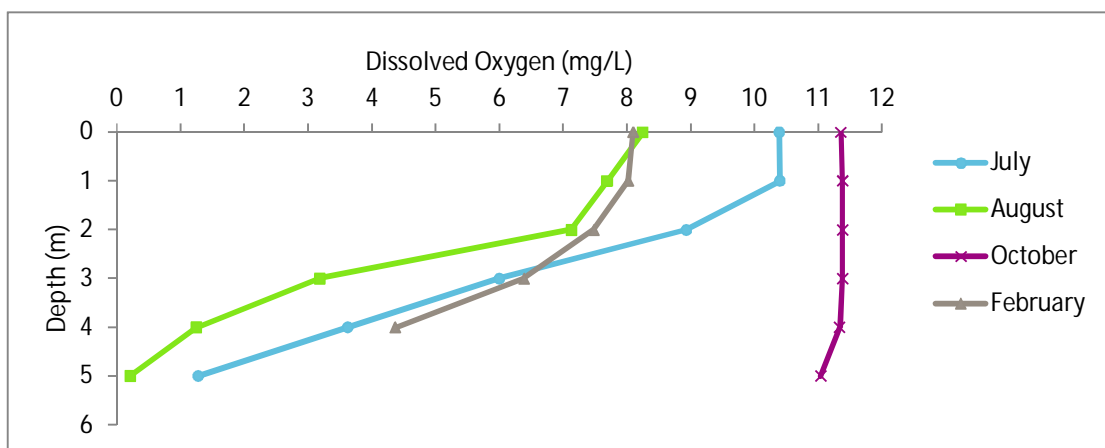


Figure 69. Tyrell Lake dissolved oxygen profiles at station TYR3.



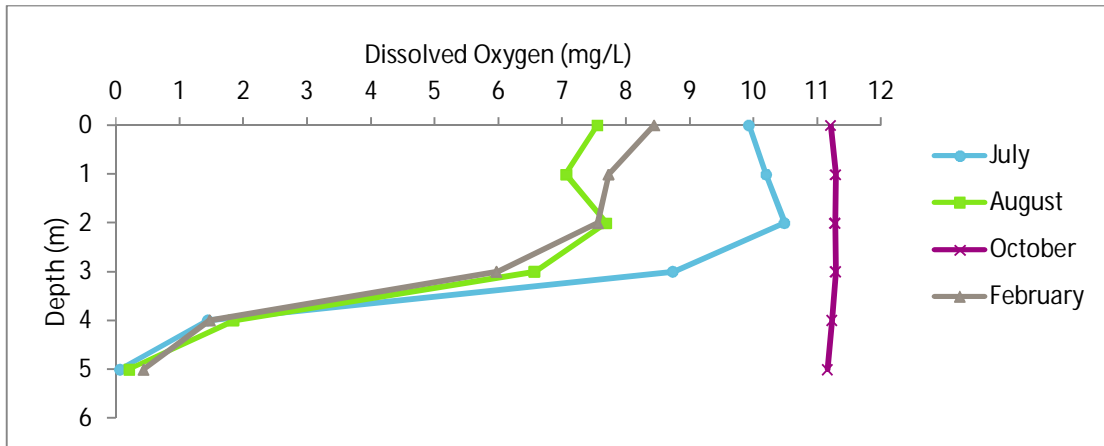


Figure 70. Tyrell Lake dissolved oxygen profiles at station TYR4.

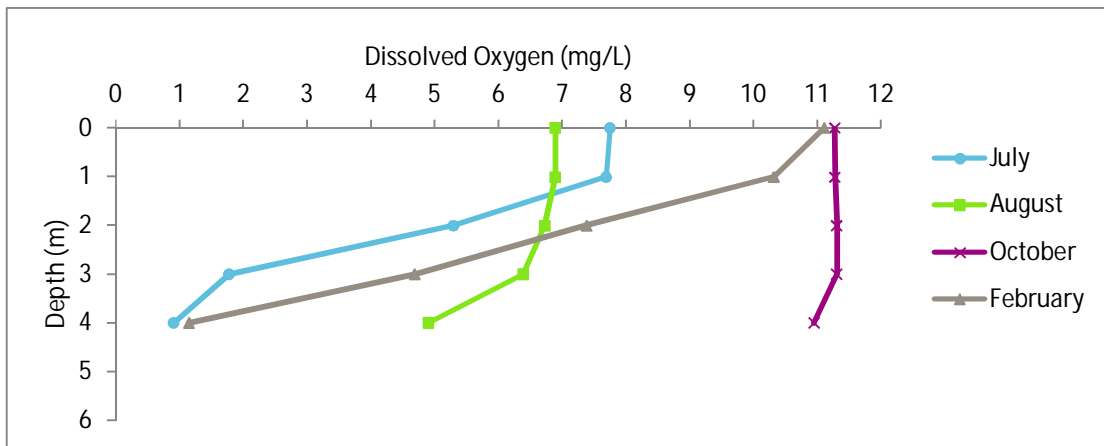


Figure 71. Tyrell Lake dissolved oxygen profiles at station TYR5.

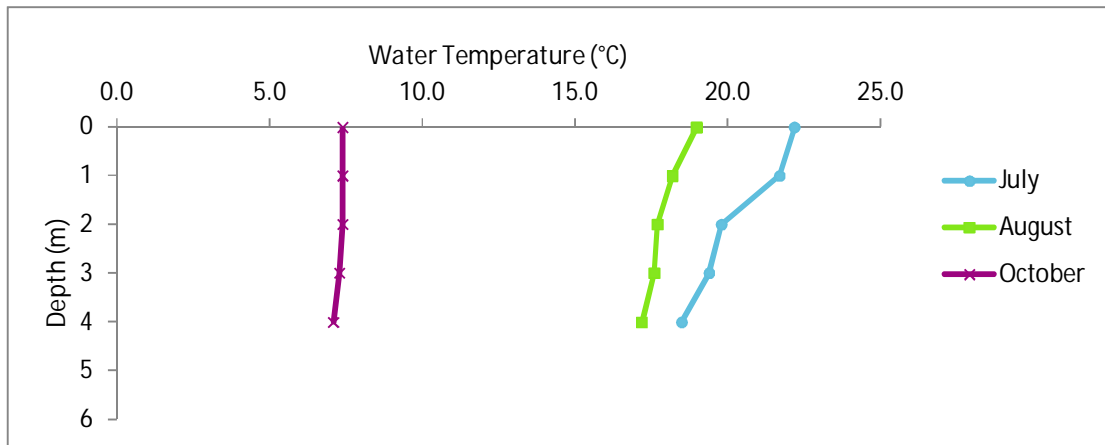


Figure 72. Tyrell Lake water temperature profiles at station TYR1.

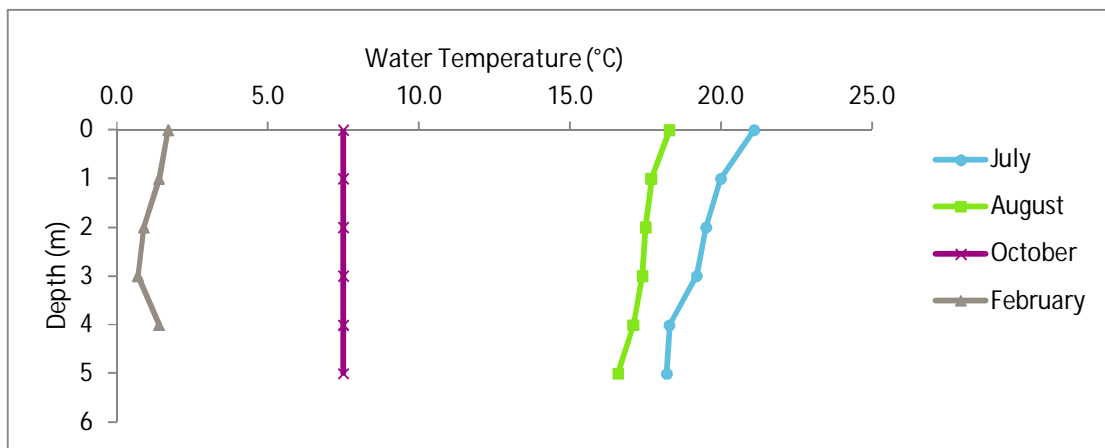


Figure 73. Tyrell Lake water temperature profiles at station TYR2.

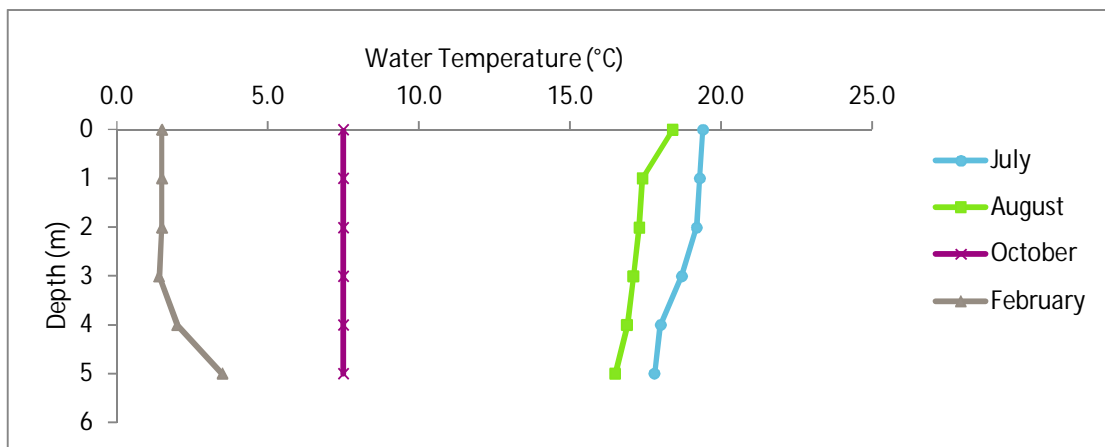


Figure 74. Tyrell Lake water temperature profiles at station TYR3.

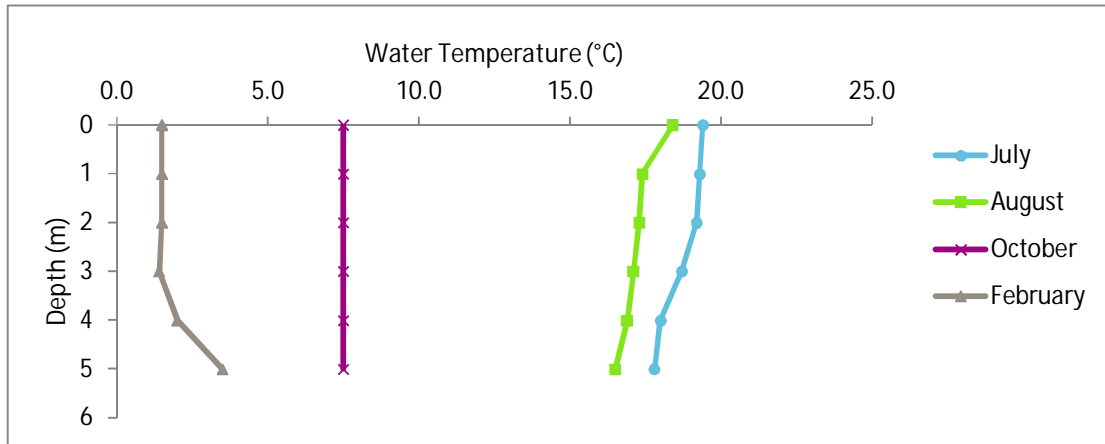


Figure 75. Tyrell Lake water temperature profiles at station TYR4.

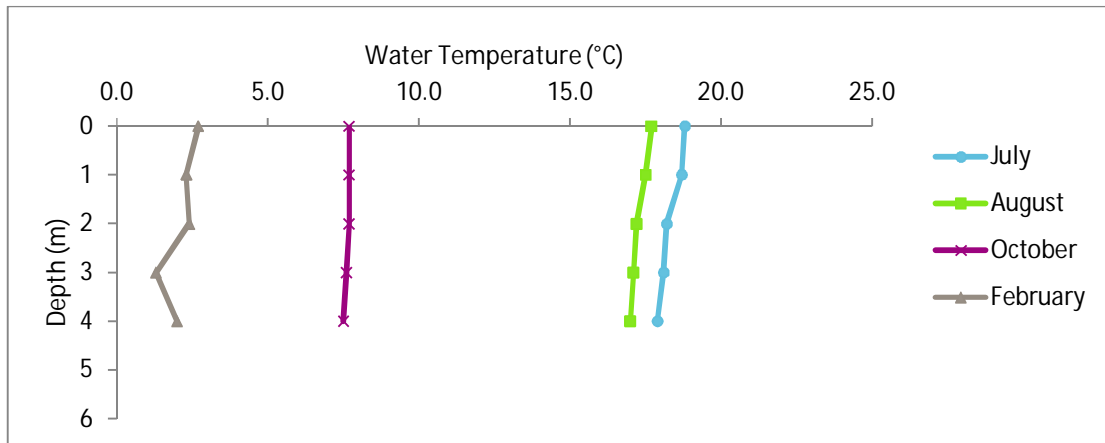
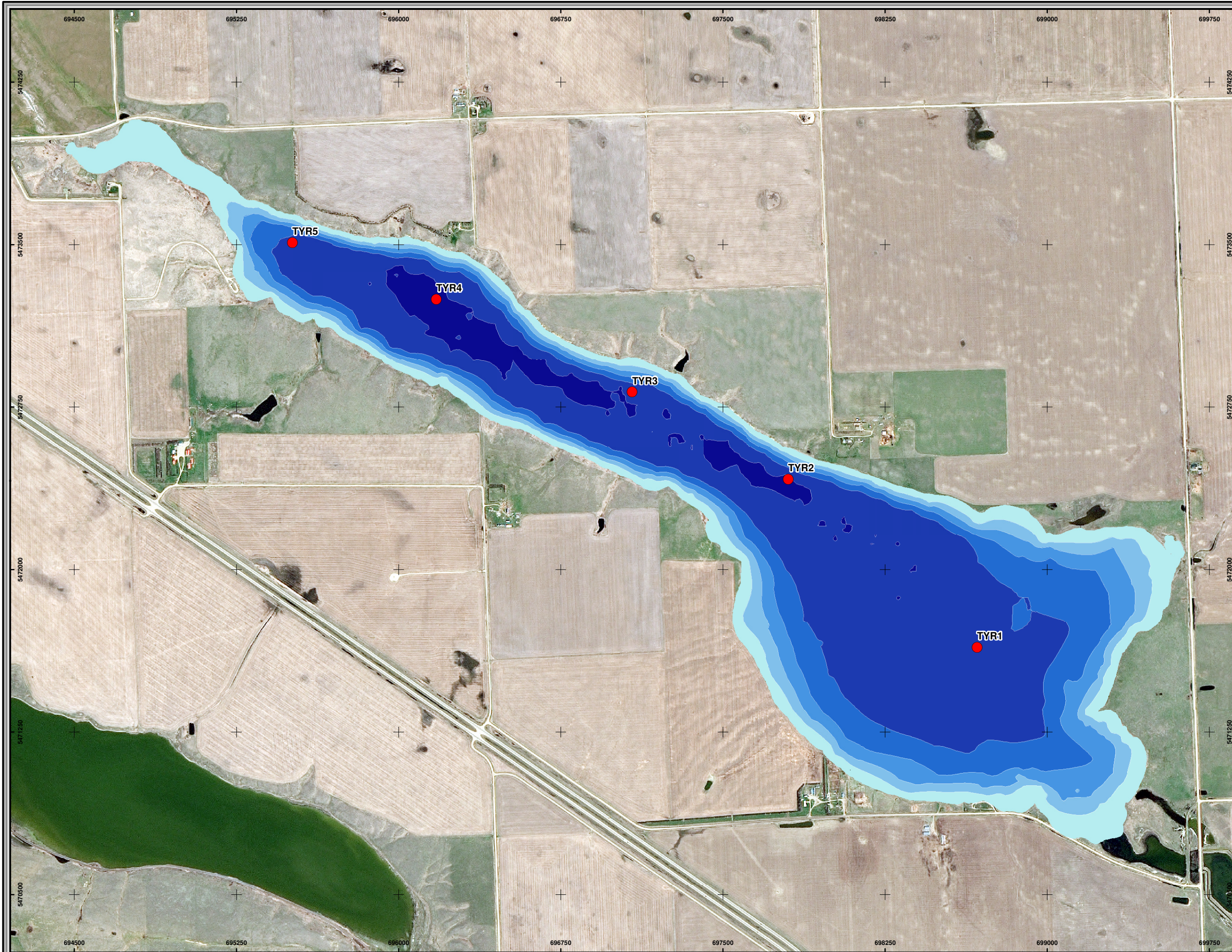


Figure 76. Tyrell Lake water temperature profiles at station TYR5.

Z:\Projects\2015\15010\_Environment and Parks\_WQ3-Mapping\_surveys\Map Projects\11X1715010\_AEP WQ Lakes\_Tyrell Lake\_17Mar2016.mxd



**LEGEND**

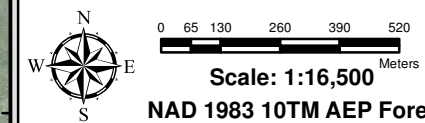
**Depth**

- 0 - 1 m
- 1 - 2 m
- 2 - 3 m
- 3 - 4 m
- 4 - 5 m
- 5 - 6 m
- Water Quality Sample Location



**Map Sources/Notes:**  
 Bathymetric Data Collected August 1, 2015  
 Using a Lowrance 5DS HD Sonar Unit. Lake  
 boundary digitized using aerial photograph  
 provided by AEP.

Tyrell Lake Surface Elevation: 943.68 m



*Alberta* Environment and Parks

Assessment of Eight  
 Alberta Waterbodies

**Tyrell Lake Bathymetry  
 Map Including Water  
 Quality Profile Locations**

Lead: Richard Carson Date: 31 Mar 2016  
 Drawn By: Sandra Babiuk Project Number: 15010

RC BioSolutions Ltd. Figure No. 77



**Figure 78. Tyrell Lake (August) – looking north from station TYR5.**



**Figure 79. Tyrell Lake (August) – sampling at station TYR2.**