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Canada

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doi:10.4095/296958

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Recommended citation
Smith, S.L., Chartrand, J., Duchesne, C., and Ednie, M., 2015. Report on 2014 field activities and collection of ground thermal and active layer data in the Mackenzie Corridor, Northwest Territories; Geological Survey of Canada, Open File 7935, 109 p. doi:10.4095/296958

ABSTRACT

This report presents a summary of field activities conducted in 2014 in the Mackenzie corridor, N.W.T. Air temperature, ground thermal and active layer data acquired from permafrost monitoring sites visited in 2014 throughout the corridor are presented in graphical and tabular format. The ground temperature records for selected sites for 2007-14 are also provided and indicate that some permafrost warming has occurred. The data presented provide essential baseline information that can be utilized by stakeholders and others for various purposes such as land management activities, regulatory processes and design of northern infrastructure. This report will be distributed to community organizations and stakeholders in the study region to provide an update on field activities.

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1. INTRODUCTION

The Geological Survey of Canada (GSC) has maintained a permafrost and active layer monitoring network in the Mackenzie Valley and Delta since the 1980s. This network provides information on ground thermal conditions and active layer thickness that is essential for land use planning decisions, engineering design of infrastructure, and for understanding the impacts of climate change on permafrost environments. The information collected from these monitoring sites is utilized to improve the characterization of regional baseline ground thermal conditions and to support development decisions in the Mackenzie corridor.

This report provides a summary of the field activities to collect air temperature, ground temperature and active layer data during August and September 2014 in the Mackenzie corridor. Graphical and tabular summaries of data are provided. Since many of the ground thermal monitoring sites were established in 2007, time series for selected sites are also provided to show the fluctuations in ground temperature over the 2007-2014 period.

Although the primary objective of this report is to update stakeholders in the region on our activities and to make the data collected available to them, this information is also of interest to those requiring regional permafrost and active layer information such as industry, engineers and the academic and modelling communities.

2. STUDY SITES AND INSTRUMENTATION

Ground thermal monitoring sites along the Mackenzie corridor in the Inuvialuit, Gwich'in, Sahtu, and Deh Cho Settlement Regions were visited in August and September 2014. The location and brief description of each site visited in 2014 is provided in Figures 1, 2 and 3 and in Table 1. Ground temperatures are measured with multi-sensor temperature cables installed in boreholes generally up to 20 m in depth. Data loggers are connected to most of the cables to record temperatures every eight hours and provide a continuous record of ground temperature throughout the year. The measurement system allows for a resolution of ±0.01°C and an accuracy of ±0.1°C. Further details on the site establishment, site characteristics and instrumentation can be found in Smith et al. (2007, 2008b, 2009a and 2010a). At other sites ground temperatures are only measured manually using a digital multimeter during site visits. Many of the sites were established in 2006-07 (e.g. Smith et al. 2009a) but some have been in operation since the 1980s such as those established along the Enbridge pipeline right-of-way (e.g. Pilon et al., 1989; Smith et al., 2008a).

Accessibility, weather and other issues also resulted in some planned site visits not being conducted in 2014. Sites that were not visited in 2014 are included in the Tables 1 and Figures 1, 2 and 3 but not in the figures presented in Appendix A. Some sites are only visited on a biennial basis while others may not have been visited for more than two years. In this case we provide a summary of the data acquired from data loggers in 2014 in Appendix A.

The GSC also maintains about 40 active layer monitoring sites throughout the Mackenzie corridor, many of which have been in operation since the early 1990s. Thaw tubes have been

installed at these sites to determine the maximum thaw penetration and the ground surface position during the period of maximum thaw in the year prior to the site visit. Data obtained during 2014 site visits therefore allow the determination of the active layer thickness for 2013. For sites visited in 2014 but not in 2013, the data acquired from the thaw tubes is used to determine the maximum thaw penetration and active layer thickness that has occurred over the previous two years (i.e 2012-2013). Table 2 provides a list of sites from which data were obtained in August 2014. Further details on thaw tube establishment, instrumentation and site characteristics can be found in Nixon and Taylor (1994), Nixon et al. (1995) and Smith et al. (2009b). Manual probing, with a stainless steel rod, is also used to determine the position of the frost table during site visits.

Air and ground surface temperature data are collected at a number of ground thermal and active layer monitoring sites (Tables 1 and 2). Air temperatures are recorded using single channel data loggers connected to a temperature sensor inserted into radiation shields 1.5 m above the ground surface as described by Taylor (2000) and Duchesne et al. (2014). Ground surface temperatures are recorded using similar data loggers but with an internal temperature sensor that are inserted about 5 cm below the ground surface. The data loggers have a resolution of 0.5ºC at -20ºC and an accuracy ranging from 0.5ºC at -20ºC to 0.2ºC at 0ºC and record temperature every 3 hours.

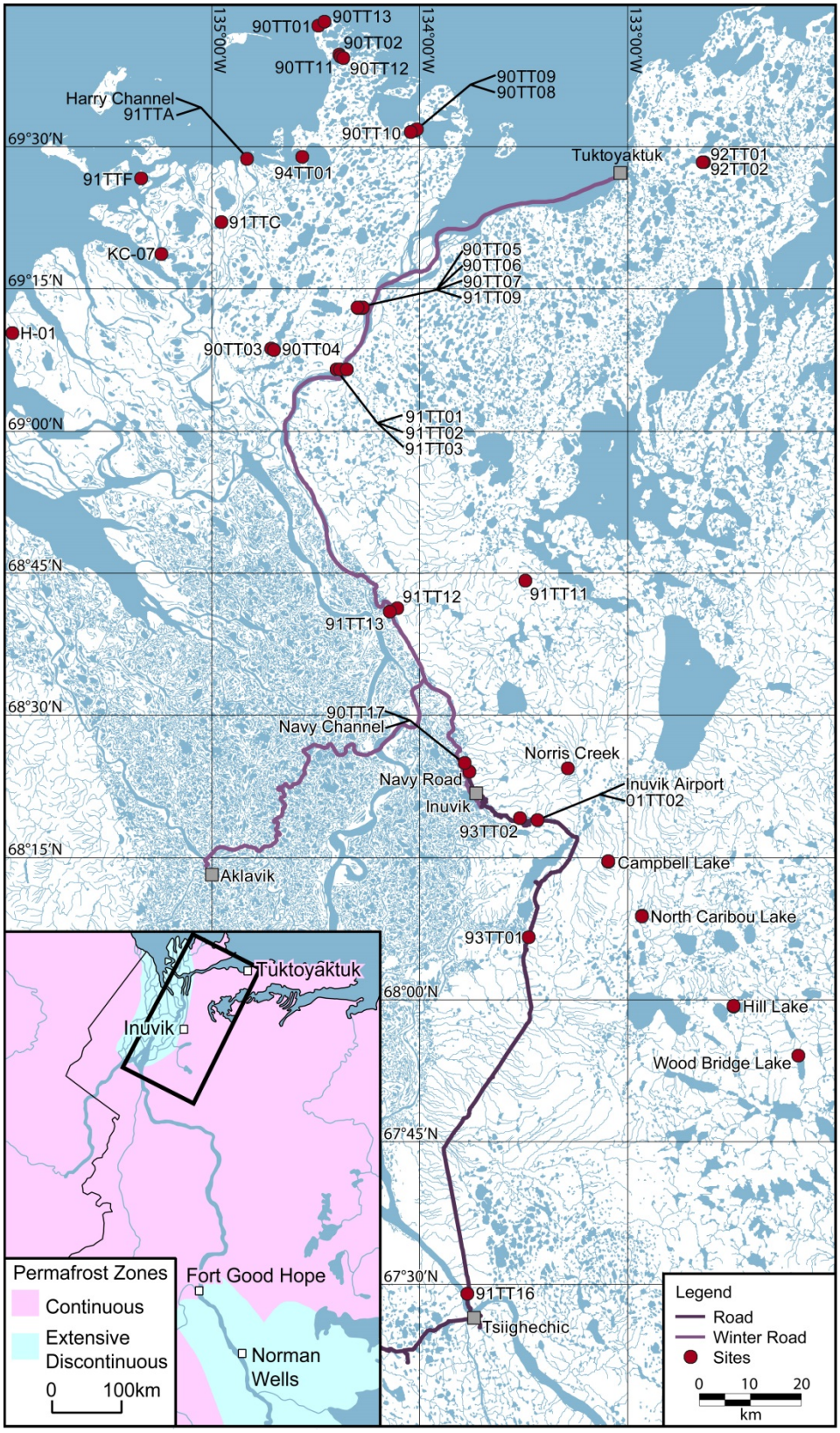

Figure 1. Permafrost and active layer monitoring sites in the Inuvialuit and Gwich'in Settlement Regions north and south of Inuvik.

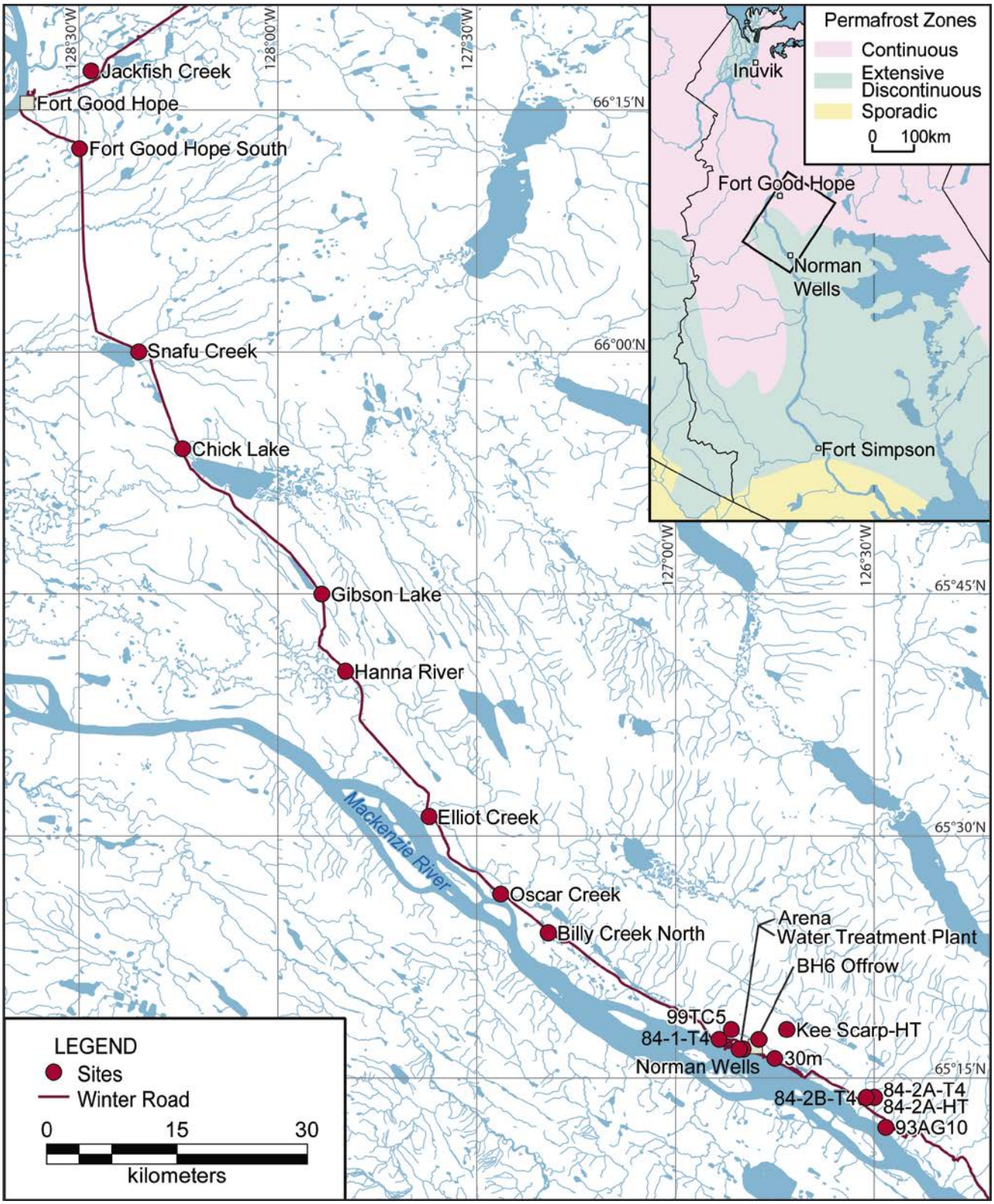

Figure 2. Permafrost monitoring sites between Fort Good Hope and Norman Wells in the Sahtu Settlement Region.

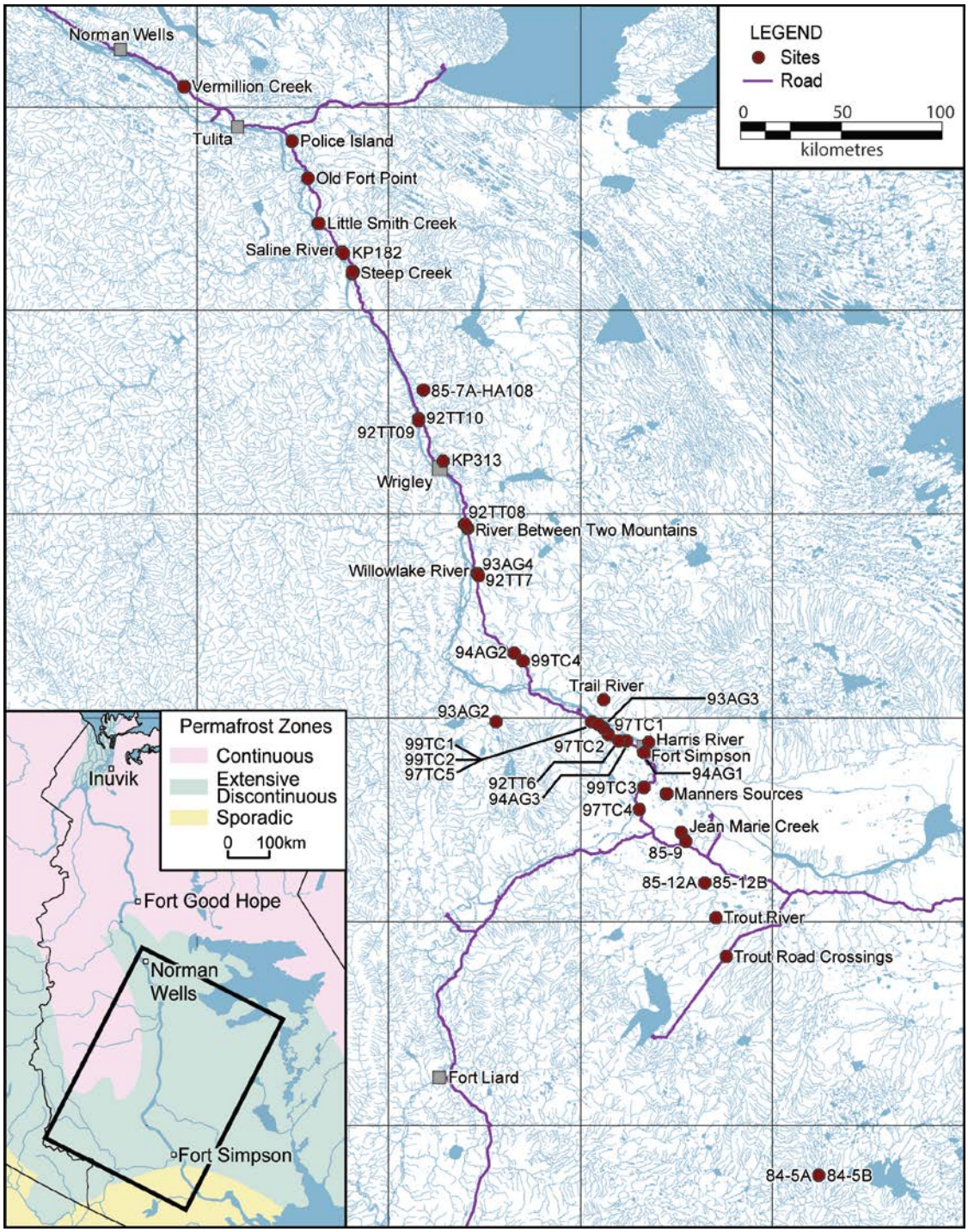

Figure 3. Permafrost and active layer monitoring sites south of Norman Wells in the Sahtu (sites north of Wrigley) and Deh Cho (sites south of Wrigley) Settlement Regions.

Table 1. Ground thermal monitoring sites in the Inuvialuit, Gwich'in, Sahtu and Deh Cho Settlement Regions.

Settlement region	Site name	Borehole name	Borehole depth (m)	Elevation (m a.s.l.)	Latitude (° N)	Longitude (° W)	Landform	Vegetation Cover	Air / ground surface temperature	Date visited in 2014
Inuvialuit	KC-07	KC-07	24.9	n/a	69.31	135.25	Tundra upland	Grass and moss tundra	None	Not visited
Inuvialuit	H-01	H-01	20	n/a	69.17	136.01	Surface of Holocene Mackenzie delta	Grass and shrub tundra	None	Not visited
Gwich'in	Navy Channel	03TC1	8	5	68.42	133.79	Surface of Holocene Mackenzie delta adjacent to eastern edge rising 10s of meters to till plain	Riparian high willow shrub, open, incomplete ground cover of forbs and sedge (forest tundra)	Air (failed)/ Ground	05/08/2014
Gwich'in	Norris Creek	NC-01	8.78	15	68.41	133.29	Thick organic material over moraine plain	Shrub tundra	None	Not visited
Gwich'in	Navy Road	01TC1	8	60	68.40	133.76	Fine grained colluvium sloping toward river, post glacial (~10Ka)	Taiga post fire succession, scattered birch and alder, open dwarf birch, heath ground cover	Ground	06/08/2014
Gwich'in	Inuvik Airport Trees	01TC2	10	84	68.32	133.44	Fluted till plain, glacial (>10Ka)	Taiga open black spruce, heath ground cover	None	05/08/2014
Gwich'in	Inuvik Airport Bog	12TC1	6.5	68	68.32	133.43	Bog between ridges on fluted till plain, glacial (>10Ka)	Taiga open bog, scattered shrub, heath ground cover (forest tundra)	Ground	05/08/2014
Gwich'in	Campbell Lake	CaL-01	4.61	115	68.24	133.10	Moraine plain	Peatland	None	01/08/2014
		CaL-02	5	118	68.24	133.10	Moraine plain	Cutline	None	01/08/2014
		CaL-03	2.97	118	68.24	133.10	Moraine plain	Black spruce forest	None	01/08/2014
Gwich'in	North Caribou Lake	NCL-01	5	209	68.15	132.93	Moraine plain	Peatland	None	01/08/2014
		NCL-02	5	217	68.15	132.93	Moraine plain	Stunted black spruce forest	None	01/08/2014
Gwich'in	Hill Lake	HL-01	5	229	67.99	132.49	Moraine plain	Tundra	None	01/08/2014
		HL-02	4.25	234	67.99	132.49	Moraine plain	Shrub tundra	None	01/08/2014

Settlement region	Site name	Borehole name	Borehole depth (m)	Elevation (m a.s.l.)	Latitude (° N)	Longitude (° W)	Landform	Vegetation Cover	Air / ground surface temperature	Date visited in 2014
Gwich'in	Wood Bridge Lake	WBL-01	4.33	204	67.90	132.18	Alluvial plain	Black spruce forest	None	01/08/2014
Sahtu	Jackfish Creek	JF-02	20	90	66.29	128.47	Eolian dune on moraine plain, well drained, elevated area	Black spruce forest and moss cover	None	19/09/2014
Sahtu	Fort Good Hope South	FGHS-01	8	134	66.21	128.50	Hummocky peatland	Dense shrub and open black spruce	Air / Ground	19/09/2014 Cable failed
		FGHS-02	4.85	134	66.21	128.50	Hummocky peatland	Peat plateau, lichen, open black spruce	None	19/09/2014
Sahtu	Snafu Creek	SC-01	16.82	100	66.00	128.35	Moraine plain	Peat bog, open black spruce forest, and lichen cover	None	19/09/2014
Sahtu	Chick Lake	CL-01	20	122	65.90	128.24	Moraine plain	Peat and organic soil with open black spruce forest and shrubs	None	19/09/2014
Sahtu	Gibson Lake	GL-01	20	228	65.75	127.89	Hummocky moraine plain	Recovering burnt area with peat and shrubs	Air / Ground	Not visited
Sahtu	Hanna River	HR-01	20	104	65.67	127.83	Lacustrine plain	Boggy burnt area	None	19/09/2014
Sahtu	Elliot Creek	EC-01	20	54	65.52	127.62	Lacustrine undulating plain, well drained elevated area	Peat cover on edge of open, mature black spruce forest	None	19/09/2014
		EC-02	9.68	54	65.52	127.62	Lacustrine plain overlain by alluvial sediments	Peat cover on edge of dense, mature black spruce forest	None	19/09/2014
Sahtu	Oscar Creek	OC-01	16	64	65.44	127.44	Undulating glaciolacustrine terrain overlain by alluvial sediments	Peat cover with dense-forested birch and black spruce	None	19/09/2014
Sahtu	Billy Creek North	BCN-01	9.05	90	65.40	127.32	Alluvial and eolian sediments overlying low-lying lacustrine plain	Peat cover with dense-forested black spruce and mixed shrub	None	19/09/2014 Cable failed

Settlement region	Site name	Borehole name	Borehole depth (m)	Elevation (m a.s.l.)	Latitude (° N)	Longitude (° W)	Landform	Vegetation Cover	Air / ground surface temperature	Date visited in 2014
Sahtu	Kee Scarp	Kee Scarp-HT	128	270	65.30	126.72	Top of narrow ridge. Borehole is in shale (which is underlain by limestone) with 20 cm moss and organic cover at surface	Boreal forest, mixture aspen birch pine and spruce with ground cover of grasses and small shrub	None	Not visited
Sahtu	NW Fen	99TC5	5	n/a	65.30	126.86	Thermokarst surface of glaciolacustrine plain (near small fen)	Large white and black spruce with smaller birch closed canopy, moss with lichen ground cover	Ground	Not visited
Sahtu	Norman Wells Pump Station	84-1-T4	6	61	65.29	126.89	Ground moraine	Moss, lichen, ericaceous shrubs with black spruce and tamarack	None	18/09/2014
Sahtu	KP5 BH6 Offrow Cable	85-11-T2	2.76	90	65.29	126.79	Lacustrine plain	Forested, moss, lichen, black spruce	None	18/09/2014
Sahtu	Normal Wells Town	Arena	16	80	65.28	126.83	Ground moraine	Disturbed area adjacent to parking lot	None	18/09/2014
		Water Treatment Plant	30	80	65.28	126.84	Ground Moraine	Disturbed area adjacent to parking lot	None	18/09/2014
Sahtu	Van Everdingen	30m	30	n/a	65.27	126.75	Lacustrine plain	Open forest, moss, shrub, spruce/tamarack	None	18/09/2014
Sahtu	Canyon Creek North A	84-2A-HT	100 & 40	110	65.23	126.50	Ground moraine	Lichen, moss, ericaceous shrubs with black spruce and tamarack	None	20/09/2014
		84-2A-T4	10.1	110	65.23	126.50	Ground moraine	Lichen, moss, ericaceous shrubs with black spruce and tamarack	None	20/09/2014
Sahtu	Canyon Creek North B	84-2B-T4	18	110	65.23	126.52	Ground moraine	Moss with white spruce	Ground	20/09/2014

Settlement region	Site name	Borehole name	Borehole depth (m)	Elevation (m a.s.l.)	Latitude (° N)	Longitude (° W)	Landform	Vegetation Cover	Air / ground surface temperature	Date visited in 2014
Sahtu	Vermillion Creek	VC-01	6	92	65.10	126.14	Moraine plain (site at approach to water crossing)	NW side of creek, on top of ridge in black spruce forest	Air / Ground	20/09/2014
		VC-02	3.53	92	65.10	126.13	Moraine plain (site at approach to water crossing)	SE side of creek on plateau in area of burnt black spruce	None	20/09/2014
Sahtu	Police Island	PI-01	10	113	64.83	125.012	Lacustrine plain	Recovering burn (burnt black spruce forest)	None	23/09/2014
		PI-02	11.4	113	64.83	125.01	Lacustrine plain	Unburnt, black spruce forest with moss and lichen ground cover	None	23/09/2014
Sahtu	Old Fort Point	OFP-01	16.5	112	64.65	124.84	Lacustrine plain	Open mixed spruce, pine deciduous forest adjacent to open, low-lying fen	None	23/09/2014
Sahtu	Little Smith Creek	LS-01	14.95	80	64.43	124.74	Alluvial flood plain	Open mature black spruce forest	None	20/09/2014
		LS-02	19.36	112	64.43	124.73	Glaciofluvial outwash plain	Tamarack, birch, poplar, and pine forest transition to spruce	None	20/09/2014
Sahtu	Saline River	SR-02	20	140	64.29	124.49	Glaciofluvial veneer over lacustrine	Burnt black spruce forest	None	23/09/2014
Sahtu	KP182	Bottom	1.8	133	64.28	124.47	Lacustrine plain	Forested (recovering burn, burned 1994)- Aspen, willow, birch, tamarack	Ground	20/09/2014
		Mid Slope HT192	1.7	138	64.28	124.47	Lacustrine plain	Forested (recovering burn, burned 1994)- Aspen, willow, birch, tamarack	Ground	20/09/2014
		Top of Slope	1.45	144	64.28	124.47	Lacustrine plain	Forested (recovering burn, burned 1994)- Aspen, willow, birch, tamarack	Ground	20/09/2014
		Crest of Slope	1	139	64.28	124.47	Lacustrine plain	Forested (recovering burn, burned 1994)- Aspen, willow, birch, tamarack	None	20/09/2014

Settlement region	Site name	Borehole name	Borehole depth (m)	Elevation (m a.s.l.)	Latitude (° N)	Longitude (° W)	Landform	Vegetation Cover	Air / ground surface temperature	Date visited in 2014
Sahtu	KP182	Unburnt	1.9	141	64.28	124.47	Lacustrine plain	Forested - white spruce, white birch with black spruce, moss and peat ground cover	Ground	20/09/2014
Sahtu	Steep Creek	Steep-01	5.62	62	64.19	124.37	Alluvial and colluvial, north facing slope of stream valley (site at edge of right-of-way)	Mixed, white spruce, jackpine, aspen, birch	None	Not visited
		Steep-02	20	134	64.18	124.38	Alluvial and colluvial, north facing slope of stream valley (site at edge of cleared right-of-way)	Mixed, white spruce, jackpine, aspen, birch	None	20/09/2014
		Steep-03	20	N/A	64.19	124.38	Alluvial and colluvial, north facing slope of stream valley (site on edge of wood chip insulated right-of-way)	Mixed, white spruce, jackpine, aspen, birch	None	Cable removed
Deh cho	Table Mountain A	85-7A-HA108	20	255	63.61	123.64	Ground moraine	Lichen, moss, ericaceous shrubs with black spruce and alder	None	23/09/2014
Deh cho	KP313	KP313 T2	20	250	63.26	123.43	Lacustrine plain, bottom of slope	Moss cover and peat, forested, mix of birch and spruce	Ground	23/09/2014
Deh cho	KP313	KP313 T4	20	250	63.26	123.43	Lacustrine plain, mid slope, W side of ROW	Moss cover and peat, forested, mix of birch and spruce	None	23/09/2014
		KP313 T5	20	250	63.26	123.43	Lacustrine plain, mid slope, E side of ROW	Moss cover and peat, forested, mix of birch and spruce	None	23/09/2014
		KP313 T6	16.5	250	63.26	123.43	Lacustrine plain, top of slope	Thin moss and organic cover, forested, mix of birch and spruce	Air / Ground	23/09/2014

Settlement region	Site name	Borehole name	Borehole depth (m)	Elevation (m a.s.l.)	Latitude (° N)	Longitude (° W)	Landform	Vegetation Cover	Air / ground surface temperature	Date visited in 2014
Deh cho	River Between Two Mountains	RBTM-01	15	120	62.95	123.21	Transition lacustrine to alluvial to moraine terrain	Dense black spruce forest	None	Not visited
		RBTM-02	12.5	150	62.93	123.18	Transition lacustrine to alluvial to moraine terrain	Dense black spruce forest	None	Not visited
Deh cho	Willow Lake River	WLR-01	3.4	122	62.72	123.08	Alluvial fan	Open mixed forest	None	Not visited
Deh cho	Wrigley Peatland	99TC4	9	n/a	62.28	122.60	Organic terrain on till plain, post glacial (>10Ka)	Boreal burn, scattered small spruce, pine and aspen, heath ground cover	Air / Ground	Not visited
Deh cho	Trail River	TR-01	10	181	62.09	121.76	Lacustrine plain and eolian landforms	Black spruce and tamarack forest with sphagnum and feathermoss ground cover	None	23/09/2014
Deh cho	Fort Simpson Bog High	99TC1	14	165	61.98	121.88	Peat plateau on surface of glaciolacustrine delta, post glacial (>10Ka)	Boreal, open black spruce (coniferous forest)	None	Not visited
	Fort Simpson Bog Low	99TC2	14.85	165	61.98	121.88	Thermokarst depression in the surface of glaciolacustrine delta, post glacial (>10Ka)	Boreal, sedge and sphagnum in depression surrounded by black spruce on raised peat rim	None	Not visited
Deh cho	Wrigley ferry transition	97TC5	10	165	61.98	121.88	Surface of glaciolacustrine delta, post glacial	Boreal, open spruce (coniferous forest)	Air / Ground	Cable removed
Deh cho	Aspen (Wrigley Highway)	97TC1	10	165	61.95	121.76	Surface of glaciolacustrine delta, post glacial (>10Ka)	Boreal, aspen grove (deciduous forest)	Ground	Not visited
Deh cho	Mature Black Spruce (Wrigley highway)	97TC2	10	165	61.92	121.71	Surface of glaciolacustrine delta, post glacial (>10Ka)	Boreal, black spruce (coniferous forest)	Air (failed) / Ground (failed)	Not visited
Deh cho	Harris River	HAR-01	2.79	146	61.88	121.29	Moraine	Predominantly birch	None	23/09/2014

Settlement region	Site name	Borehole name	Borehole depth (m)	Elevation (m a.s.l.)	Latitude (° N)	Longitude (° W)	Landform	Vegetation Cover	Air / ground surface temperature	Date visited in 2014
Deh cho	Open Black Spruce	99TC3	14	183	61.66	121.34	Surface of glaciolacustrine delta, post glacial (>10Ka)	Small black spruce thicket with willow shrub, 100% cover of moss with lichen and boreal heath (coniferous)	Air / Ground	Not visited
Deh cho	Manners Sources	MS-01 (Fen)	15	182	61.63	121.11	Eolian interdune	Thermokarst shrub fen	None	21/09/2014
		MS-02 (Crest)	15	182	61.63	121.10	Eolian dune crest	Pine forest	None	21/09/2014
Deh cho	Liard Spruce	97TC4	9.75	180	61.55	121.39	Surface of glaciolacustrine delta, late glacial (>10Ka)	Boreal, wetland shrub and sedge	Ground	Not visited
Deh cho	Jean-Marie Creek	JMC-01	5	198	61.44	120.95	Transition alluvial flood plain to organic (fen) over lacustrine plain	Poorly drained shrub fen	None	21/09/2014
		JMC-02	5	198	61.44	120.95	Transition alluvial flood plain to organic (fen) over lacustrine plain	Sandy ridge with spruce, pine forest	None	21/09/2014
Deh cho	85-9-T4	Pump Station 3	17	223	61.24	120.54	Lacustrine veneer over ground moraine (unfrozen granular)	Open black spruce, eriraceous shrubs, moss-lichen woodland	Air / Ground	21/09/2014
Deh cho	85-12A-T4	Off Row – Jean Marie Creek A	12	300	61.11	120.42	Ground moraine	Open black spruce, ericaceous shrubs, moss-lichen woodland (peat plateau)	None	21/09/2014
Deh cho	85-12B-T4	Off Row – Jean Marie Creek B	8	300	61.12	120.42	Ground moraine	Open black spruce, ericaceous shrubs, moss-lichen woodland (peat plateau)	Air / Ground	21/09/2014
Deh cho	Trout River	Trout R	5	350	61.02	120.59	Organic terrain	Peatland with scattered spruce and sphagnum ground cover	None	21/09/2014

Settlement region	Site name	Borehole name	Borehole depth (m)	Elevation (m a.s.l.)	Latitude (° N)	Longitude (° W)	Landform	Vegetation Cover	Air / ground surface temperature	Date visited in 2014
Deh cho	Trout Road Crossing	TRC	10	420	60.83	120.48	Bog-dominated moraine plain	Dry peatland vegetation consisting of black spruce, tamarack, and feathermoss	None	21/09/2014
Deh cho	84-5B-T4	Petitot River North B Off Row	20.6	552	59.76	119.51	Ground moraine	Recovering burn (burned 2004), originally stunted black spruce, ericaceous shrubs, moss woodland (peat plateau)	Air / Ground	21/09/2014
Deh cho	84-5A-T4	Petitot River North B Off Row	18	552	59.75	119.50	Ground moraine	Recovering burn (burned 2004), originally stunted black spruce, ericaceous shrubs, moss woodland (peat plateau)	None	21/09/2014

Table 2. Active layer and air/ground surface temperature monitoring sites throughout the corridor. Active layer thickness in 2013 determined from thaw tubes at active layer monitoring sites is provided.

Note: Site IDs that include "AG" are only air and ground surface temperature sites and do not have a thaw tube. Probed active layer depths are taken on day of visit and are for the 2014 thaw season. Probed active layer values at ground temperature sites are presented in Appendix A.

Site Name	Site ID	Latitude (° N)	Longitude (° W)	2013 Active Layer (m)	Air / Ground Surface Temperature	Date Visited
North Head shore	90TT13	69.72	134.46	n/a	Air / Ground	03/08/2014
North Head ridge	90TT01	69.71	134.49	n/a	Abandoned	Not visited
North Point summit	90TT02	69.66	134.39	0.53	None	03/08/2014
North Point mid-slope	90TT11	69.66	134.38	0.68	None	03/08/2014
North Point shore	90TT12	69.66	134.36	0.45	None	03/08/2014
Mason Bay high	90TT08	69.53	134.02	0.87	None	03/08/2014
Mason Bay shore	90TT09	69.53	134.01	0.63	None	03/08/2014
Mason Bay inlet	90TT10	69.53	134.04	n/a	None	03/08/2014
Illasarvik	94TT01	69.49	134.55	0.59	None	03/08/2014
Harry Channel mouth	91TTA	69.48	134.83	n/a	None	Not visited
Involuted Hill top	92TT01	69.47	132.63	n/a	None	Not visited
Involuted Hill flat	92TT02	69.47	132.63	n/a	Air / Ground	Not visited
Kendall Island Meadow	91TTF	69.45	135.34	n/a	None	Not visited
Taglu	91TTC	69.37	134.95	>1.32 (probed)	Air / Ground	01/08/2014
Lousy Point hollow	91TT09	69.22	134.30	0.34	None	03/08/2014
Lousy Point ridge	90TT05	69.22	134.28	0.78	Air / Ground	03/08/2014
Lousy Point low terrace	90TT06	69.22	134.28	0.42	Air / Ground	03/08/2014
Lousy Point flood plain	90TT07	69.22	134.27	n/a	None	Not visited
YaYa Lake high	90TT03	69.15	134.71	1.21	None	01/08/2014
YaYa Lake low	90TT04	69.14	134.70	0.86	Air / Ground	01/08/2014
Swimming Point slope	91TT01	69.11	134.40	0.63	None	04/08/2014
Swimming Point shore	91TT02	69.11	134.38	thawed	None	Not visited
Swimming Point Holmes	91TT03	69.11	134.35	n/a	None	Not visited
Trail Valley Creek	91TT11	68.74	133.49	0.64	None	01/08/2014
Reindeer Station plateau	91TT12	68.69	134.11	0.73	Air / Ground	01/08/2014
Williams Island	91TT13	68.68	134.14	1.50	Air / Ground	05/08/2014
Navy Channel	90TT17	68.42	133.79	>1.35 (probed)	Air / Ground	05/08/2014
Inuvik Airport	01TT02	68.32	133.43	0.86	None	05/08/2014
Upper Air	90TT16	68.32	133.53	0.81	None	05/08/2014

Site Name	Site ID	Latitude (° N)	Longitude (° W)	2013 Active Layer (m)	Air / Ground Surface Temperature	Date Visited
Havikpak Creek	93TT02	68.32	133.52	0.63	None	06/08/2014
Caribou Creek	93TT01	68.11	133.48	0.70	None	02/08/2014
Rengleng River mouth	91TT14	67.80	134.13	0.95 (probed)	Air / Ground	04/08/2014
Tsiigehtchic	91TT16	67.48	133.77	n/a	Air / Ground	Not visited
Ochre River cabin	92TT10	63.47	123.69	n/a	None	Not visited
Ochre River	92TT09	63.46	123.70	n/a	None	Not visited
River between two mountains	92TT08	62.96	123.21	n/a	Air / Ground	Not visited
Willow Lake burn	93AG4	62.70	123.06	n/a	Air / Ground	Not visited
Willlow Lake River	92TT7	62.70	123.06	n/a	Air / Ground	Not visited
Wrigley Pines	94AG2	62.32	122.69	n/a	Air / Ground	Not visited
Fort Simpson bog	93AG2	61.98	122.88	n/a	Air / Ground	Not visited
Spruce cutline	93AG3	61.97	121.82	n/a	Air / Ground	Not visited
FS aspen dune	94AG3	61.89	121.52	n/a	Air / Ground	Not visited
Martin River	92TT6	61.89	121.60	n/a	Air / Ground	Not visited
FS deep	94AG1	61.84	121.34	n/a	Air / Ground	Not visited

3. DATA COLLECTION AND PRESENTATION

Site visits were conducted in August and September 2014 to collect ground temperature data from the data loggers, to take manual temperature measurements and to service the instrumentation. The temperature record acquired from the data loggers was checked visually and any irregular data were removed.

The data record acquired for each site was analyzed to determine the annual minimum and maximum temperature at each depth and to define the annual ground temperature envelope for the 2013-2014 period. For sites that had not been visited in the previous two or more years, data acquired over a two year period were utilized to determine the annual ground temperature envelopes for the entire record acquired in 2014 (commonly, 2012-13 and 2013-14). These data are presented in graphical and tabular format for each site in Appendix A. The maximum thaw depth for each site was determined by either interpolating between the maximum temperatures reached at the depths that bracket 0°C or by use of a frost probe at the time of visit. Maximum thaw depth is included with each temperature envelope in Appendix A. Previous data collected from the thermal monitoring sites have also been presented in Smith et al. (2008b, 2009a, 2010a, 2010c), Ednie et al. (2011, 2012, 2013) and Chartrand et al. (2014).

At some sites the data logger malfunctioned or instrumentation was damaged so that a continuous temperature record could not be acquired. For these sites the manual temperature measurements made during the August or September 2014 site visit are presented in Appendix A. For sites which do not have data loggers connected to the cables, a ground temperature profile for August or September 2014 is provided.

Air and ground surface temperature records were visually checked and any irregularities were removed. Monthly averages of air and ground surface temperatures were determined and are presented in graphical and tabular format in Appendix A. The air and ground surface temperature data collected prior to 2014 is summarized in Ednie et al. (2012, 2013), Chartrand et al. (2014), and Duchesne et al. (2014).

The 2013 active layer thickness data determined from thaw tubes are presented in Table 2 for all active layer monitoring sites that were visited in August 2014. Data collected prior to 2013 have been published in Smith et al. (2009b, 2010c), Ednie et al. (2011, 2012, 2013) and Chartrand et al. (2014). For active layer monitoring sites not visited in 2013, the values represent the estimated maximum depth of thaw penetration of the previous two summers.

4. CHANGES IN GROUND TEMPERATURES 2007-2014

Many of the monitoring sites, utilizing multi-sensor temperature cables, were established in 2007 and data are now available for about seven full years. Although data records are too short to assess any long-term trends in ground temperatures, they can be used to characterize recent temperature fluctuations and the range in ground temperature that may occur at an individual site.

Mean annual ground temperature for the 2007-14 period has been plotted for selected sites for the following regions: Northern (Figure 4), Norman Wells to Fort Good Hope (Figure 5), Norman Wells to Wrigley (Figure 6), Southern (Figure 7). The mean annual ground temperature (MAGT) at the measurement depth at or closest to the depth of zero annual amplitude (ZAA) was used. For practical purposes the ZAA depth is defined as the depth where seasonal variation is less than 0.1°C. For sites where the temperature cable extends below this depth, the MAGT is determined for the depth of the shallowest sensor for which the seasonal variation is less than 0.1°C. For sites with cables shallow than the ZAA depth, MAGT at the deepest measurement depth has been utilized. Temperatures at the ZAA depth are desirable for tracking long-term trends whereas temperatures at shallower depths will reflect shorter term fluctuations. The annual period for MAGT calculation is September 1 to August 31 for sites south of Fort Good Hope (visited in mid-September) and August 1 to July 31 for sites in the northern portion of the corridor (visited in August).

MAGT for the majority of sites in permafrost (Figure 4, 5, and 6) have increased over the last seven years. This increase however has generally been relatively small, about 0.1°C or less between Norman Wells and Wrigley and less than 0.2°C between Norman Wells and Fort Good Hope. At the colder permafrost sites in the northern portion of the corridor, MAGT has increased by 0.2 to 0.5°C. It should however be noted that at most of these sites, the measurement depth is shallower than the ZAA depth. At some sites, ground temperatures have changed very little over this time period.

At some of the unfrozen sites in the southern portion of the corridor, MAGT has increased over the last seven years by about 0.4°C (Figure 7). At other sites there has been little overall change or no definite trends. The measurement depth at most of the northern sites is shallower than the ZAA depth so temperatures are more responsive to short term fluctuations in climate.

In general, changes in MAGT over the last seven years have been greater for colder permafrost sites or unfrozen sites. At warmer permafrost sites, especially where ground temperatures are close to 0°C and soils are ice-rich, latent heat effects associated with phase change result in ground temperatures being less responsive to changes in climate (Smith et al., 2010b).

Air temperature records form Environment Canada weather stations (Figure 8) indicate a general warming since 2007 in northern (Inuvik) and southern portion (Fort Simpson) of the corridor while air temperatures in the central valley (Norman Wells) have been fairly stable. The increase in MAGT observed in the northern and southern portions of the corridor (Figure 4 and 7) appear to be consistent with the overall increases in air temperature. In the central valley MAGT has increased at some sites since 2010 and this may be a result of the warmer air temperatures between 2010 and 2014 compared to those between 2007 and 2009. Analysis of longer term records for the central Mackenzie Valley (see for example Smith et al., 2010b and Smith et al., in press) indicate a general warming of permafrost since the mid 1980s with MAGT increasing at a lower rate more recently.

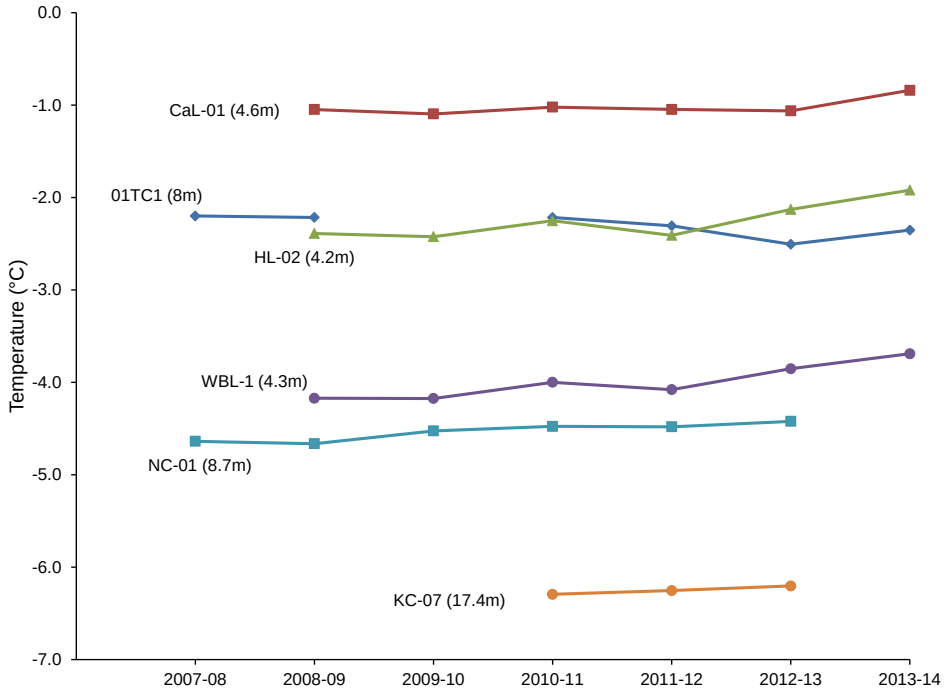

Figure 4. MAGT at ZAA depth (or measurement depth closest to it) for selected sites in the northern portion of the corridor. The ZAA depth is below the measurement depth for all sites except CaL-01 and KC-07.

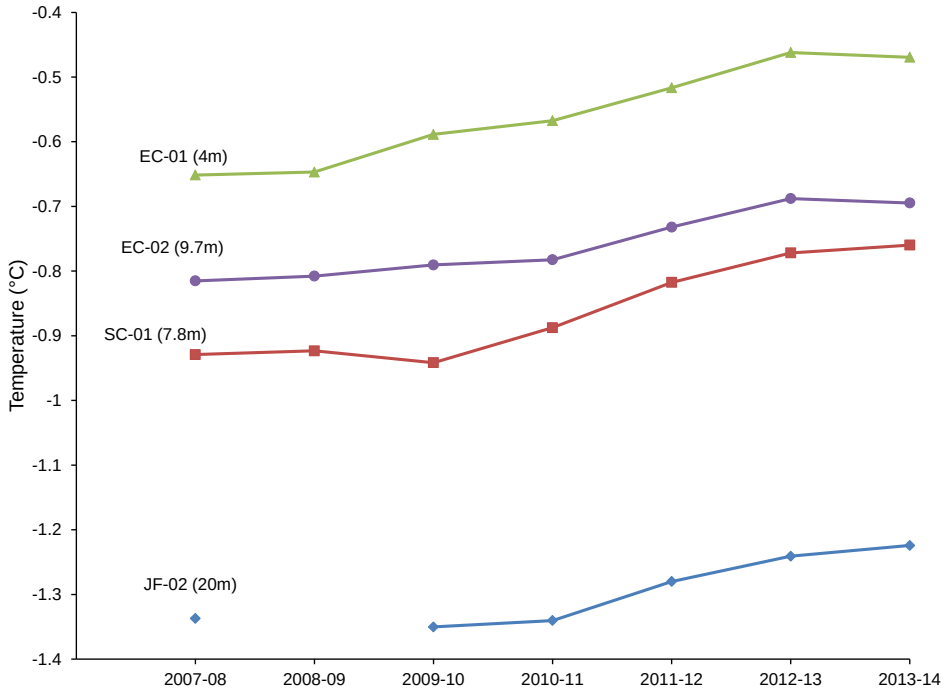

Figure 5. MAGT at ZAA depth (or measurement depth closest to it) for selected sites between Norman Wells and Fort Good Hope.

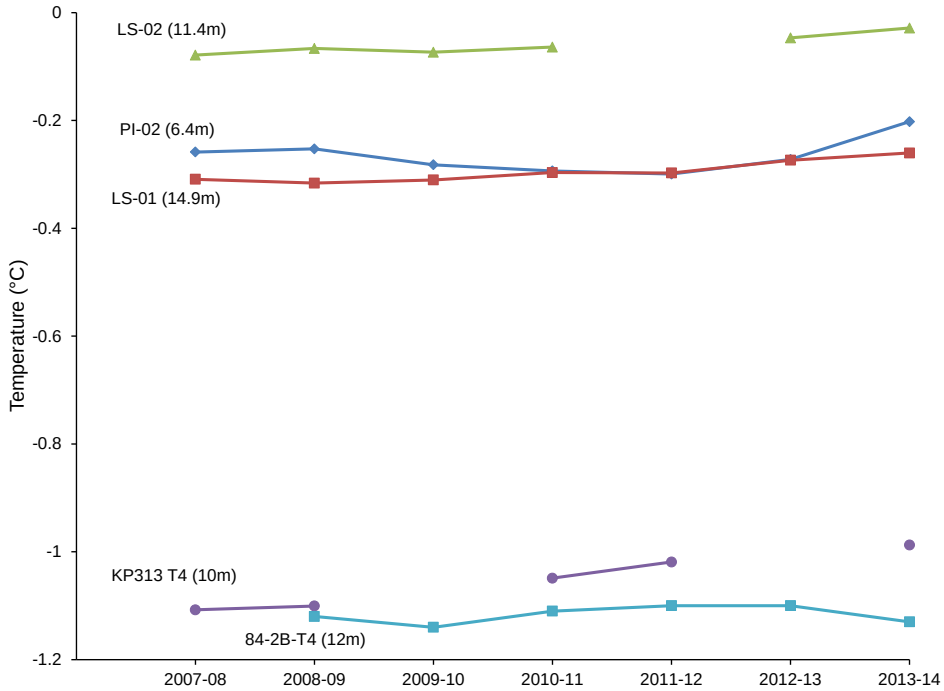

Figure 6. MAGT at ZAA depth (or measurement depth closest to it) for selected sites between Norman Wells and Wrigley. Note: ZAA depth at PI-02 is deeper than the measurement depth.

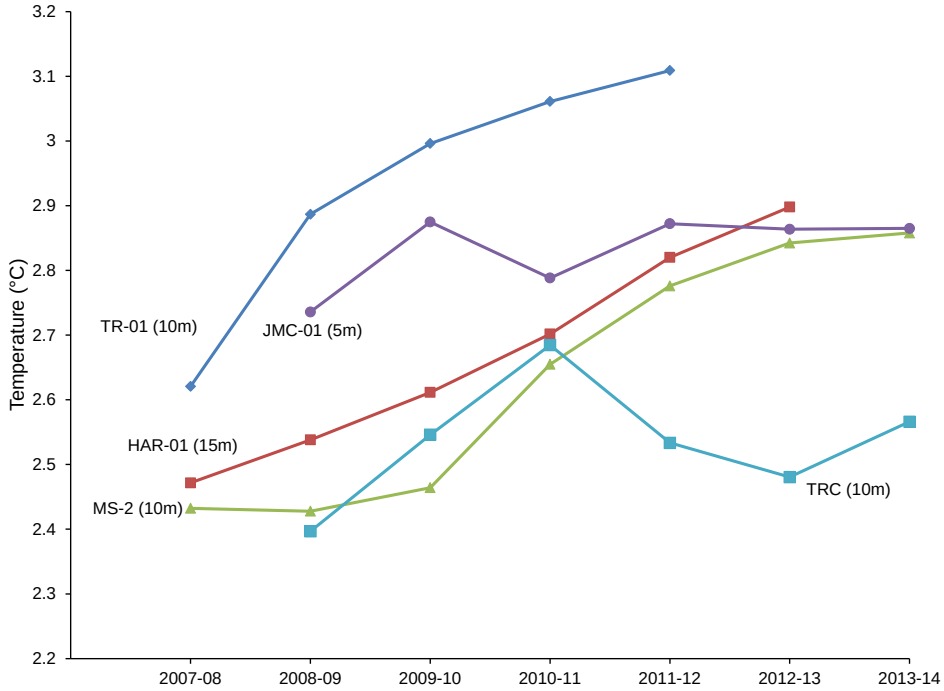

Figure 7. MAGT at ZAA depth (or measurement depth closest to it) for selected (unfrozen) sites in the southern portion of the corridor. ZAA depth is below the measurement depth at all sites except HAR-01.

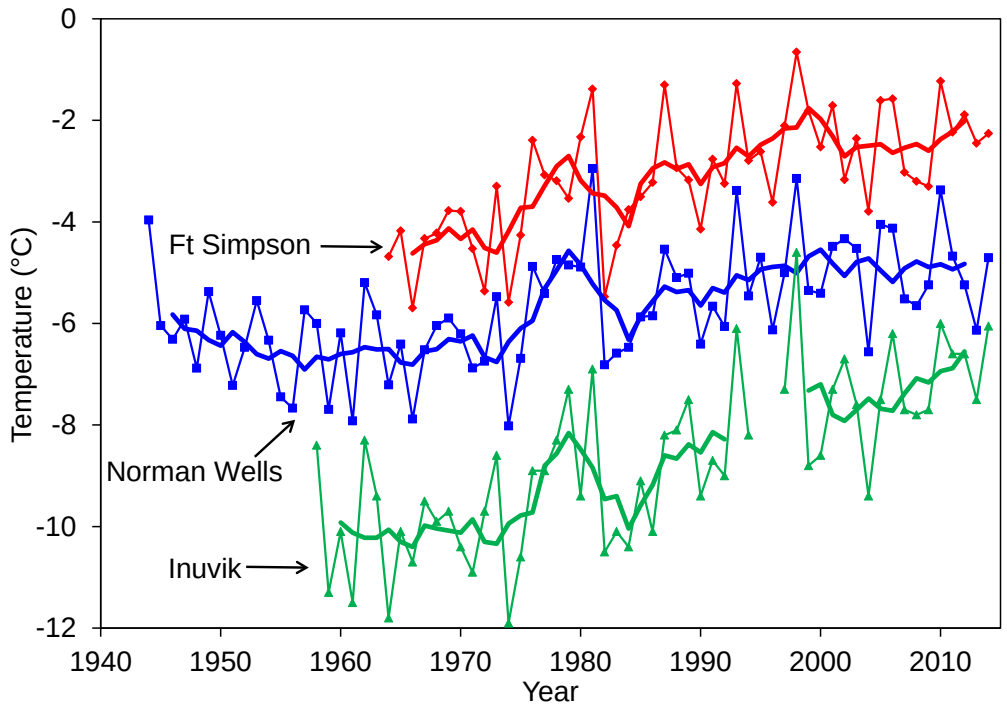

Figure 8. Mean annual air temperature for three Environment Canada weather stations in the Mackenzie Valley. The thick line represents the 5-year running mean. Data from Environment Canada (http://climate.weather.gc.ca/).

5. SUMMARY

This report provides a summary of field activities in the Mackenzie corridor. A summary of the ground thermal data collected at permafrost monitoring sites in August and September 2014 for the previous one-year period is presented in graphical and tabular format. The 2013 active layer thickness data for active layer monitoring sites visited in 2014 are also provided. Examination of the 2007-14 ground temperature record indicates an increase in ground temperature for most sites.

This report will be distributed to the various community organizations and stakeholders within the region in order to provide them with an update of our activities. The data presented can be utilized for land management activities, regulatory processes and for engineering design. The addition of these data to existing records builds up the ground temperature time-series and also improves the quality of baseline permafrost data against which change may be measured.

6. ACKNOWLEDGEMENTS

Support for the 2014 field data collection was provided by Natural Resources Canada. Logistical support was provided by the Polar Continental Shelf Program and the Aurora Research Institute. We are also grateful for the continuing support for this project of the various community organizations and stakeholders in the region. We would like to thank Willie Modeste and Janet Hurst for their help with fieldwork.

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APPENDIX A

GRAPHICAL AND TABULAR PRESENTATION OF GROUND TEMPERATURE DATA FOR THE PERIOD 2013-14

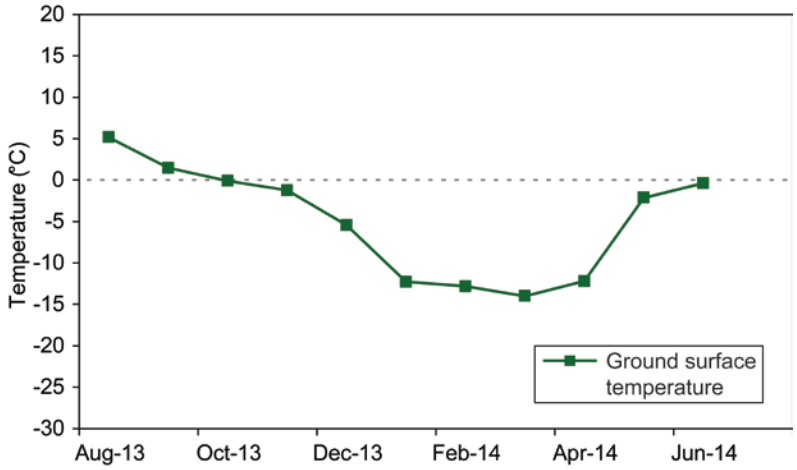
The annual maximum (red line) and minimum (blue line) temperature profile, or ground temperature envelope, is provided for each site for which a continuous 2013-14 record of ground temperature is available. For sites that do not have a continuous record for 2013-14, the ground temperature profile based on a single manual measurement during the 2014 site visit (in August or September) is provided (green line). For sites not visited in 2013 but visited in 2014, the ground temperature envelope for 2012-14 and 2013-14 is provided. The thaw depth is provided for each site and is based on interpolation of temperature profiles unless otherwise noted. Where temperature data are not sufficient to determine the thaw depth, the measurement obtained through probing on the day of the site visit is provided. Mean monthly air and ground surface temperature (5 cm depth) data for the 2013-14 period (or 2012-14 period if site not visited in 2013) is presented in graphical and tabular format for each site where available.

North Head shore — 90TT13

Inuvialuit Settlement Region

Latitude: 69.72 N Longitude: 134.46 W
Elevation: 3 m a.s.l.
Landform: Thermokarst coastal plain
Vegetation cover: Tundra
Thaw Depth: n/a
Site visit: August 3, 2014

Month / Year	Temperature (°C)	
	Air	Surface
Aug / 2013	n/a	5.16
Sept / 2013	n/a	1.47
Oct / 2013	n/a	-0.10
Nov / 2013	n/a	-1.24
Dec / 2013	n/a	-5.44
Jan / 2014	n/a	-12.30
Feb / 2014	n/a	-12.83
Mar / 2014	n/a	-14.01
Apr / 2014	n/a	-12.21
May / 2014	n/a	-2.14
Jun / 2014	n/a	-0.38
Jul / 2014	n/a	n/a

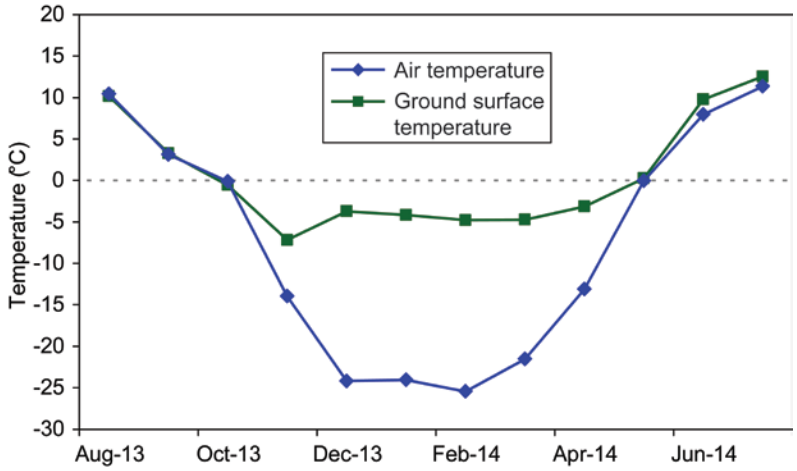


Taglu — 91TTC

Inuvialuit Settlement Region

Latitude: 69.37 N Longitude: 134.95 W
Elevation: 15 m a.s.l.
Landform: Surface of Holocene Mackenzie delta
Vegetation cover: Low shrub tundra
Thaw Depth: >1.32 m (probed)
Site visit: August 1, 2014

Month / Year	Temperature (°C)	
	Air	Surface
Aug / 2013	10.44	10.16
Sept / 2013	3.13	3.29
Oct / 2013	-0.13	-0.56
Nov / 2013	-13.97	-7.18
Dec / 2013	-24.20	-3.73
Jan / 2014	-24.06	-4.18
Feb / 2014	-25.46	-4.80
Mar / 2014	-21.54	-4.74
Apr / 2014	-13.12	-3.16
May / 2014	-0.06	0.25
Jun / 2014	7.95	9.76
Jul / 2014	11.35	12.53

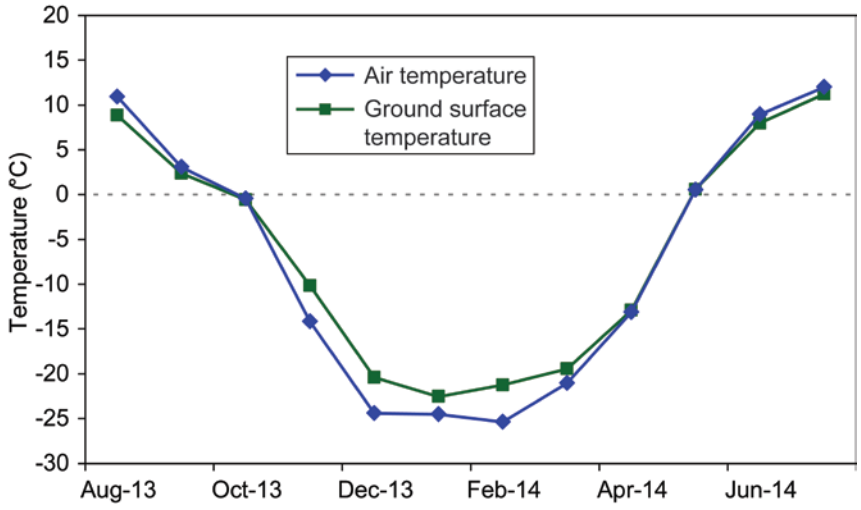


Lousy Point ridge — 90TT05

Inuvialuit Settlement Region

Latitude: 69.22 N Longitude: 134.28 W
Elevation: 39 m a.s.l.
Landform: Glaciofluvial ridge
Vegetation cover: Low shrub tundra
Thaw depth: 0.83 m (probed)
Site visit: August 3, 2014

Month / Year	Temperature (°C)	
	Air	Surface
Aug / 2013	10.94	8.86
Sept / 2013	3.07	2.35
Oct / 2013	-0.44	-0.59
Nov / 2013	-14.16	-10.16
Dec / 2013	-24.40	-20.41
Jan / 2014	-24.52	-22.55
Feb / 2014	-25.36	-21.26
Mar / 2014	-21.05	-19.45
Apr / 2014	-13.11	-12.93
May / 2014	0.54	0.59
Jun / 2014	8.94	7.95
Jul / 2014	11.99	11.20

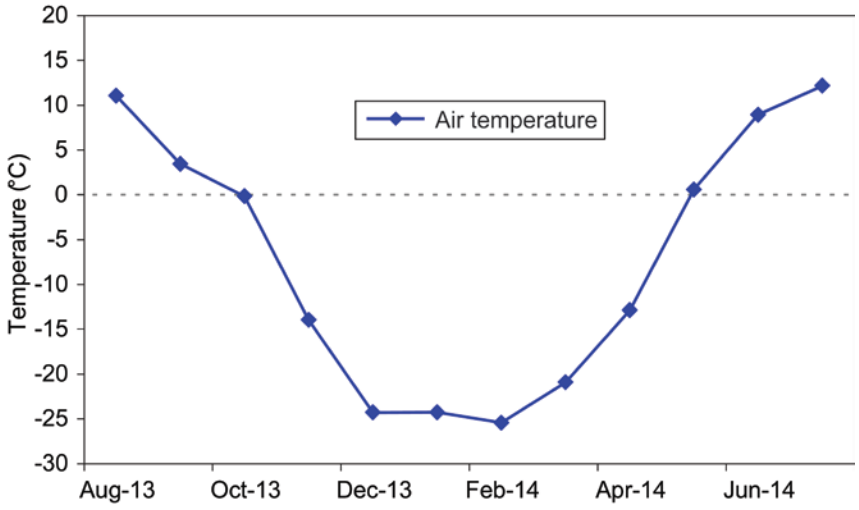


Lousy Point Low Terrace — 90TT06

Inuvialuit Settlement Region

Latitude: 69.22 N Longitude: 134.28 W
Elevation: 9 m a.s.l.
Landform: Glaciofluvial ridge
Vegetation cover: Low shrub tundra
Thaw depth: 0.37 m (probed)
Site visit: August 3, 2014

Month / Year	Temperature (°C)	
	Air	Surface
Aug / 2013	11.06	n/a
Sept / 2013	3.44	n/a
Oct / 2013	-0.18	n/a
Nov / 2013	-13.97	n/a
Dec / 2013	-24.29	n/a
Jan / 2014	-24.27	n/a
Feb / 2014	-25.42	n/a
Mar / 2014	-20.92	n/a
Apr / 2014	-12.88	n/a
May / 2014	0.58	n/a
Jun / 2014	8.94	n/a
Jul / 2014	12.15	n/a

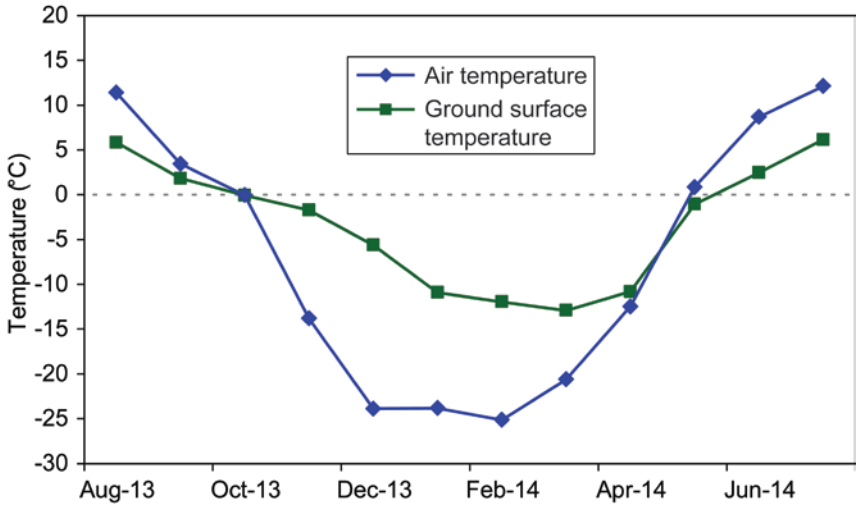


YaYa Lake low — 90TT04

Inuvialuit Settlement Region

Latitude: 69.14 N Longitude: 134.70 W
Elevation: 10 m a.s.l.
Landform: Ice contact complex
Vegetation cover: shrub tundra
Thaw Depth: 0.80 m (probed)
Site visit: August 1, 2014

Month / Year	Temperature (°C)	
	Air	Surface
Aug / 2013	11.40	5.83
Sept / 2013	3.44	1.81
Oct / 2013	-0.06	-0.08
Nov / 2013	-13.83	-1.72
Dec / 2013	-23.88	-5.62
Jan / 2014	-23.83	-10.92
Feb / 2014	-25.13	-11.97
Mar / 2014	-20.62	-12.92
Apr / 2014	-12.49	-10.82
May / 2014	0.84	-1.06
Jun / 2014	8.69	2.45
Jul / 2014	12.12	6.14

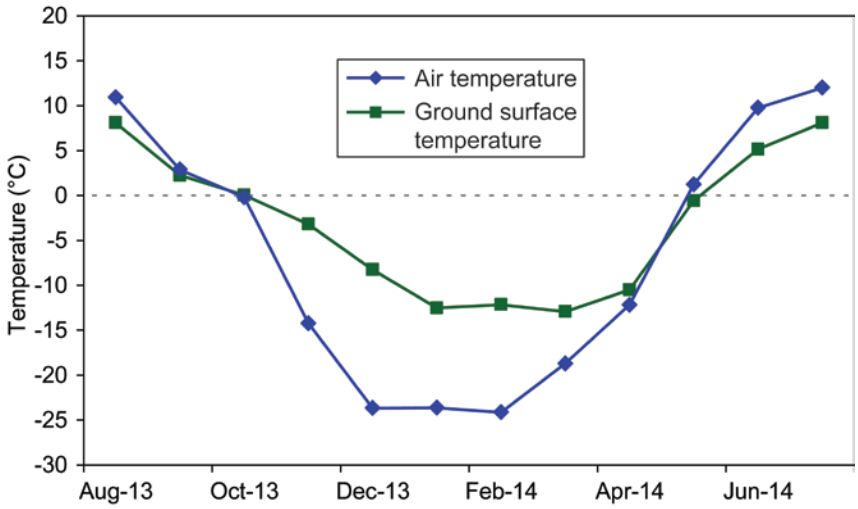


Reindeer Station plateau — 91TT12

Inuvialuit Settlement Region

Latitude: 68.69 N Longitude: 134.11 W
Elevation: 152 m a.s.l.
Landform: Plateau surface, till plain
Vegetation cover: Shrub tundra
Thaw Depth: 0.45 m (Probed)
Site visit: August 1, 2014

Month / Year	Temperature (°C)	
	Air	Surface
Aug / 2013	10.93	8.10
Sept / 2013	2.89	2.23
Oct / 2013	-0.20	0.05
Nov / 2013	-14.21	-3.19
Dec / 2013	-23.67	-8.25
Jan / 2014	-23.64	-12.51
Feb / 2014	-24.14	-12.15
Mar / 2014	-18.71	-12.94
Apr / 2014	-12.17	-10.52
May / 2014	1.24	-0.58
Jun / 2014	9.76	5.13
Jul / 2014	12.01	8.10

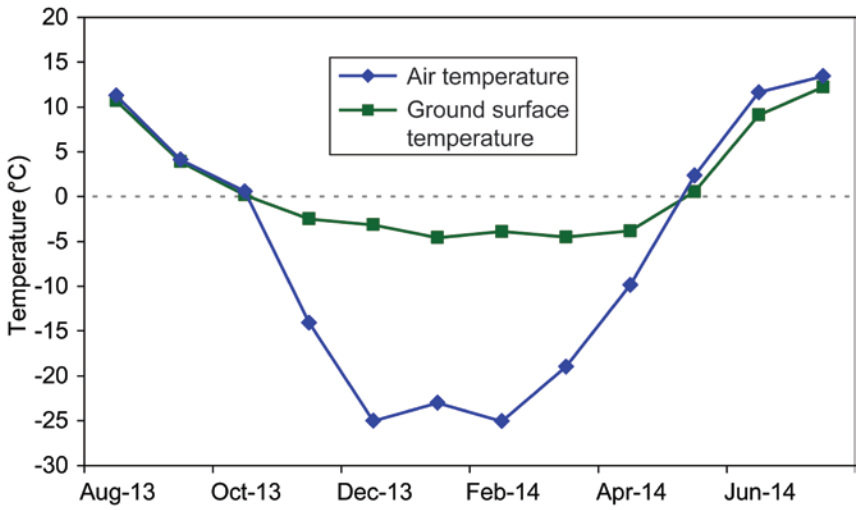


Reindeer Depot (Williams Island) — 91TT13

Inuvialuit Settlement Region

Latitude: 68.68 N Longitude: 134.15 W
Elevation: 5 m a.s.l.
Landform: Surface of bar in Mackenzie Delta
Vegetation cover: Riparian willow and alder (~2 m height)
Thaw Depth: >1.35 m (Probed)
Site visit: August 5, 2014

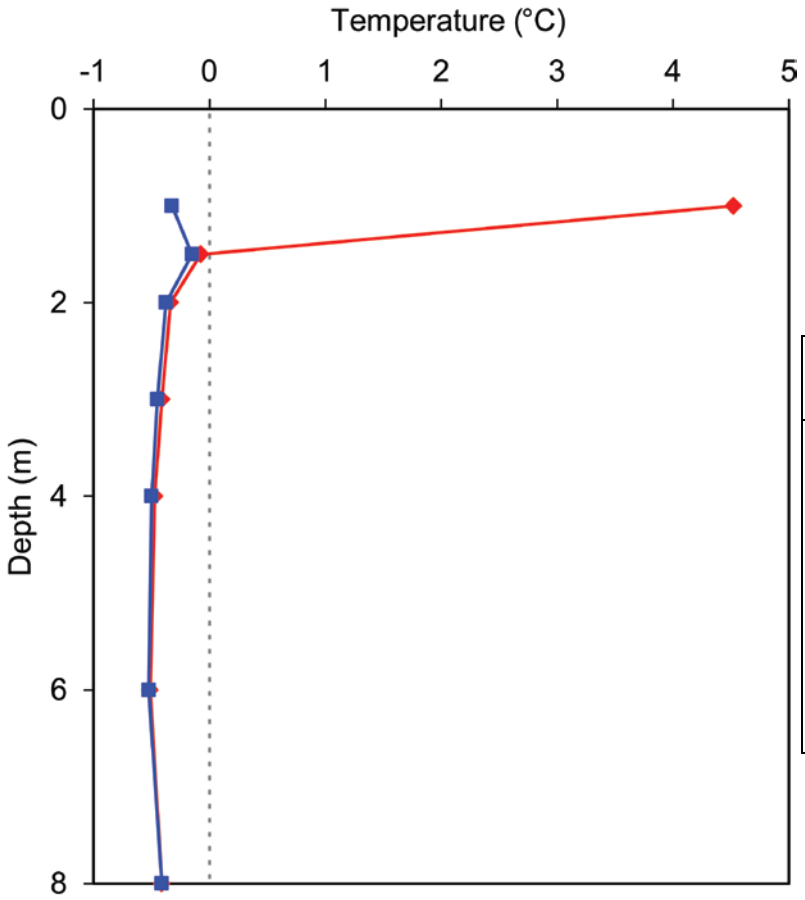
Month / Year	Temperature (°C)	
	Air	Surface
Aug / 2013	11.26	10.69
Sept / 2013	4.12	3.88
Oct / 2013	0.58	0.18
Nov / 2013	-14.07	-2.49
Dec / 2013	-25.03	-3.16
Jan / 2014	-23.01	-4.58
Feb / 2014	-25.07	-3.90
Mar / 2014	-18.98	-4.53
Apr / 2014	-9.85	-3.82
May / 2014	2.34	0.54
Jun / 2014	11.64	9.10
Jul / 2014	13.44	12.22



Navy Channel — 03TC1

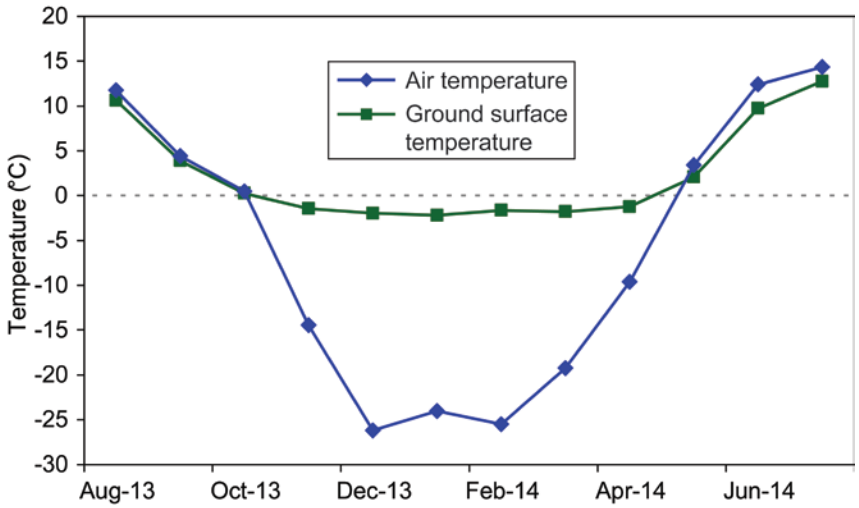
Inuvialuit Settlement Region

Latitude: 68.42 N Longitude: 133.79 W
Elevation: 5 m a.s.l.
Landform: Surface of Holocene Mackenzie delta adjacent to eastern edge rising 10s of meters to till plain
Vegetation cover: Riparian high willow shrub, open, incomplete ground cover of forbs and sedge (forest tundra)
Thaw Depth: 1.49 m
Site visit: August 5, 2014



Depth (m)	Max (°C)	Min (°C)
1	4.52	-0.32
1.5	-0.08	-0.15
2	-0.34	-0.37
3	-0.41	-0.45
4	-0.47	-0.50
6	-0.51	-0.52
8	-0.41	-0.41

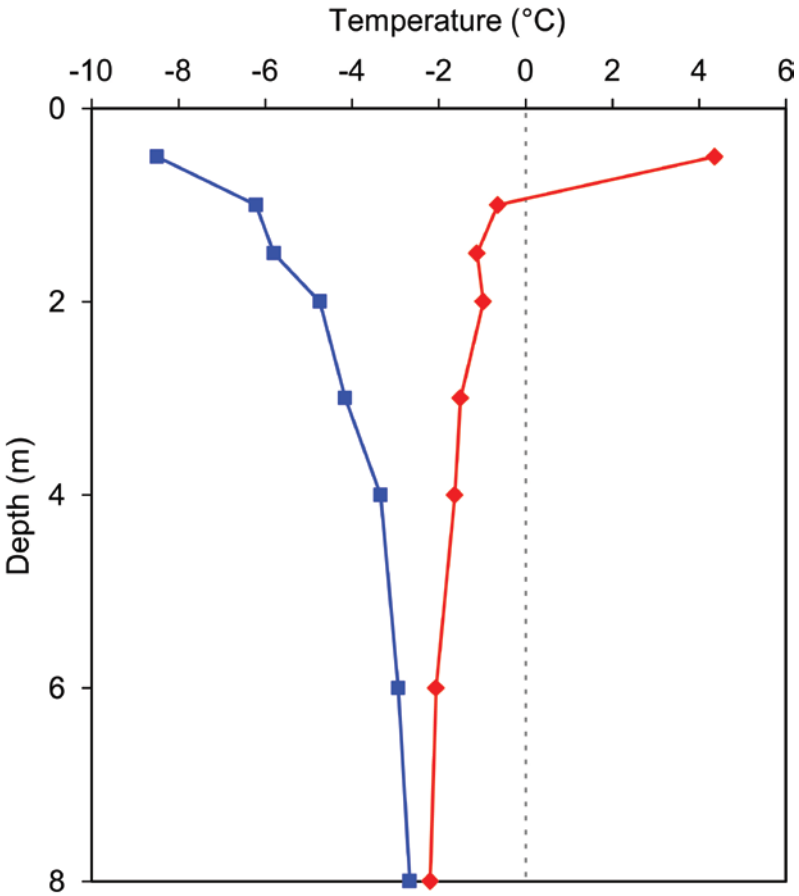
Month / Year	Temperature (°C)	
	Air	Surface
Aug / 2013	11.73	10.62
Sept / 2013	4.40	3.88
Oct / 2013	0.47	0.25
Nov / 2013	-14.47	-1.44
Dec / 2013	-26.20	-1.96
Jan / 2014	-24.04	-2.21
Feb / 2014	-25.51	-1.65
Mar / 2014	-19.24	-1.80
Apr / 2014	-9.63	-1.24
May / 2014	3.38	2.07
Jun / 2014	12.39	9.71
Jul / 2014	14.34	12.75



Navy Road — 01TC1

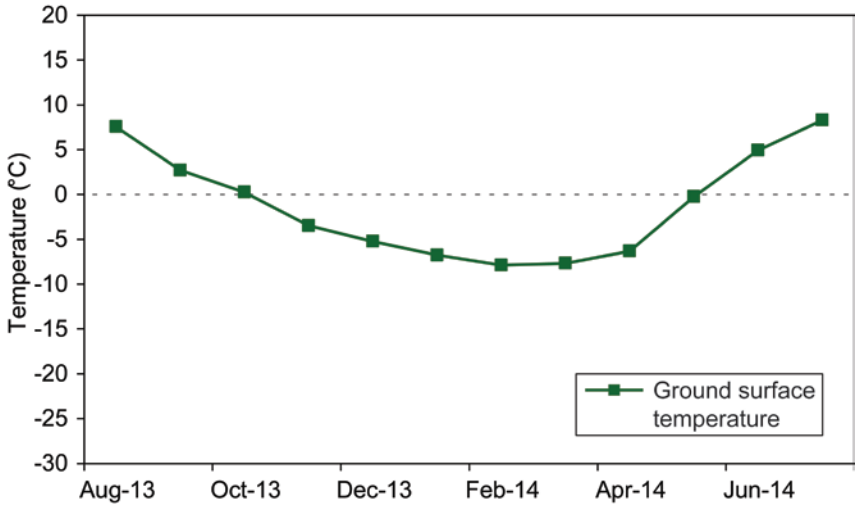
Inuvialuit Settlement Region

Latitude: 68.40 N Longitude: 133.76 W
Elevation: 60 m a.s.l.
Landform: Fine grained colluvium sloping toward river, post glacial (~10Ka)
Vegetation cover: Taiga post fire succession, scattered birch and alder, open dwarf birch, heath ground cover
Thaw Depth: 0.94 m
Site visit: August 6, 2014



Depth (m)	Max (°C)	Min (°C)
0.5	4.35	-8.50
1	-0.64	-6.21
1.5	-1.12	-5.80
2	-0.98	-4.74
3	-1.50	-4.16
4	-1.63	-3.34
6	-2.06	-2.93
8	-2.20	-2.67

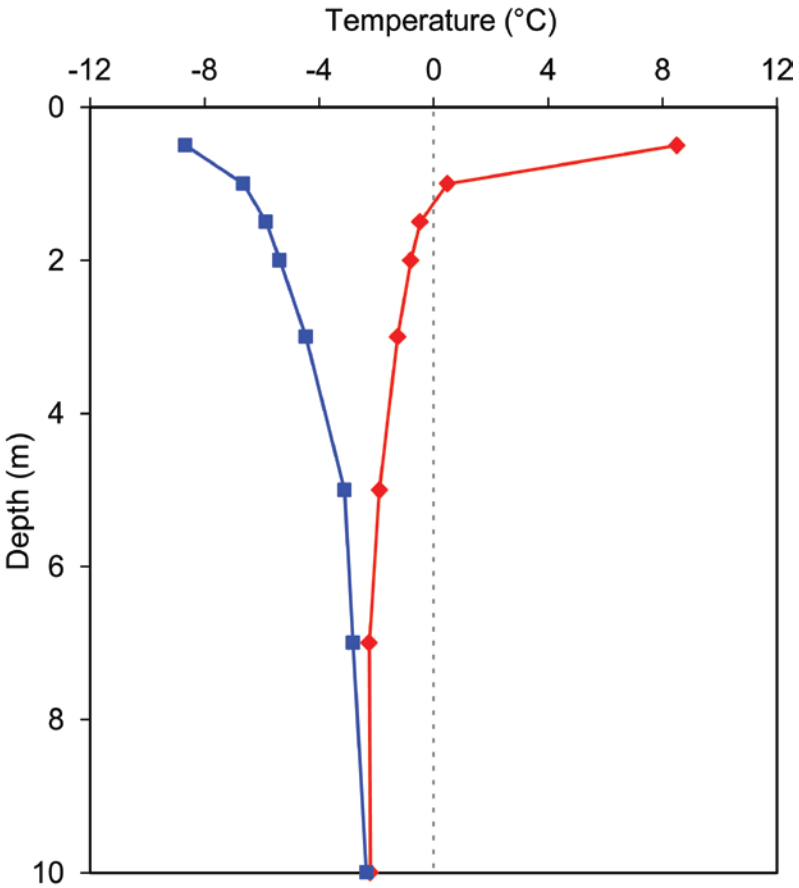
Month / Year	Temperature (°C)	
	Air	Surface
Aug / 2013	n/a	7.56
Sept / 2013	n/a	2.71
Oct / 2013	n/a	0.26
Nov / 2013	n/a	-3.48
Dec / 2013	n/a	-5.23
Jan / 2014	n/a	-6.77
Feb / 2014	n/a	-7.89
Mar / 2014	n/a	-7.67
Apr / 2014	n/a	-6.31
May / 2014	n/a	-0.25
Jun / 2014	n/a	4.92
Jul / 2014	n/a	8.29



Inuvik Airport (trees) — 01TC2

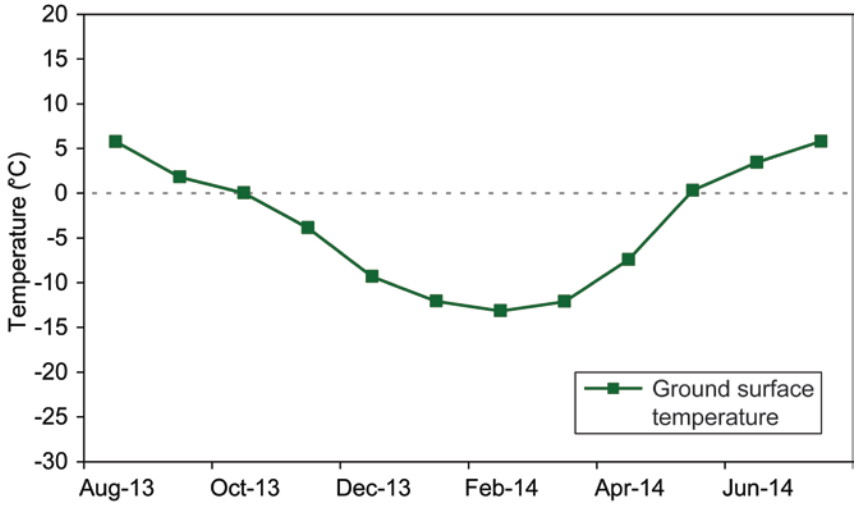
Gwich'in Settlement Region

Latitude: 68.32 N Longitude: 133.44 W
Elevation: 84 m a.s.l.
Landform: Fluted till plain glacial (>10Ka)
Vegetation cover: Taiga open black spruce, health ground cover
Thaw Depth: 1.25 m
Site visit: August 5, 2014



Depth (m)	Max (°C)	Min (°C)
0.5	8.50	-8.67
1	0.48	-6.65
1.5	-0.48	-5.85
2	-0.80	-5.37
3	-1.26	-4.46
5	-1.89	-3.12
7	-2.25	-2.81
10	-2.21	-2.35

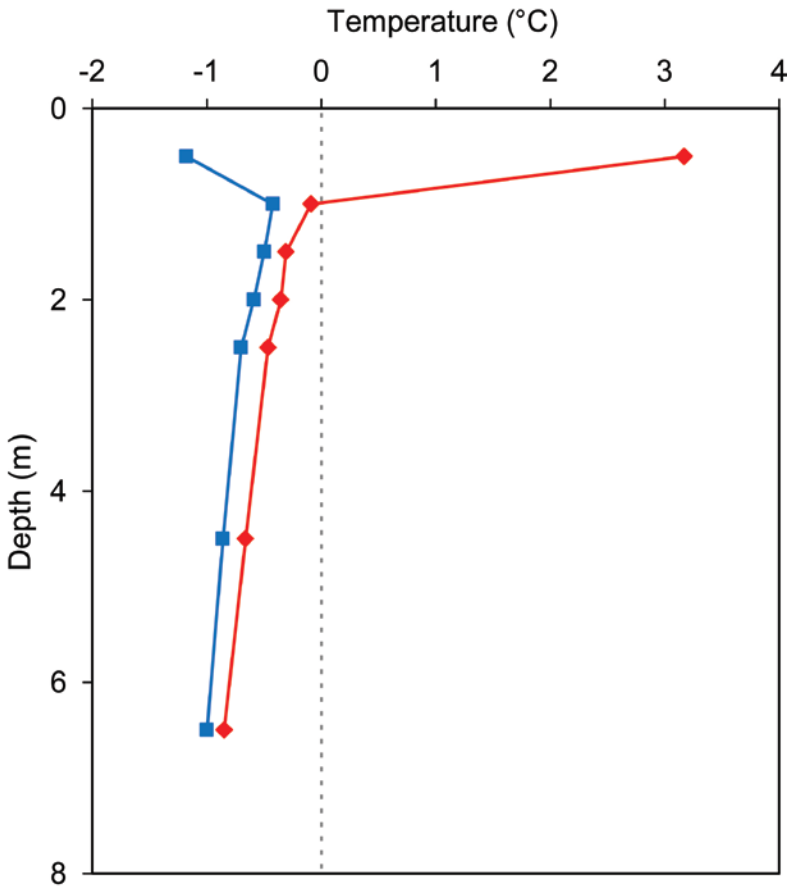
Month / Year	Temperature (°C)	
	Air	Surface
Aug / 2013	n/a	5.76
Sept / 2013	n/a	1.80
Oct / 2013	n/a	0.02
Nov / 2013	n/a	-3.88
Dec / 2013	n/a	-9.34
Jan / 2014	n/a	-12.08
Feb / 2014	n/a	-13.16
Mar / 2014	n/a	-12.11
Apr / 2014	n/a	-7.42
May / 2014	n/a	0.31
Jun / 2014	n/a	3.44
Jul / 2014	n/a	5.80



Inuvik Airport (bog) — 12TC1

Gwich'in Settlement Area

Latitude: 68.32 N Longitude: 133.43 W
Elevation: 68 m a.s.l.
Landform: Bog between ridges on fluted till plain, glacial (>10Ka)
Vegetation cover: Taiga open bog, scattered shrub, heath ground cover (forest tundra)
Thaw Depth: 0.99 m
Site visit: August 5, 2014



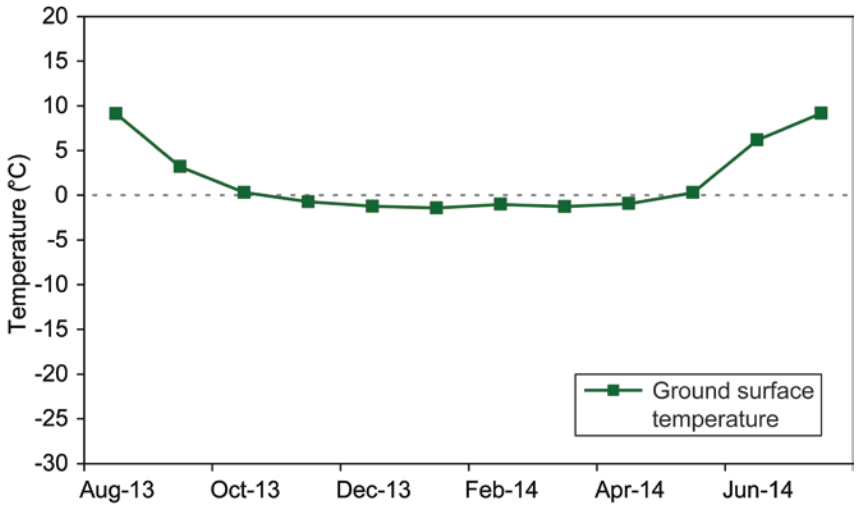
Depth (m)	Max (°C)	Min (°C)
0.5	3.17	-1.18
1	-0.09	-0.42
1.5	-0.31	-0.50
2	-0.35	-0.59
2.5	-0.47	-0.70
4.5	-0.66	-0.86
6.5	-0.85	-1.00

Inuvik Airport (bog) — 01TC3

Gwich'in Settlement Area

Latitude: 68.32 N Longitude: 133.43 W
Elevation: 68 m a.s.l.
Landform: Bog between ridges on fluted till plain, glacial (>10Ka)
Vegetation cover: Taiga open bog, scattered shrub, heath ground cover (forest tundra)
Thaw Depth: n/a
Site visit: August 6, 2014

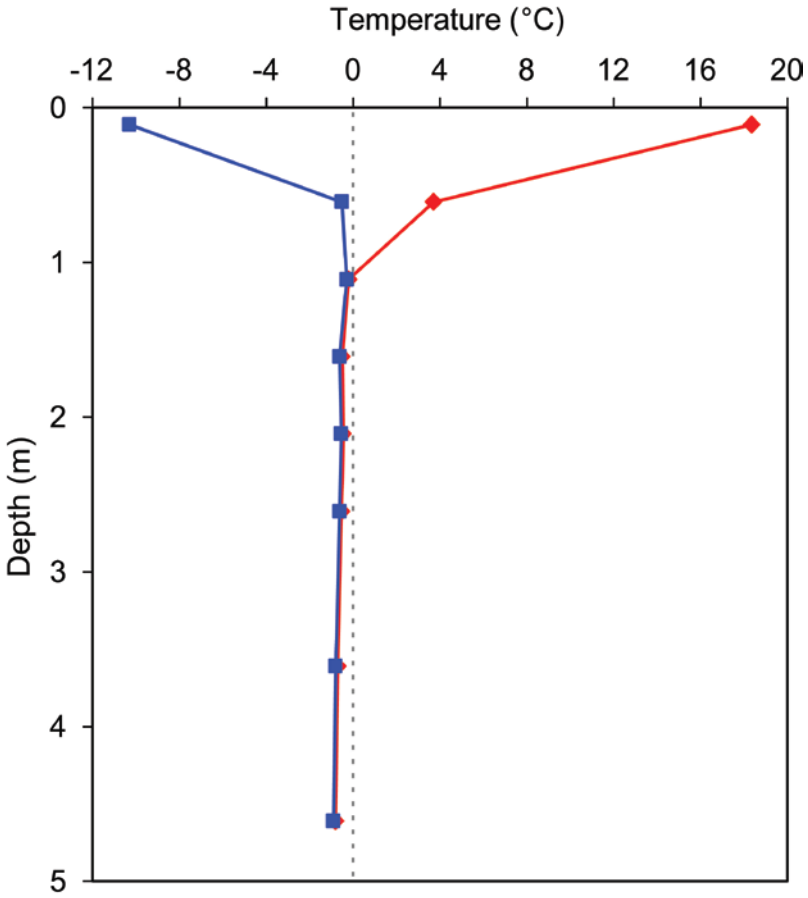
Month / Year	Temperature (°C)	
	Air	Surface
Aug / 2013	n/a	9.12
Sept / 2013	n/a	3.20
Oct / 2013	n/a	0.30
Nov / 2013	n/a	-0.74
Dec / 2013	n/a	-1.23
Jan / 2014	n/a	-1.42
Feb / 2014	n/a	-1.02
Mar / 2014	n/a	-1.28
Apr / 2014	n/a	-0.95
May / 2014	n/a	0.30
Jun / 2014	n/a	6.17
Jul / 2014	n/a	9.17



Campbell Lake — CaL-01

Gwich'in Settlement Region

Latitude: 68.24 N Longitude: 133.10 W
Elevation: 115 m a.s.l.
Landform: Moraine plain
Vegetation cover: Peatland
Thaw Depth: 1.08 m
Site visit: August 1, 2014

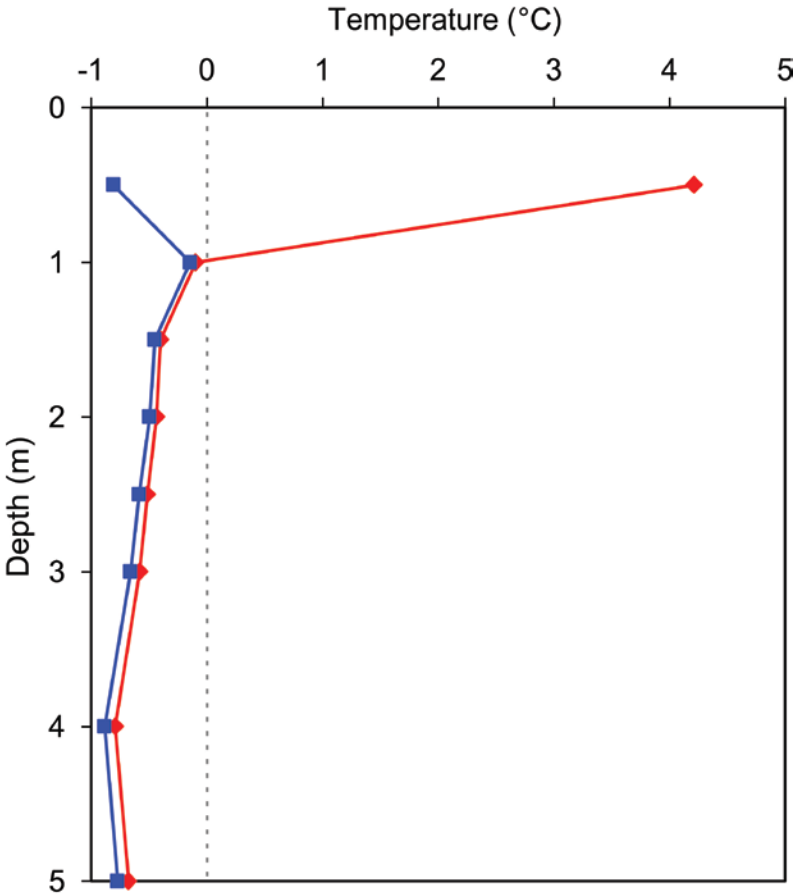


Depth (m)	Max (°C)	Min (°C)
0.11	18.37	-10.30
0.61	3.71	-0.51
1.11	-0.20	-0.29
1.61	-0.51	-0.62
2.11	-0.46	-0.54
2.61	-0.53	-0.62
3.61	-0.70	-0.80
4.61	-0.80	-0.91

Campbell Lake — CaL-02

Gwich'in Settlement Region

Latitude: 68.24 N Longitude: 133.09 W
Elevation: 118 m a.s.l.
Landform: Moraine plain
Vegetation cover: Cutline through Black spruce forest
Thaw Depth: 0.99 m
Site visit: August 1, 2014

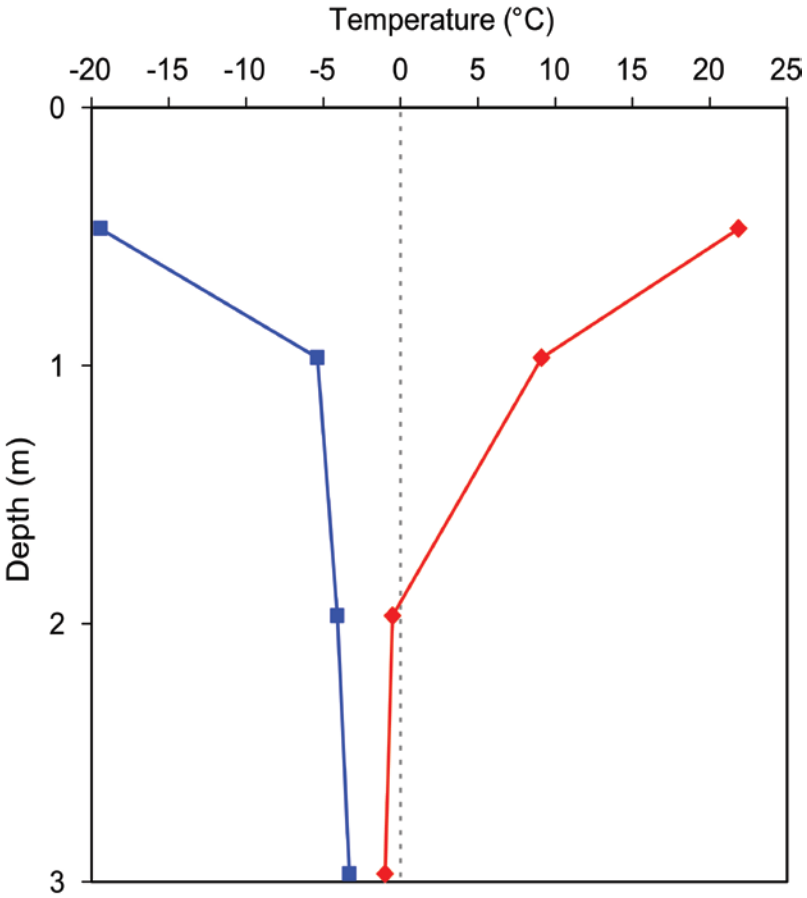


Depth (m)	Max (°C)	Min (°C)
0.5	4.21	-0.81
1	-0.10	-0.15
1.5	-0.40	-0.45
2	-0.44	-0.50
2.5	-0.52	-0.59
3	-0.58	-0.66
4	-0.79	-0.88
5	-0.68	-0.77

Campbell Lake — CaL-03

Gwich'in Settlement Region

Latitude: 68.24 N Longitude: 133.10 W
Elevation: 118 m a.s.l.
Landform: Moraine plain
Vegetation cover: Black spruce forest
Thaw Depth: 1.92 m
Site visit: August 1, 2014

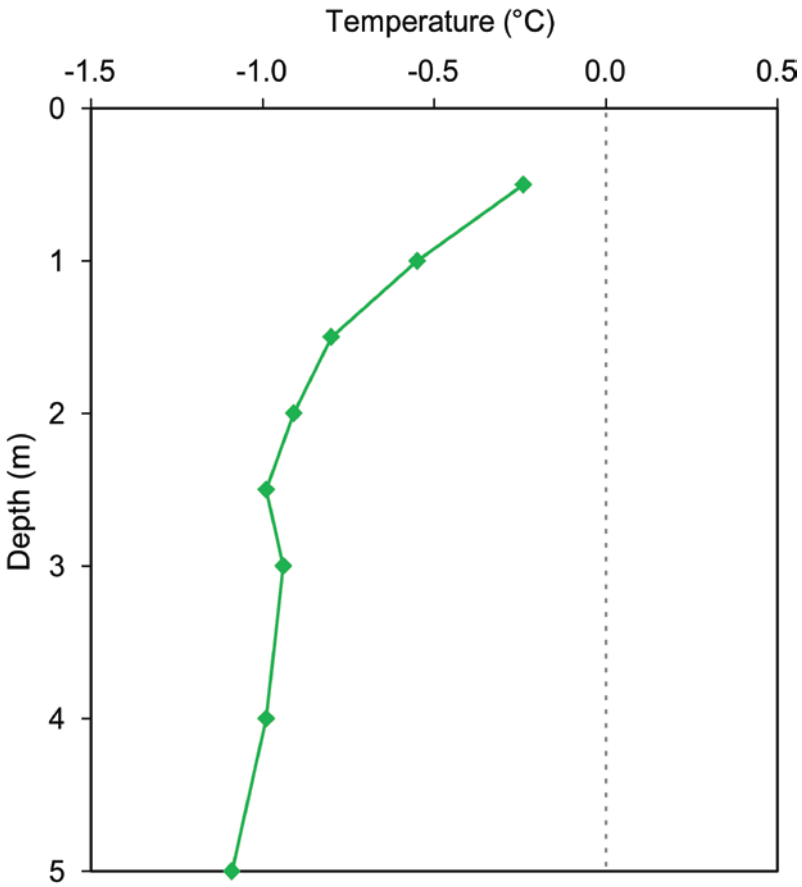


Depth (m)	Max (°C)	Min (°C)
0.47	21.86	-19.42
0.97	9.13	-5.38
1.97	-0.52	-4.10
2.97	-1.00	-3.31

North Caribou Lake — NCL-01

Gwich'in Settlement Region

Latitude: 68.15 N Longitude: 132.93 W
Elevation: 209 m a.s.l.
Landform: Moraine plain
Vegetation cover: Peatland
Thaw Depth: 0.45 m (Probed)
Site visit: August 1, 2014

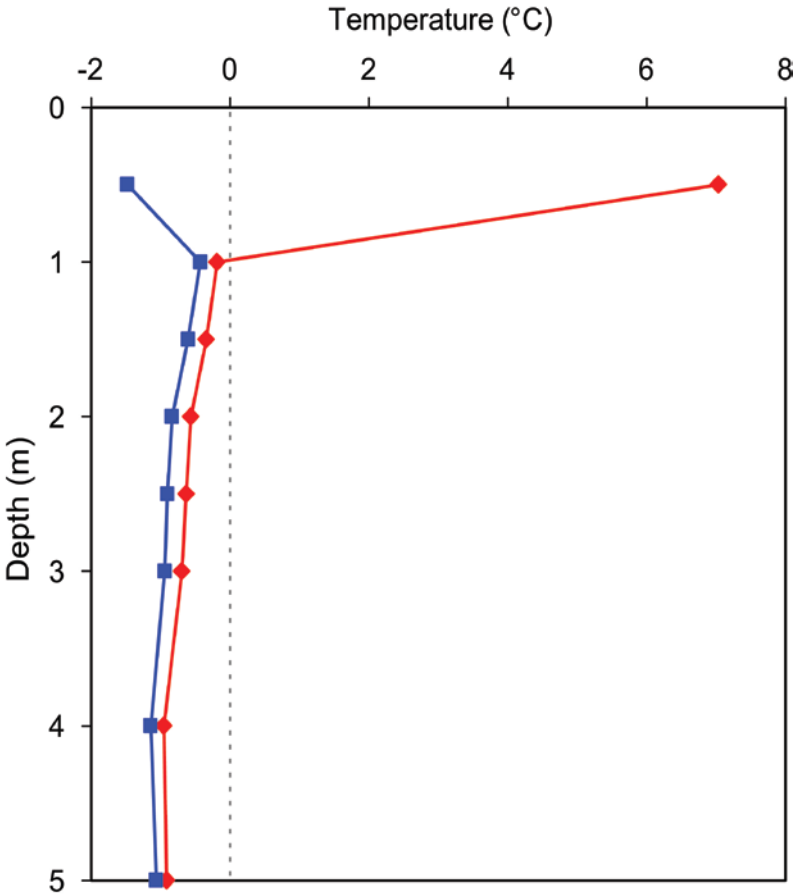


Depth (m)	Temp (°C)
0.5	-0.24
1	-0.55
1.5	-0.8
2	-0.91
2.5	-0.99
3	-0.94
4	-0.99
5	-1.09

North Caribou Lake — NCL-02

Gwich'in Settlement Region

Latitude: 68.15 N Longitude: 132.93 W
Elevation: 217 m a.s.l.
Landform: Moraine plain
Vegetation cover: Stunted black spruce forest
Thaw Depth: 0.99 m
Site visit: August 1, 2014

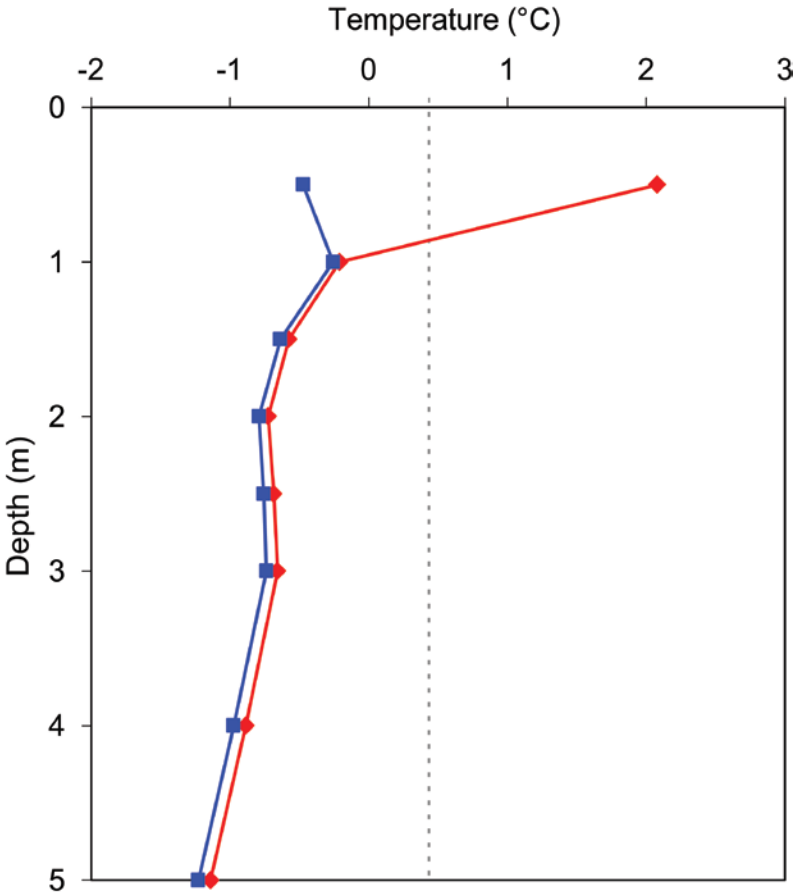


Depth (m)	Max (°C)	Min (°C)
0.5	7.04	-1.48
1	-0.19	-0.43
1.5	-0.34	-0.60
2	-0.56	-0.84
2.5	-0.63	-0.90
3	-0.69	-0.94
4	-0.95	-1.14
5	-0.91	-1.06

Hill Lake — HL-01

Gwich'in Settlement Region

Latitude: 67.99 N Longitude: 132.49 W
Elevation: 229 m a.s.l.
Landform: Moraine plain
Vegetation cover: Tundra
Thaw Depth : 0.95 m
Site visit: August 1, 2014

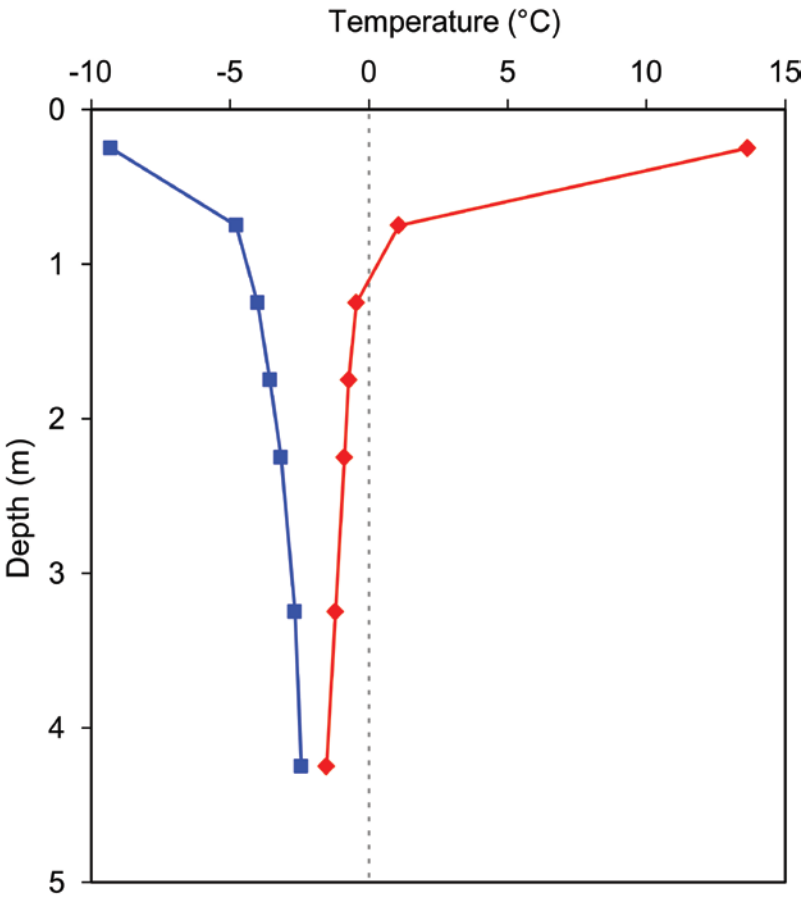


Depth (m)	Max (°C)	Min (°C)
0.5	2.08	-0.47
1	-0.21	-0.26
1.5	-0.58	-0.64
2	-0.73	-0.79
2.5	-0.68	-0.76
3	-0.66	-0.74
4	-0.89	-0.97
5	-1.14	-1.23

Hill Lake — HL-02

Gwich'in Settlement Region

Latitude: 67.99 N Longitude: 132.49 W
Elevation: 234 m a.s.l.
Landform: Moraine plain
Vegetation cover: Shrub Tundra
Thaw Depth: 1.10 m
Site visit: August 1, 2014

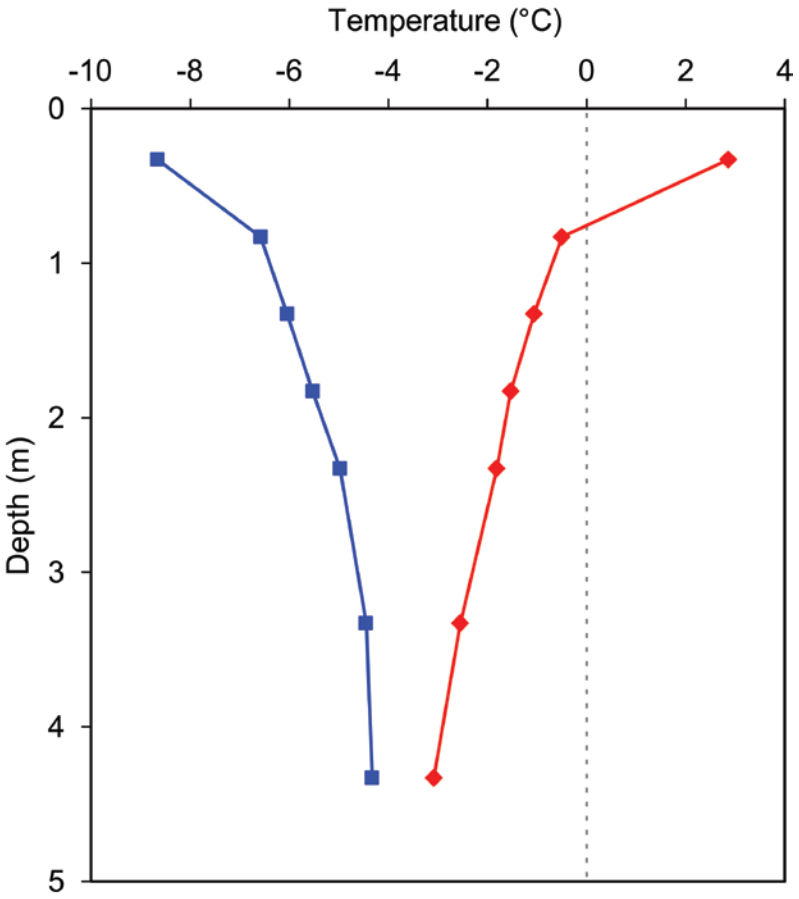


Depth (m)	Max (°C)	Min (°C)
0.25	13.64	-9.31
0.75	1.07	-4.78
1.25	-0.45	-4.02
1.75	-0.73	-3.57
2.25	-0.88	-3.17
3.25	-1.21	-2.67
4.25	-1.53	-2.44

Wood Bridge Lake — WBL-01

Gwich'in Settlement Region

Latitude: 67.90 N Longitude: 132.18 W
Elevation: 204 m a.s.l.
Landform: Alluvial plain
Vegetation: Black spruce forest
Thaw Depth: 0.76 m
Site visit: August 1, 2014



Depth (m)	Max (°C)	Min (°C)
0.33	2.86	-8.66
0.83	-0.50	-6.58
1.33	-1.06	-6.04
1.83	-1.53	-5.53
2.33	-1.81	-4.98
3.33	-2.55	-4.45
4.33	-3.08	-4.33

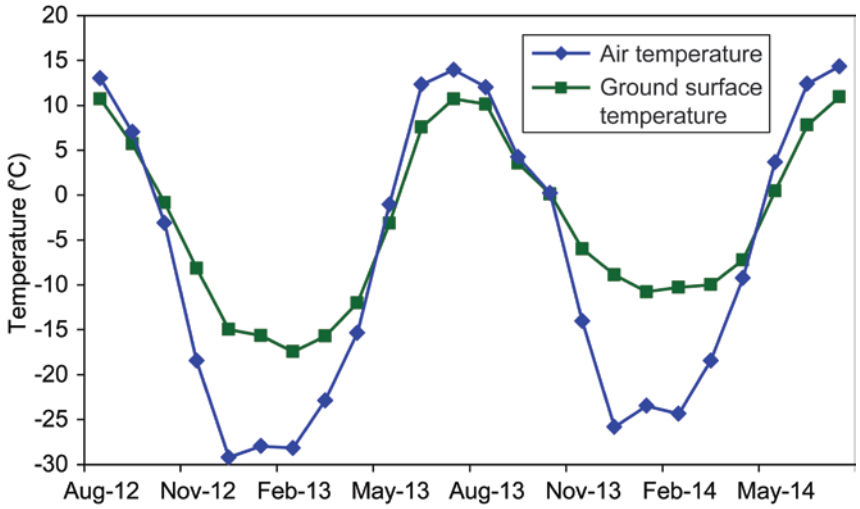
Rengleng River mouth — 91TT14

Gwich'in Settlement Region

Latitude: 67.80 N Longitude: 134.13 W
Elevation: 8 m a.s.l.
Landform: Alluvial plain
Vegetation cover: Mixed spruce and hardwood forest
Thaw Depth : 0.95 m (probed)
Site visit: August 4, 2014

Month / Year	Temperature (°C)	
	Air	Surface
Aug / 2012	13.02	10.71
Sept / 2012	7.01	5.69
Oct / 2012	-3.11	-0.84
Nov / 2012	-18.46	-8.16
Dec / 2012	-29.22	-14.98
Jan / 2013	-27.96	-15.65
Feb / 2013	-28.18	-17.45
Mar / 2013	-22.87	-15.71
Apr / 2013	-15.34	-12.03
May / 2013	-1.04	-3.15
Jun / 2013	12.31	7.55
Jul / 2013	13.95	10.71

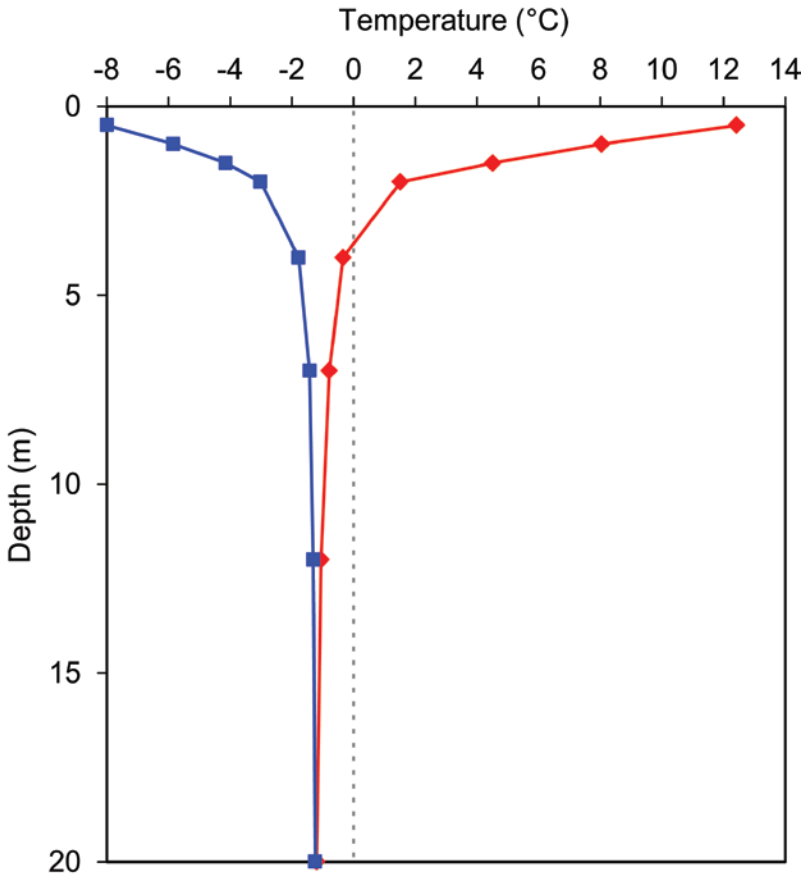
Month / Year	Temperature (°C)	
	Air	Surface
Aug / 2013	12.02	10.13
Sept / 2013	4.22	3.55
Oct / 2013	0.21	0.12
Nov / 2013	-14.03	-6.00
Dec / 2013	-25.83	-8.88
Jan / 2014	-23.47	-10.78
Feb / 2014	-24.37	-10.28
Mar / 2014	-18.44	-9.99
Apr / 2014	-9.23	-7.22
May / 2014	3.68	0.44
Jun / 2014	12.39	7.78
Jul / 2014	14.34	10.92



Jackfish Creek — JF-02

Sahtu Settlement Region

Latitude: 66.29 N Longitude: 128.47 W
Elevation: 90 m a.s.l.
Landform: Eolian dune on moraine plain, well drained, elevated area
Vegetation cover: Black spruce forest and moss cover
Thaw Depth: 3.63 m
Site visit: September 19, 2014



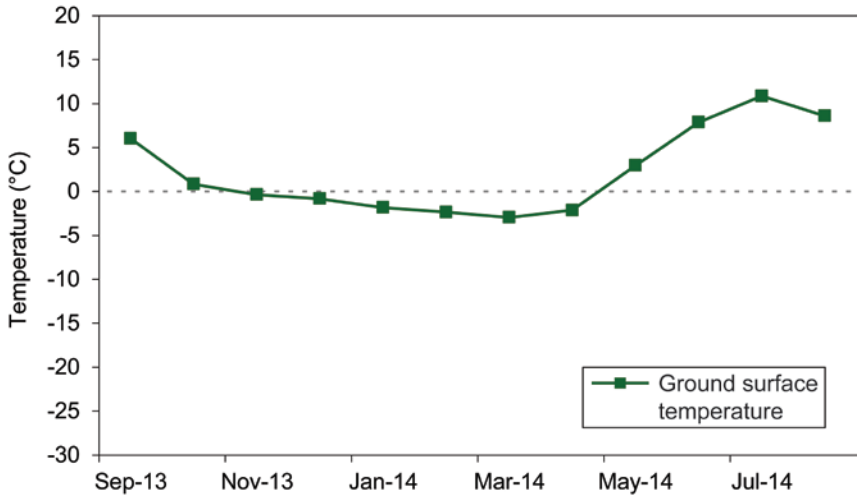
Depth (m)	Max (°C)	Min (°C)
0.5	12.42	-7.99
1	8.05	-5.85
1.5	4.51	-4.14
2	1.52	-3.01
4	-0.34	-1.78
7	-0.79	-1.43
12	-1.06	-1.31
20	-1.20	-1.24

Fort Good Hope South — FGHS-01

Sahtu Settlement Region

Latitude: 66.21 N Longitude: 128.50 W
Elevation: 134 m a.s.l.
Landform: Hummocky peatland
Vegetation cover: Dense shrub and open black spruce
Thaw Depth: n/a
Site visit: September 19, 2014

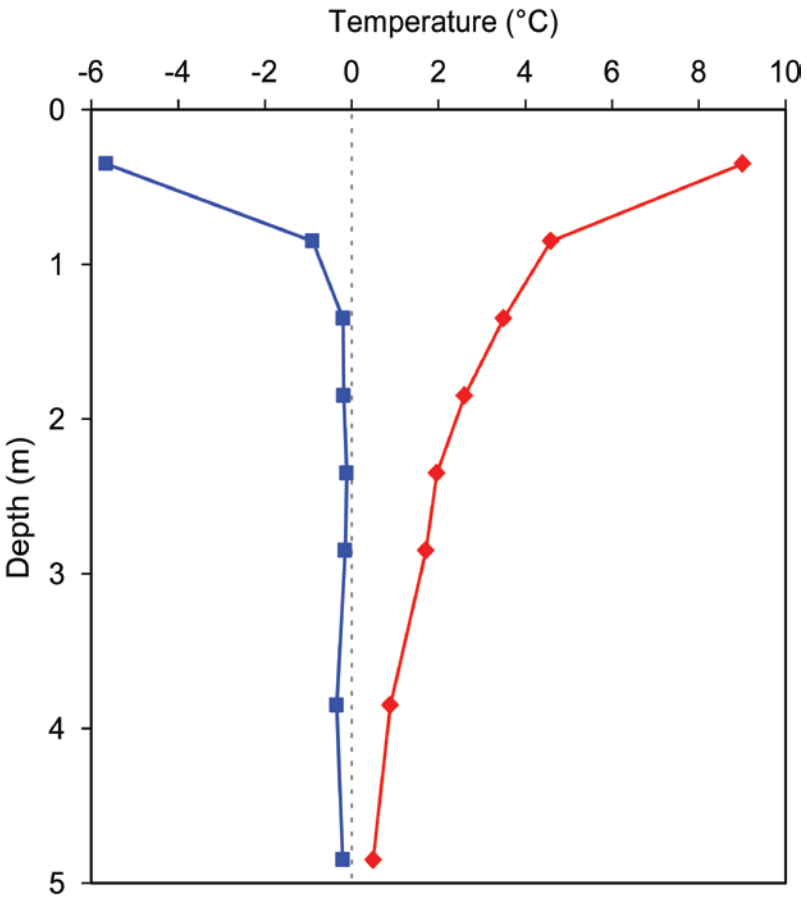
Month / Year	Temperature (°C)	
	Air	Surface
Sept / 2013	n/a	6.03
Oct / 2013	n/a	0.84
Nov / 2013	n/a	-0.36
Dec / 2013	n/a	-0.84
Jan / 2014	n/a	-1.84
Feb / 2014	n/a	-2.35
Mar / 2014	n/a	-2.96
Apr / 2014	n/a	-2.13
May / 2014	n/a	2.96
Jun / 2014	n/a	7.87
Jul / 2014	n/a	10.86
Aug / 2014	n/a	8.59



Fort Good Hope South — FGHS-02

Sahtu Settlement Region

Latitude: 66.21 N Longitude: 128.50 W
Elevation: 134 m a.s.l.
Landform: Hummocky peatland
Vegetation cover: Peat plateau, lichen, open black spruce
Thaw Depth: 6.11 m (thaw depth was extrapolated from bottom two temperature measurements)
Site visit: September 19, 2014

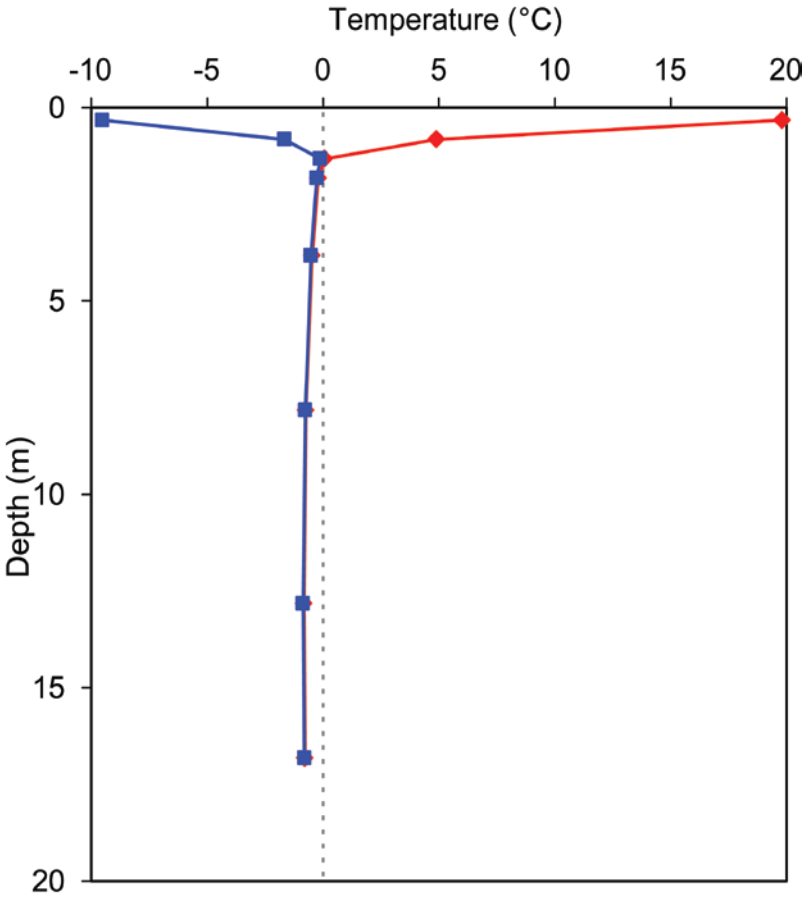


Depth (m)	Max (°C)	Min (°C)
0.35	9.01	-5.66
0.85	4.59	-0.90
1.35	3.50	-0.20
1.85	2.60	-0.19
2.35	1.96	-0.12
2.85	1.71	-0.15
3.85	0.89	-0.34
4.85	0.50	-0.21

Snafu Creek — SC-01

Sahtu Settlement Region

Latitude: 66.00 N Longitude: 128.35 W
Elevation: 100 m a.s.l.
Landform: Moraine plain
Vegetation cover: Peat bog, open black spruce forest, and lichen cover
Thaw Depth: 1.43 m
Site visit: September 19, 2014

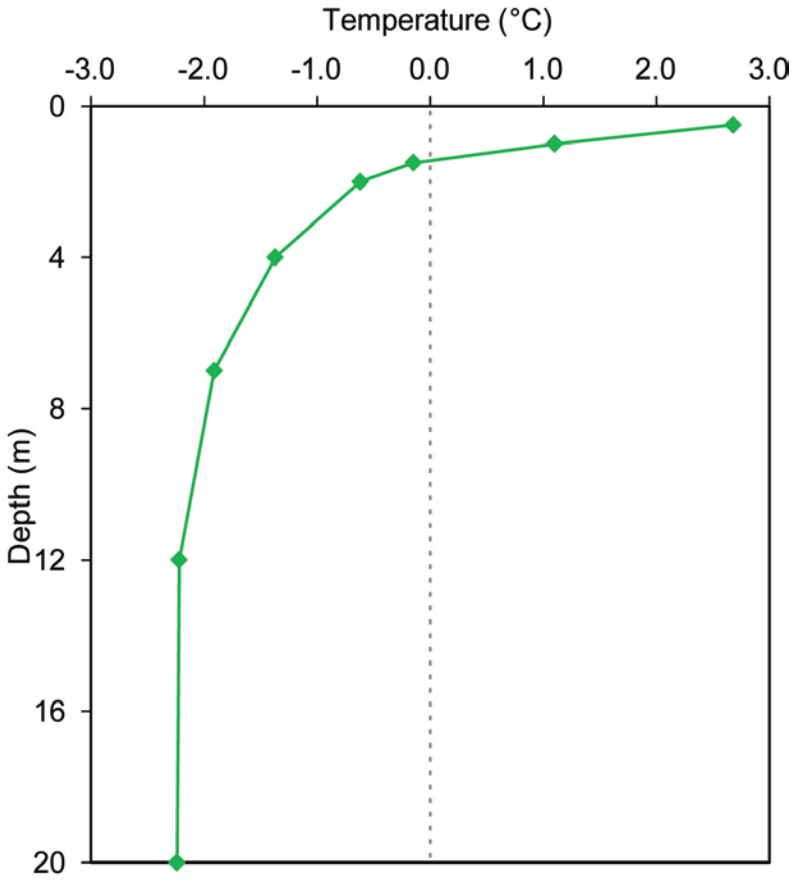


Depth (m)	Max (°C)	Min (°C)
0.32	19.81	-9.53
0.82	4.88	-1.66
1.32	0.06	-0.11
1.82	-0.22	-0.27
3.82	-0.48	-0.52
7.82	-0.75	-0.77
12.82	-0.83	-0.87
16.82	-0.78	-0.80

Chick Lake — CL-01

Sahtu Settlement Region

Latitude: 65.90 N Longitude: 128.24 W
Elevation: 122 m a.s.l.
Landform: Moraine plain
Vegetation cover: Peat and organic soil with open black spruce forest and shrubs
Thaw Depth: 1.44 m
Site visit: September 19, 2014

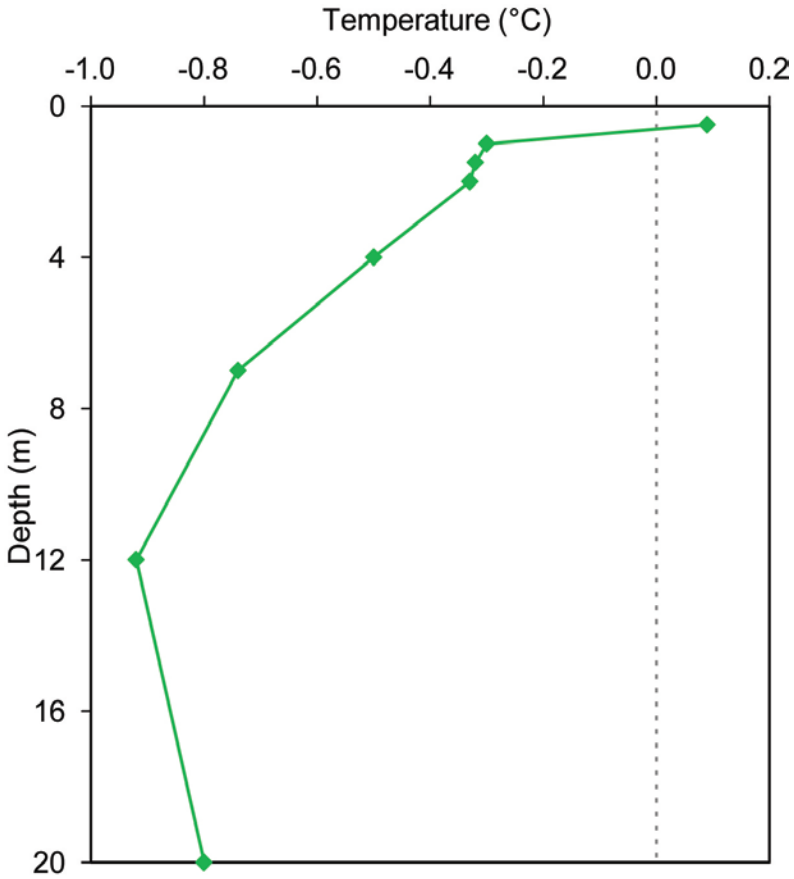


Depth (m)	Max (°C)
0.5	2.68
1	1.1
1.5	-0.15
2	-0.62
4	-1.37
7	-1.91
12	-2.22
20	-2.24

Hanna River — HR-01

Sahtu Settlement Region

Latitude: 65.67 N Longitude: 127.83 W
Elevation: 104 m a.s.l.
Landform: Lacustrine plain
Vegetation cover: Boggy burnt area
Thaw Depth: 0.62 m
Site visit: September 19, 2014

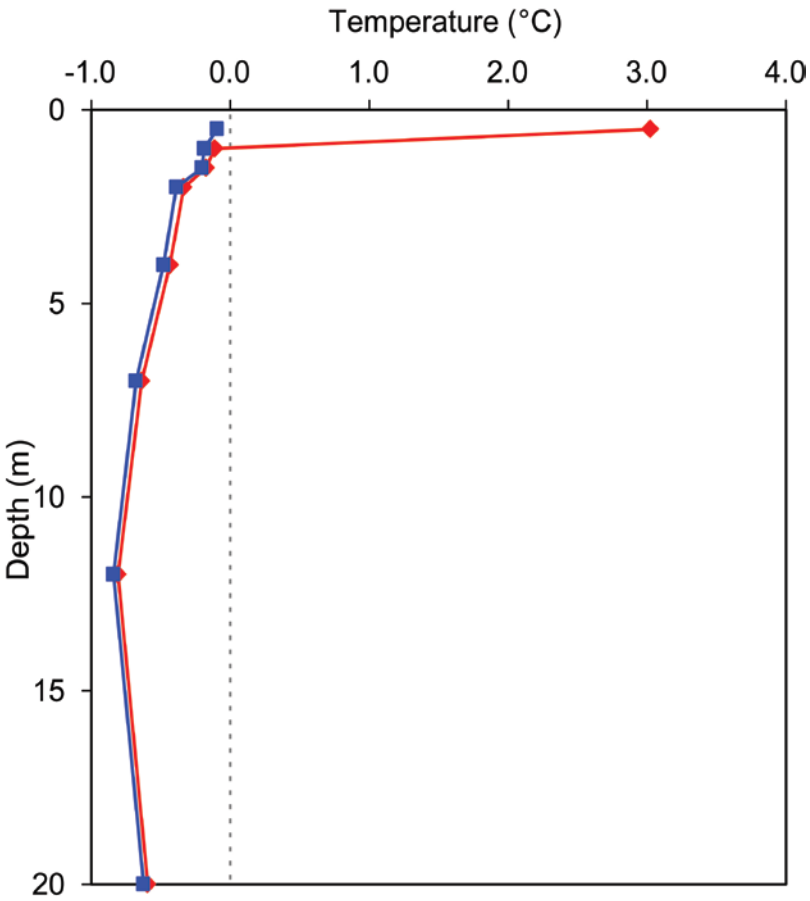


Depth (m)	Max (°C)
0.5	0.09
1	-0.3
1.5	-0.32
2	-0.33
4	-0.5
7	-0.74
12	-0.92
20	-0.8

Elliot Creek — EC-01

Sahtu Settlement Region

Latitude: 65.52 N Longitude: 127.62 W
Elevation: 54 m a.s.l.
Landform: Lacustrine undulating plain, well-drained elevated area
Vegetation cover: Peat cover on edge of open, mature black spruce forest
Thaw Depth: 0.98 m
Site visit: September 19, 2014

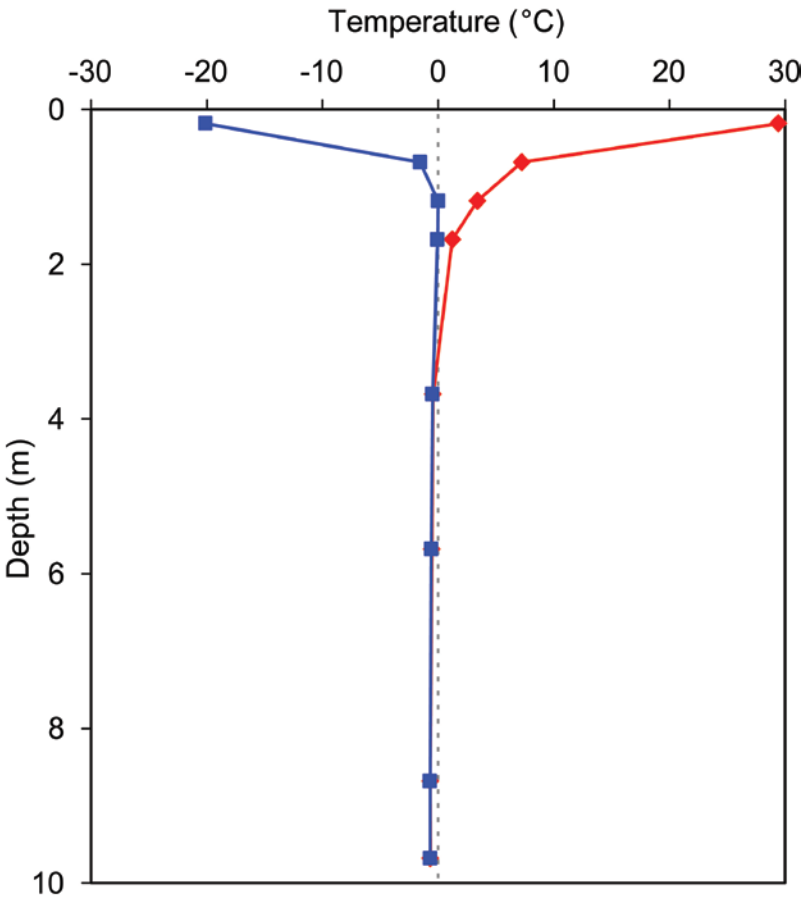


Depth (m)	Max (°C)	Min (°C)
0.5	3.02	-0.10
1	-0.11	-0.19
1.5	-0.18	-0.20
2	-0.34	-0.39
4	-0.44	-0.48
7	-0.64	-0.68
12	-0.81	-0.84
20	-0.60	-0.63

Elliot Creek — EC-02

Sahtu Settlement Region

Latitude: 65.52 N Longitude: 127.62 W
Elevation: 54 m a.s.l.
Landform: Lacustrine plain overlain by alluvial sediments
Vegetation cover: Peat cover on edge of dense, mature black spruce forest
Thaw Depth: 3.16 m
Site visit: September 19, 2014

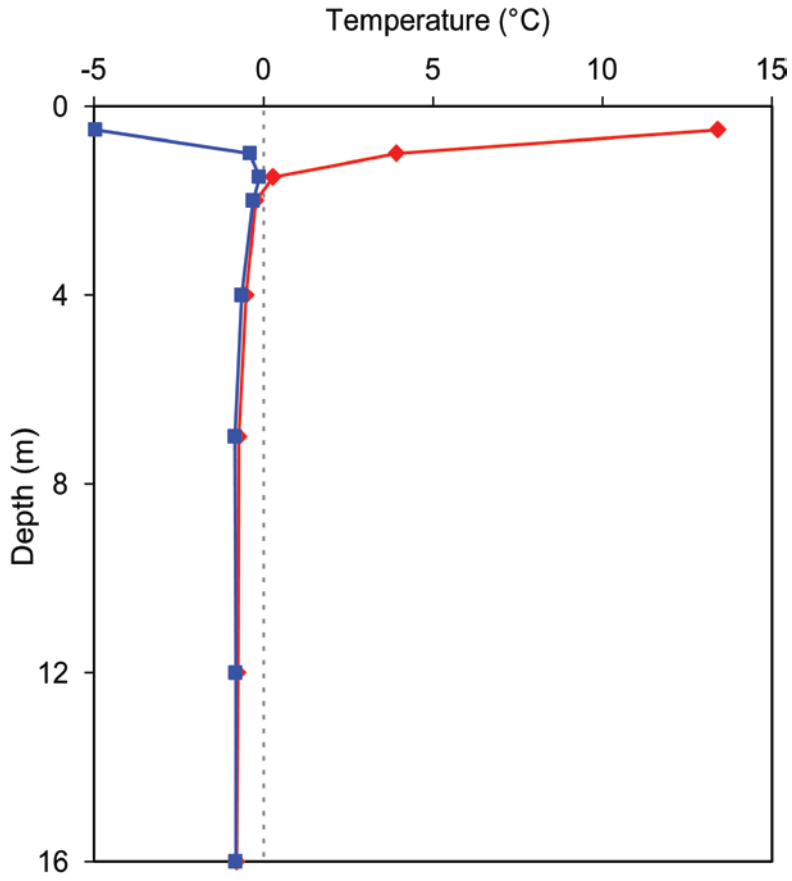


Depth (m)	Max (°C)	Min (°C)
0.18	29.41	-20.09
0.68	7.23	-1.55
1.18	3.40	0.00
1.68	1.23	-0.05
3.68	-0.44	-0.47
5.68	-0.54	-0.58
8.68	-0.68	-0.70
9.68	-0.66	-0.69

Oscar Creek — OC-01

Sahtu Settlement Region

Latitude: 65.44 N Longitude: 127.44 W
Elevation: 64 m a.s.l.
Landform: Undulating glaciolacustrine terrain overlain by alluvial sediments
Vegetation cover: Peat cover with dense-forested birch and black spruce
Thaw Depth: 1.77 m
Site visit: September 19, 2014

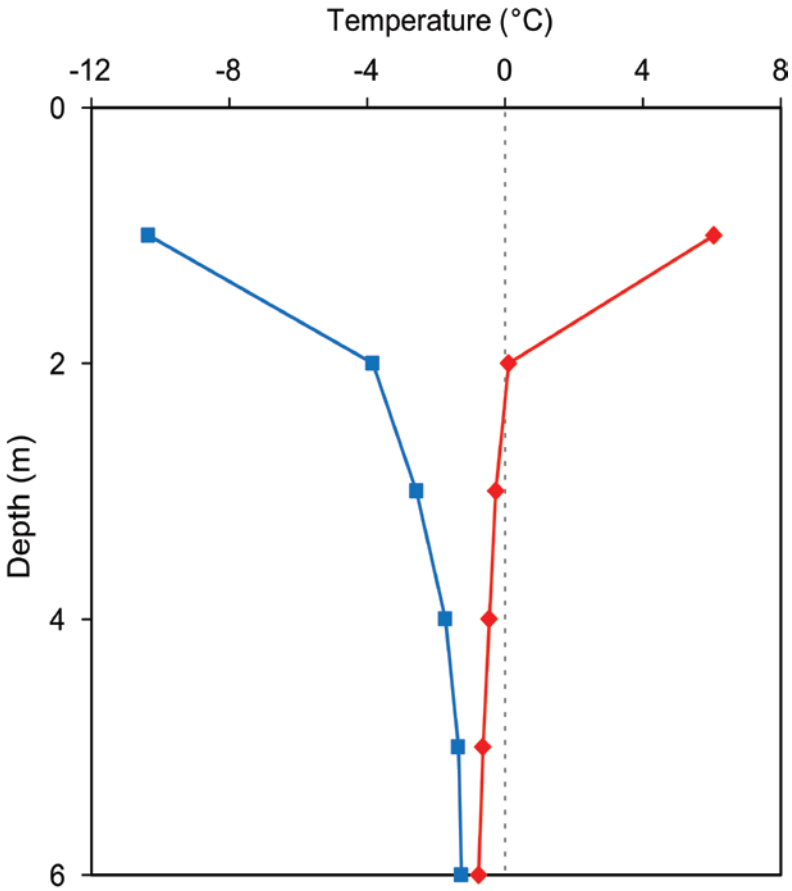


Depth (m)	Max (°C)	Min (°C)
0.5	13.41	-4.96
1	3.93	-0.40
1.5	0.28	-0.13
2	-0.23	-0.31
4	-0.52	-0.65
7	-0.73	-0.85
12	-0.76	-0.82
16	-0.79	-0.82

84-1-T4

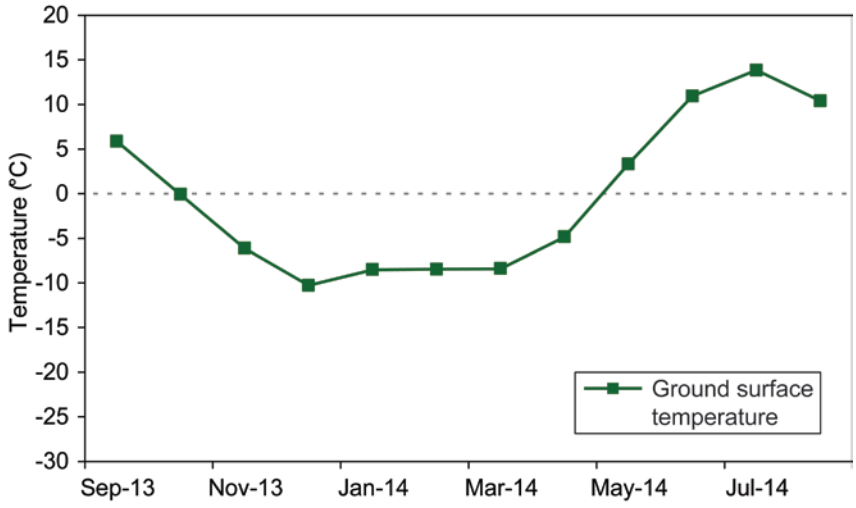
Sahtu Settlement Region

Latitude: 65.29 N Longitude: 126.89 W
Elevation: 61 m a.s.l.
Landform: Ground moraine
Vegetation cover: Moss, lichen, ericaceous shrubs with black spruce and tamarack
Thaw Depth: 2.27 m
Site visit: September 18, 2014



Depth (m)	Max (°C)	Min (°C)
1	6.06	-10.35
2	0.10	-3.84
3	-0.27	-2.57
4	-0.46	-1.73
5	-0.64	-1.36
6	-0.77	-1.27

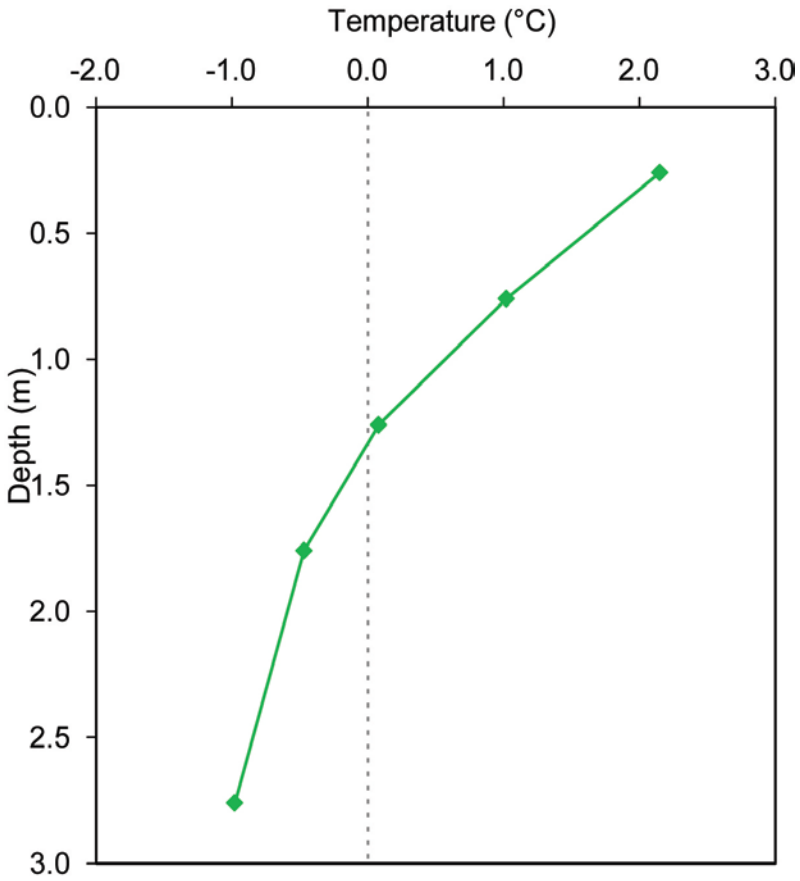
Month / Year	Temperature (°C)	
	Air	Surface
Sept / 2013	n/a	5.88
Oct / 2013	n/a	-0.11
Nov / 2013	n/a	-6.13
Dec / 2013	n/a	-10.28
Jan / 2014	n/a	-8.53
Feb / 2014	n/a	-8.46
Mar / 2014	n/a	-8.41
Apr / 2014	n/a	-4.85
May / 2014	n/a	3.33
Jun / 2014	n/a	10.93
Jul / 2014	n/a	13.84
Aug / 2014	n/a	10.40



KP5 BH6 Offrow –Cable 85-11-T2

Sahtu Settlement Region

Latitude: 65.29 N Longitude: 126.79 W
Elevation: 90 m a.s.l.
Landform: lacustrine plain
Vegetation cover: forested, moss, lichen, black spruce
Thaw Depth: 1.33 m
Site visit: September 18, 2014

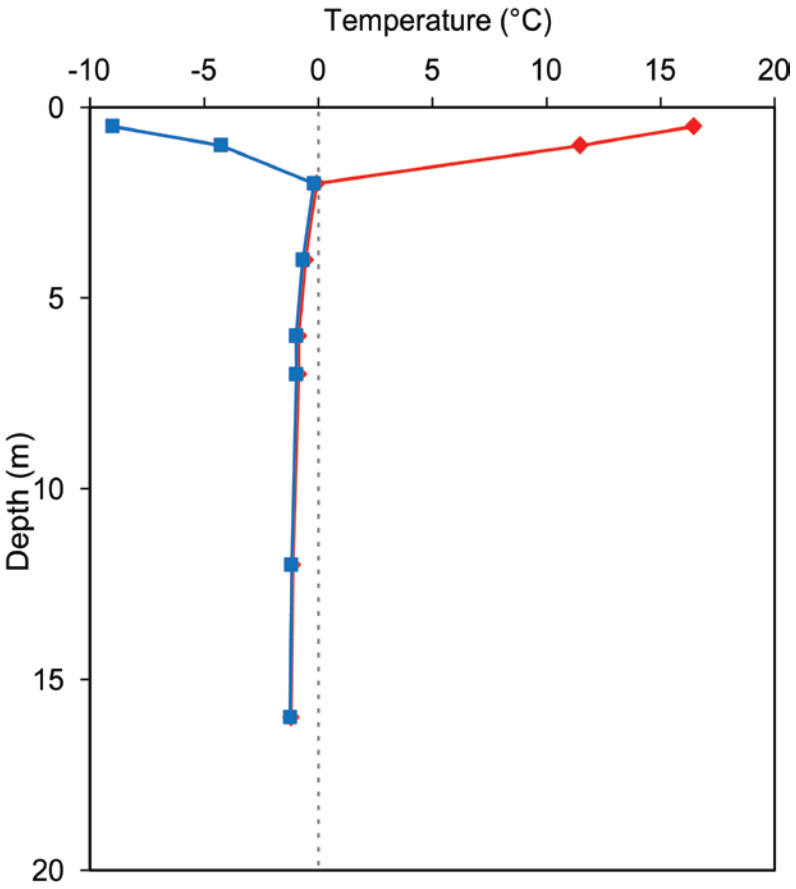


Depth (m)	Temp (°C)
0.26	2.15
0.76	1.02
1.26	0.08
1.76	-0.47
2.76	-0.98

Norman Wells Arena

Sahtu Settlement Region

Latitude: 65.28 N Longitude: 126.83 W
Elevation: 80 m a.s.l.
Landform: Ground moraine
Vegetation cover: Disturbed area adjacent to parking lot
Thaw Depth: 1.99 m
Site visit: September 18, 2014

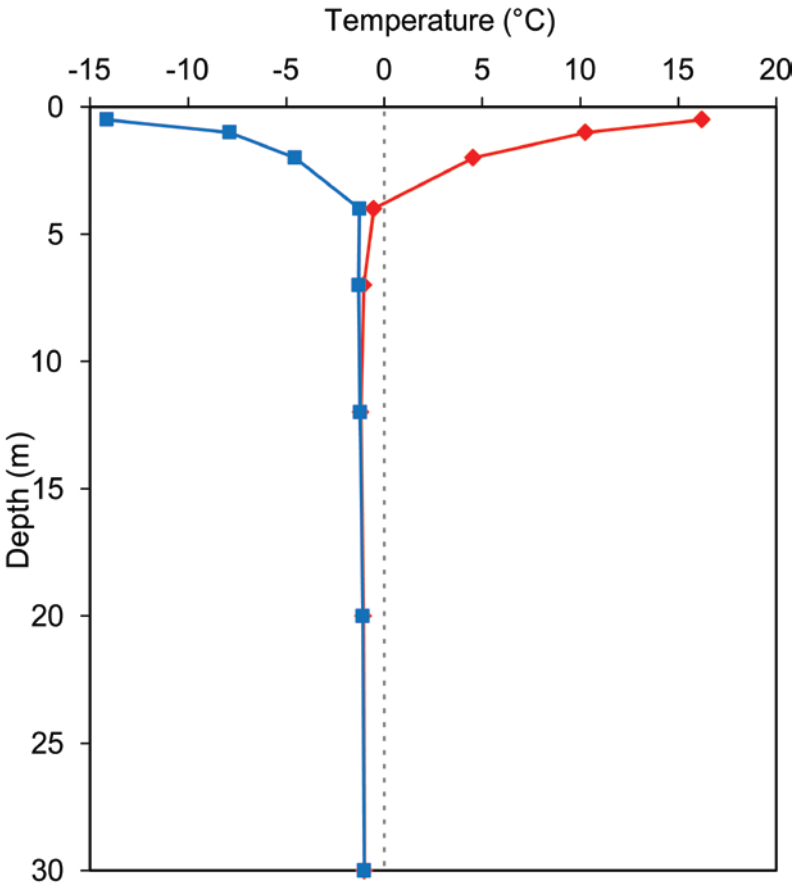


Depth (m)	Max (°C)	Min (°C)
0.5	16.45	-9.01
1	11.48	-4.26
2	-0.08	-0.19
4	-0.56	-0.67
6	-0.86	-0.97
7	-0.86	-0.96
12	-1.12	-1.17
16	-1.19	-1.23

Norman Wells Water treatment plant

Sahtu Settlement Region

Latitude: 65.28 N Longitude: 126.84 W
Elevation: 80 m a.s.l.
Landform: Ground moraine
Vegetation cover: Disturbed area adjacent to parking lot
Thaw Depth: 3.79 m
Site visit: September 18, 2014

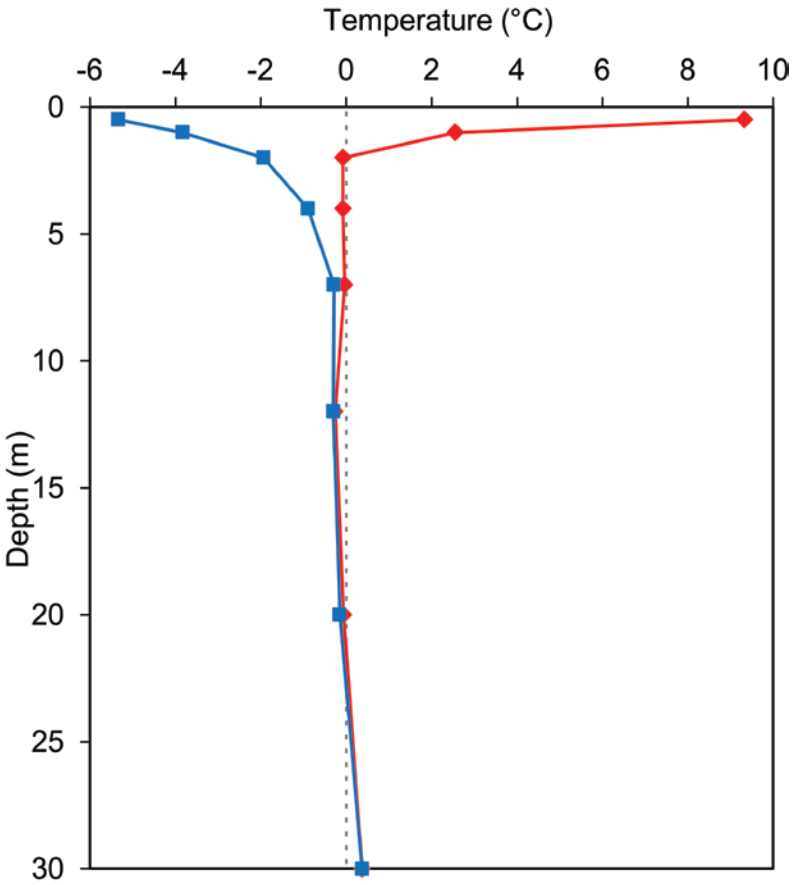


Depth (m)	Max (°C)	Min (°C)
0.5	16.21	-14.15
1	10.27	-7.88
2	4.54	-4.55
4	-0.54	-1.27
7	-1.05	-1.31
12	-1.19	-1.23
20	-1.07	-1.10
30	-1.01	-1.02

Van Everdingen 30m

Sahtu Settlement Region

Latitude: 65.27 N Longitude: 126.75 W
Elevation: n/a
Landform: Lacustrine plain
Vegetation cover: Open forest, moss, shrub, spruce/tamarack
Thaw Depth: 1.97 m
Site visit: September 18, 2014



Depth (m)	Max (°C)	Min (°C)
0.5	9.32	-5.33
1.0	2.55	-3.83
2.0	-0.08	-1.94
4.0	-0.08	-0.90
7.0	-0.04	-0.29
12.0	-0.26	-0.30
20.0	-0.06	-0.15
30.0	0.38	0.38

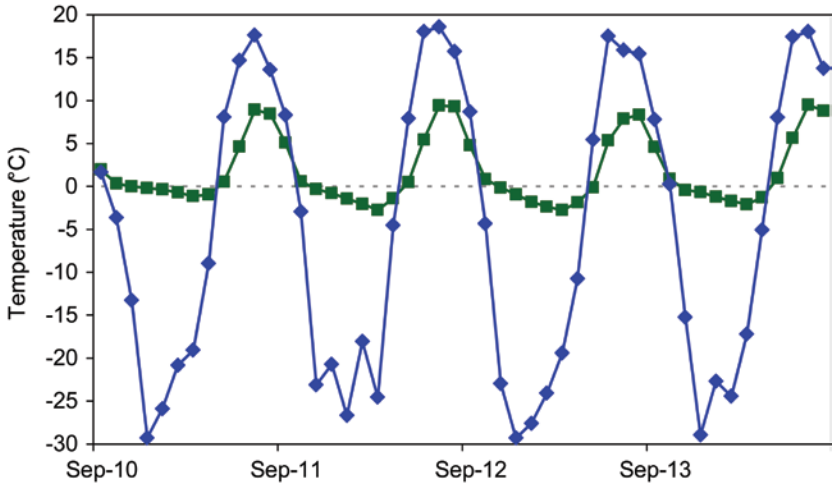
93AG10 — Norman Wells

Sahtu Settlement Region

Latitude: 65.20 N Longitude: 126.47 W
Elevation: 94 m a.s.l.
Landform: Till plain
Vegetation cover: Moss, lichen, herbaceous, alder and willow shrub, open black spruce
Thaw Depth: NA
Site visit: September 18, 2014 (Not visited since 2010)

Month / Year	Temperature (°C)	
	Air	Surface
Sept / 2010	1.67	1.95
Oct / 2010	-3.63	0.34
Nov / 2010	-13.27	0.00
Dec / 2010	-29.30	-0.19
Jan / 2011	-25.90	-0.37
Feb / 2011	-20.82	-0.69
Mar / 2011	-19.07	-1.13
Apr / 2011	-8.96	-0.95
May / 2011	8.06	0.51
Jun / 2011	14.66	4.62
Jul / 2011	17.60	8.91
Aug / 2011	13.58	8.47
Sept / 2011	8.29	5.08
Oct / 2011	-2.94	0.59
Nov / 2011	-23.13	-0.30
Dec / 2011	-20.72	-0.79
Jan / 2012	-26.69	-1.44
Feb / 2012	-18.08	-2.05
Mar / 2012	-24.56	-2.74
Apr / 2012	-4.55	-1.39
May / 2012	7.91	0.51
Jun / 2012	18.05	5.46
Jul / 2012	18.57	9.44
Aug / 2012	15.72	9.29

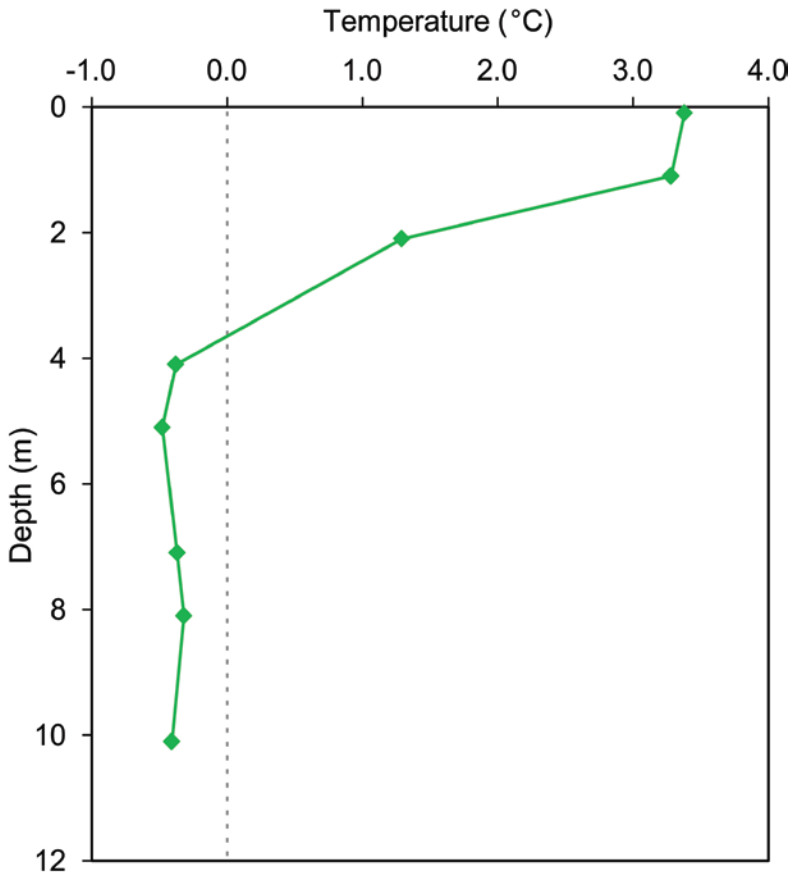
Month / Year	Temperature (°C)	
	Air	Surface
Sept / 2012	8.69	4.78
Oct / 2012	-4.33	0.85
Nov / 2012	-22.97	-0.15
Dec / 2012	-29.32	-0.93
Jan / 2013	-27.60	-1.81
Feb / 2013	-24.09	-2.35
Mar / 2013	-19.40	-2.76
Apr / 2013	-10.76	-1.87
May / 2013	5.45	-0.13
Jun / 2013	17.49	5.35
Jul / 2013	15.86	7.86
Aug / 2013	15.45	8.36
Sept / 2013	7.81	4.59
Oct / 2013	0.25	0.87
Nov / 2013	-15.23	-0.42
Dec / 2013	-28.97	-0.65
Jan / 2014	-22.69	-1.22
Feb / 2014	-24.45	-1.70
Mar / 2014	-17.22	-2.09
Apr / 2014	-5.08	-1.29
May / 2014	8.02	0.94
Jun / 2014	17.43	5.65
Jul / 2014	18.03	9.49
Aug / 2014	13.74	8.81



84-2A-T4 Canyon Creek North A

Sahtu Settlement Region

Latitude: 65.23 N Longitude: 126.5 W
Elevation: 110 m a.s.l.
Landform: Ground moraine
Vegetation cover: Lichen, moss, ericaceous shrubs with black spruce and tamarack
Thaw Depth: 3.64 m
Site visit: September 20, 2014

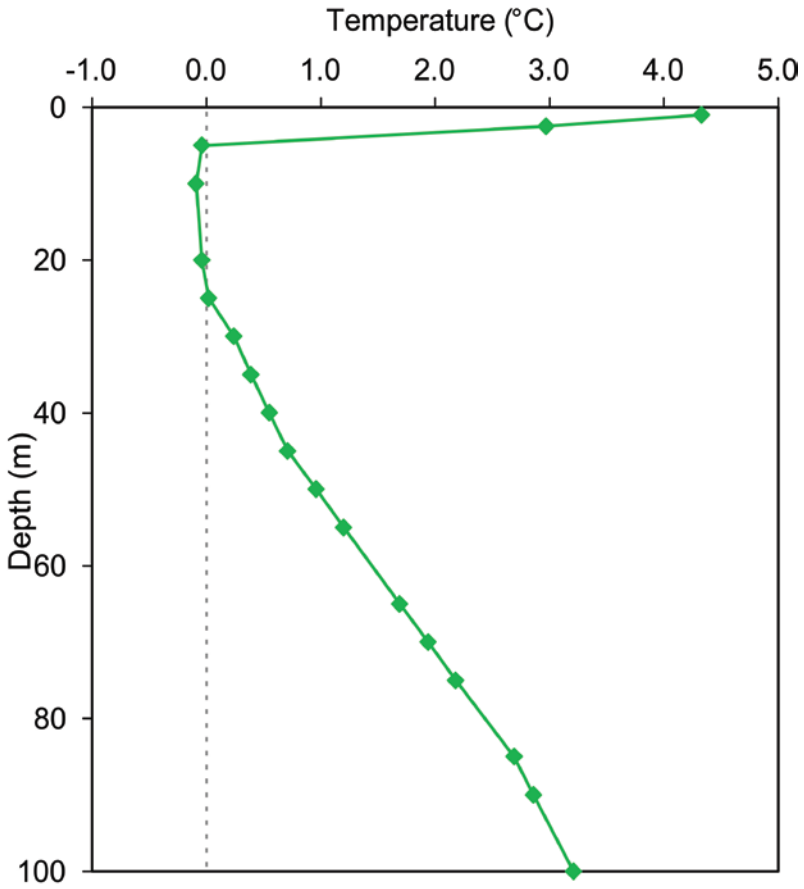


Depth (m)	Temp (°C)
0.1	3.38
1.1	3.28
2.1	1.29
4.1	-0.38
5.1	-0.48
7.1	-0.37
8.1	-0.32
10.1	-0.41

84-2A-HT Canyon Creek North A

Sahtu Settlement Region

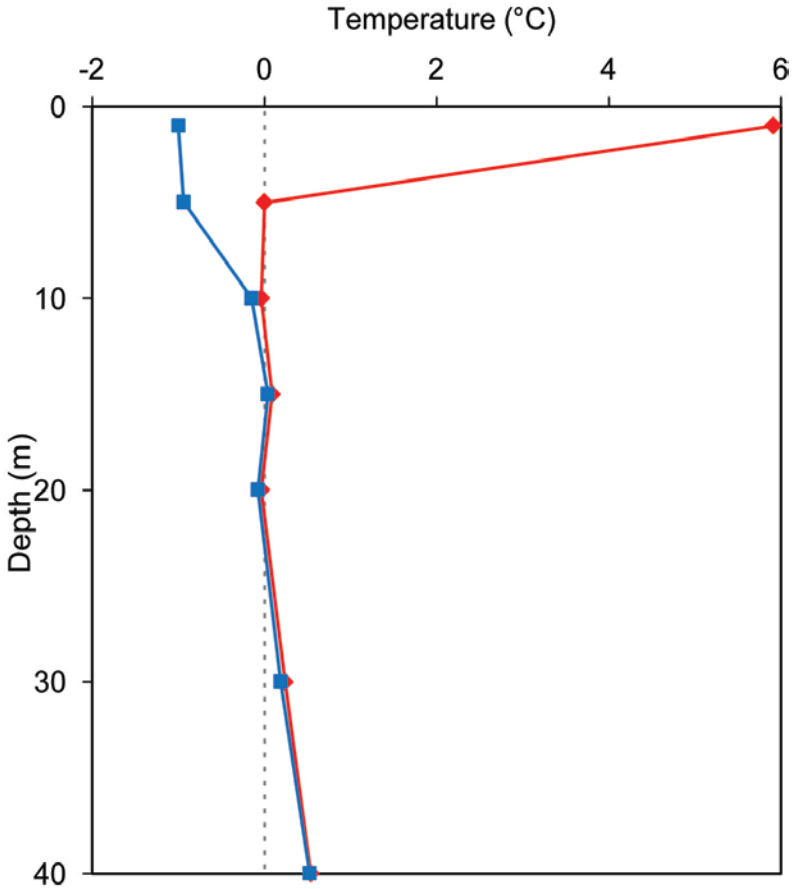
Latitude: 65.23 N Longitude: 126.5 W
Elevation: 110 m a.s.l.
Landform: Ground moraine
Vegetation cover: Lichen, moss, ericaceous shrubs with black spruce and tamarack
Thaw Depth: 4.97 m
Site visit: September 20, 2014



Depth (m)	Temp (°C)
1	4.33
2.5	2.97
5	-0.04
10	-0.09
20	-0.04
25	0.02
30	0.24
35	0.39
40	0.55
45	0.71
50	0.96
55	1.2
65	1.69
70	1.94
75	2.18
85	2.69
90	2.86
100	3.21

84-2A-HT Canyon Creek North A

Sahtu Settlement Region

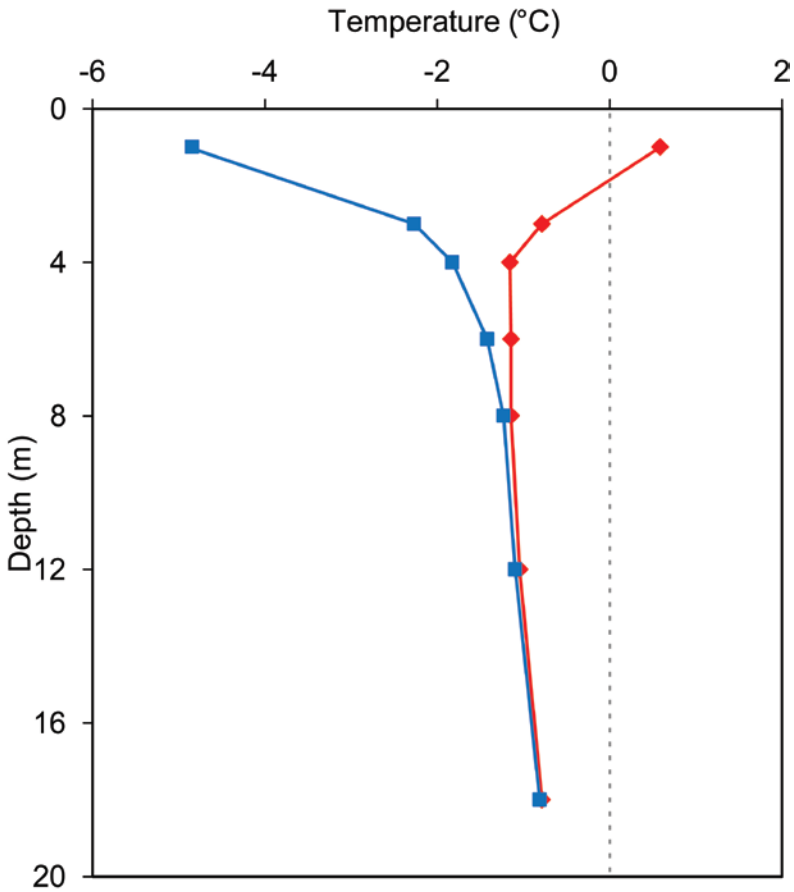


Depth (m)	Max (°C)	Min (°C)
1	5.91	-1.00
5	0.00	-0.93
10	-0.04	-0.15
15	0.09	0.04
20	-0.04	-0.08
30	0.24	0.19
40	0.54	0.53

84-2B-T4

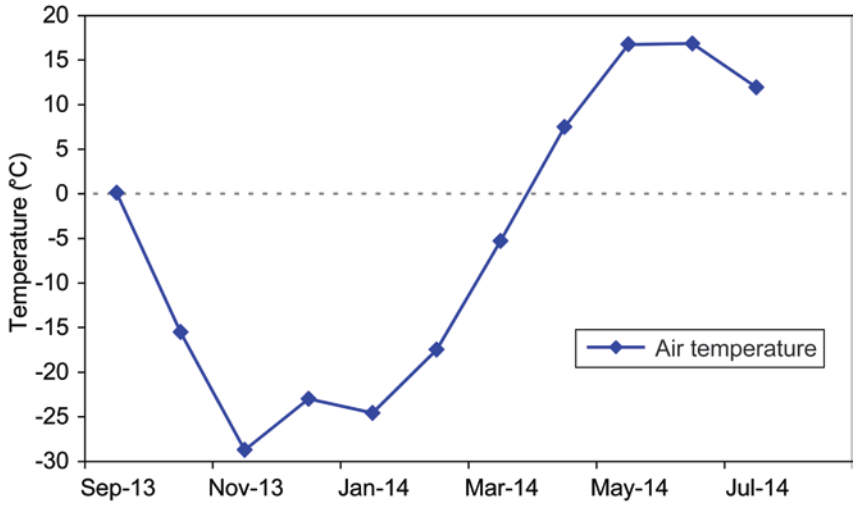
Sahtu Settlement Region

Latitude: 65.23N Longitude: 126.52 W
Elevation: 110 m a.s.l.
Landform: Ground moraine
Vegetation cover: Moss with white spruce
Thaw Depth: 1.85 m
Site visit: September 20, 2014



Depth (m)	Max (°C)	Min (°C)
1	0.59	-4.84
3	-0.79	-2.27
4	-1.16	-1.83
6	-1.14	-1.42
8	-1.14	-1.23
12	-1.05	-1.10
18	-0.79	-0.81

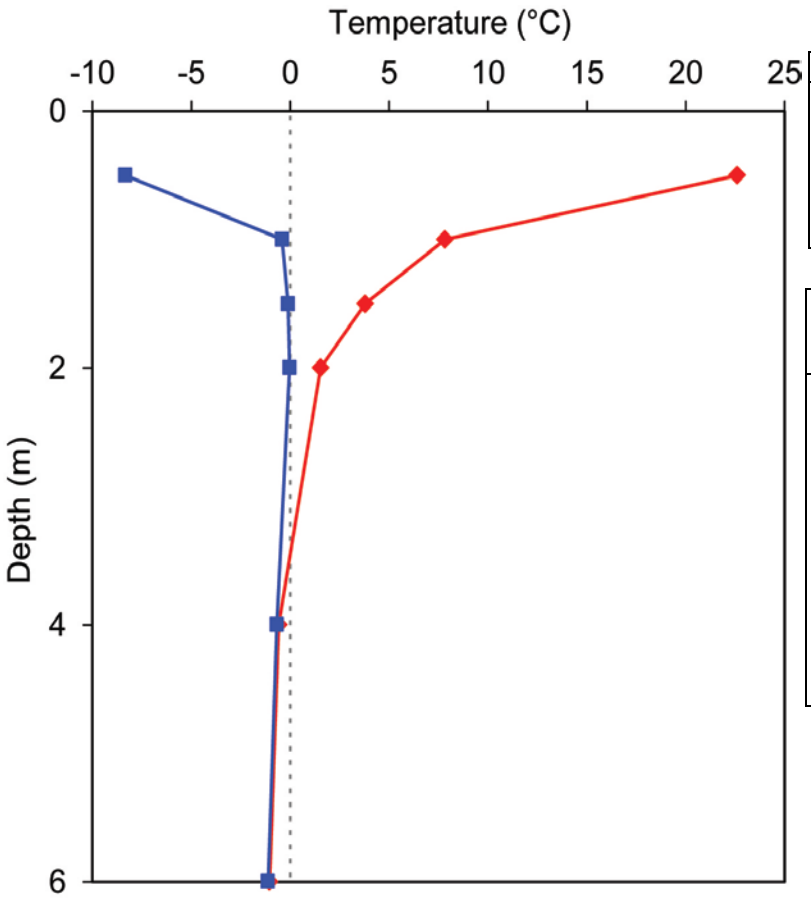
Month / Year	Temperature (°C)	
	Air	Surface
Sept / 2013	5.73	n/a
Oct / 2013	0.10	n/a
Nov / 2013	-15.52	n/a
Dec / 2013	-28.73	n/a
Jan / 2014	-22.99	n/a
Feb / 2014	-24.59	n/a
Mar / 2014	-17.49	n/a
Apr / 2014	-5.30	n/a
May / 2014	7.47	n/a
Jun / 2014	16.76	n/a
Jul / 2014	16.85	n/a
Aug / 2014	11.95	n/a



Vermillion Creek — VC-01

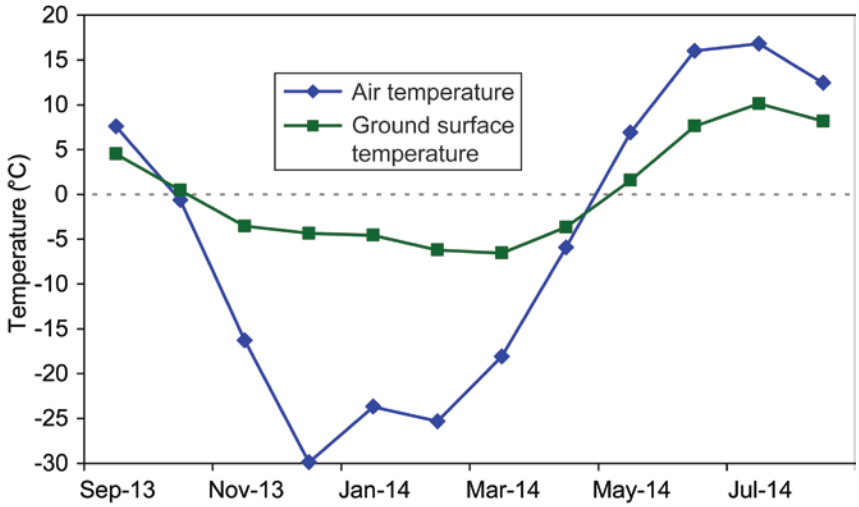
Sahtu Settlement Region

Latitude: 65.10 N Longitude: 126.14 W
Elevation: 92 m a.s.l.
Landform: Moraine plain (site at approach to water crossing)
Vegetation cover: NW side of creek, on top of ridge in black spruce forest
Thaw Depth: 3.45 m
Site visit: September 20, 2014



Depth (m)	Max (°C)	Min (°C)
0.5	22.61	-8.34
1	7.83	-0.41
1.5	3.79	-0.11
2	1.54	-0.03
4	-0.58	-0.67
6	-1.04	-1.12

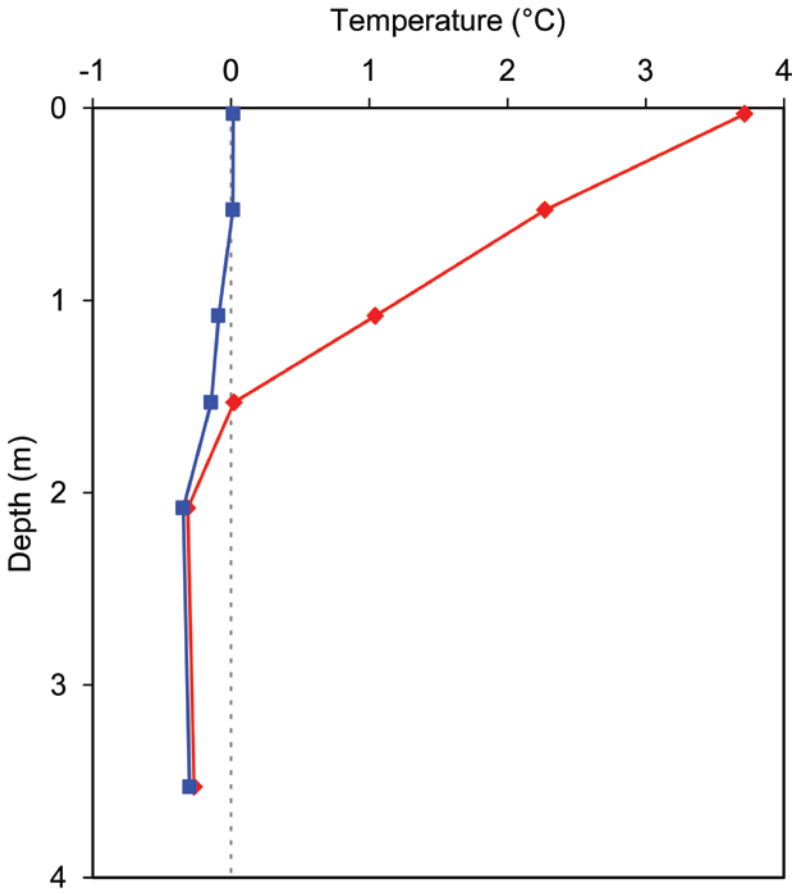
Month / Year	Temperature (°C)	
	Air	Surface
Sept / 2013	7.58	4.52
Oct / 2013	-0.65	0.46
Nov / 2013	-16.29	-3.54
Dec / 2013	-29.90	-4.34
Jan / 2014	-23.70	-4.56
Feb / 2014	-25.33	-6.19
Mar / 2014	-18.08	-6.55
Apr / 2014	-5.92	-3.66
May / 2014	6.89	1.57
Jun / 2014	16.01	7.63
Jul / 2014	16.81	10.12
Aug / 2014	12.44	8.16



Vermillion Creek — VC-02

Sahtu Settlement Region

Latitude: 66.10 N Longitude: 126.13 W
Elevation: 92 m a.s.l.
Landform: Moraine plain (site at approach to water crossing)
Vegetation cover: SE side of creek on plateau in area of burnt black spruce
Thaw Depth: 1.56 m
Site visit: September 20, 2014

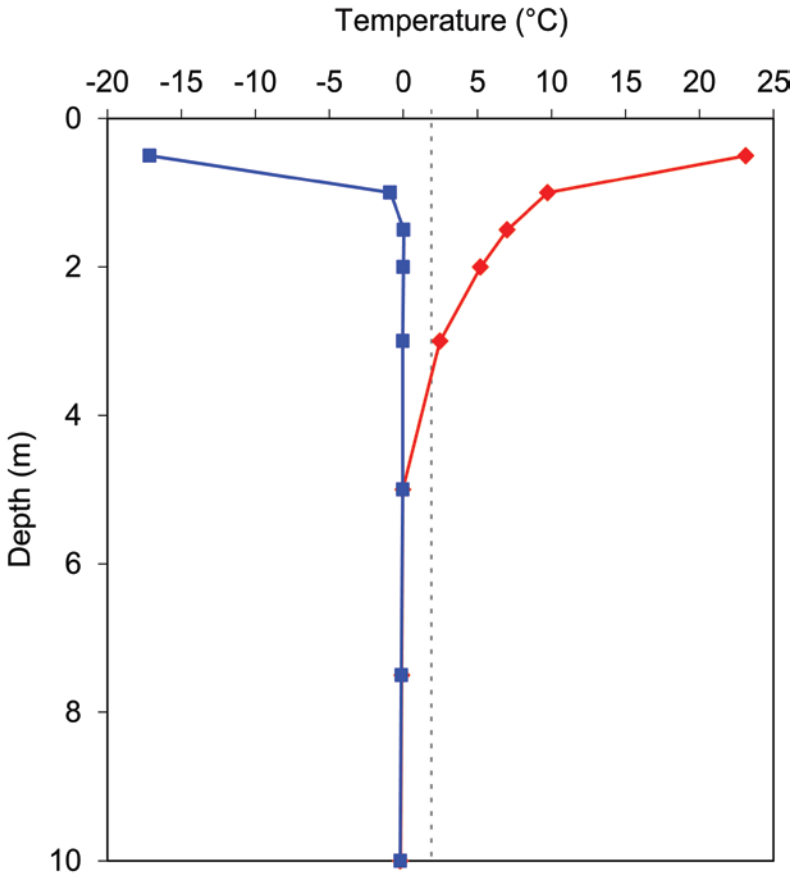


Depth (m)	Max (°C)	Min (°C)
0.03	3.72	0.02
0.53	2.27	0.01
1.08	1.04	-0.09
1.53	0.02	-0.14
2.08	-0.32	-0.35
3.53	-0.27	-0.30

Police Island — PI-01

Sahtu Settlement Region

Latitude: 64.83 N Longitude: 125.02 W
Elevation: 113 m a.s.l.
Landform: Lacustrine plain
Vegetation cover: Recovering burn (burnt black spruce forest)
Thaw Depth: 4.98 m
Site visit: September 22, 2014

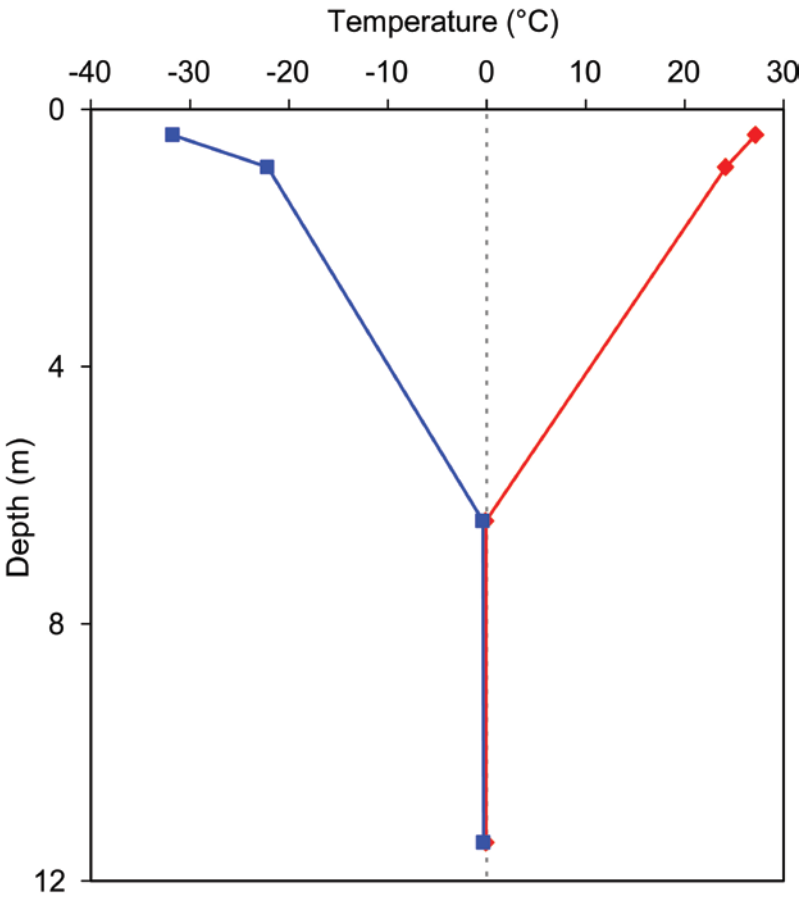


Depth (m)	Max (°C)	Min (°C)
0.5	23.13	-17.12
1	9.77	-0.89
1.5	7.01	0.03
2	5.21	0.00
3	2.47	-0.03
5	-0.03	-0.04
7.5	-0.11	-0.12
10	-0.18	-0.20

Police Island — PI-02

Sahtu Settlement Region

Latitude: 64.83 N Longitude: 125.01 W
Elevation: 113 m a.s.l.
Landform: Lacustrine plain
Vegetation cover: Unburnt, black spruce forest with moss and lichen ground cover
Thaw Depth: 6.38 m
Site visit: September 22, 2014

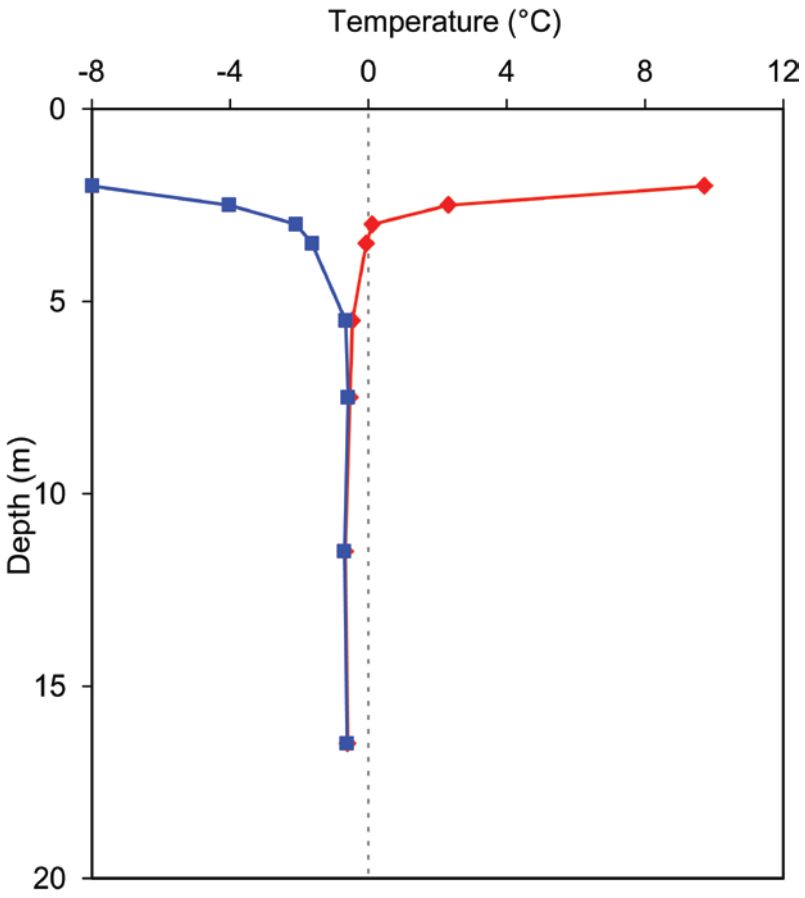


Depth (m)	Max (°C)	Min (°C)
0.4	27.16	-31.73
0.9	24.15	-22.17
6.4	-0.10	-0.40
11.4	-0.08	-0.33

Old Fort Point — OFP-01

Sahtu Settlement Region

Latitude: 64.65 N Longitude: 124.84 W
Elevation: 112 m a.s.l.
Landform: Lacustrine plain
Vegetation cover: Open mixed spruce, pine deciduous forest adjacent to open, low-lying fen
Thaw Depth: 3.31 m
Site visit: September 12, 2014

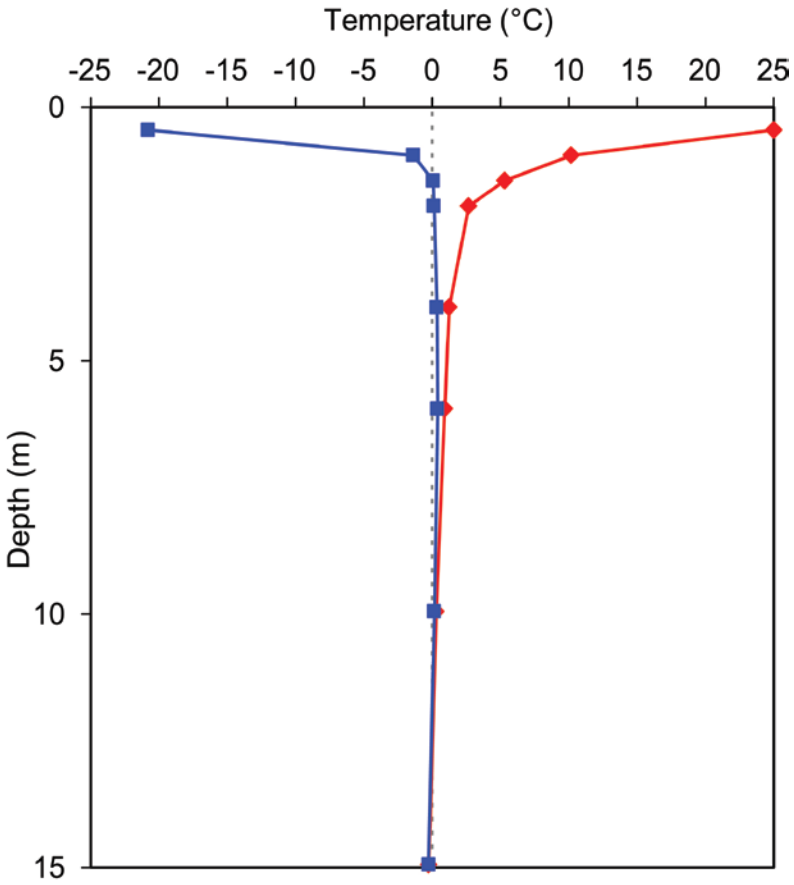


Depth (m)	Max (°C)	Min (°C)
2	9.72	-7.98
2.5	2.31	-4.03
3	0.11	-2.09
3.5	-0.07	-1.63
5.5	-0.47	-0.66
7.5	-0.53	-0.59
11.5	-0.67	-0.70
16.5	-0.60	-0.62

Little Smith Creek — LS-01

Sahtu Settlement Region

Latitude: 64.43 N Longitude: 124.74 W
Elevation: 80 m a.s.l.
Landform: Alluvial flood plain
Vegetation cover: Open mature black spruce forest
Thaw Depth: 12.62 m
Site visit: September 20, 2014

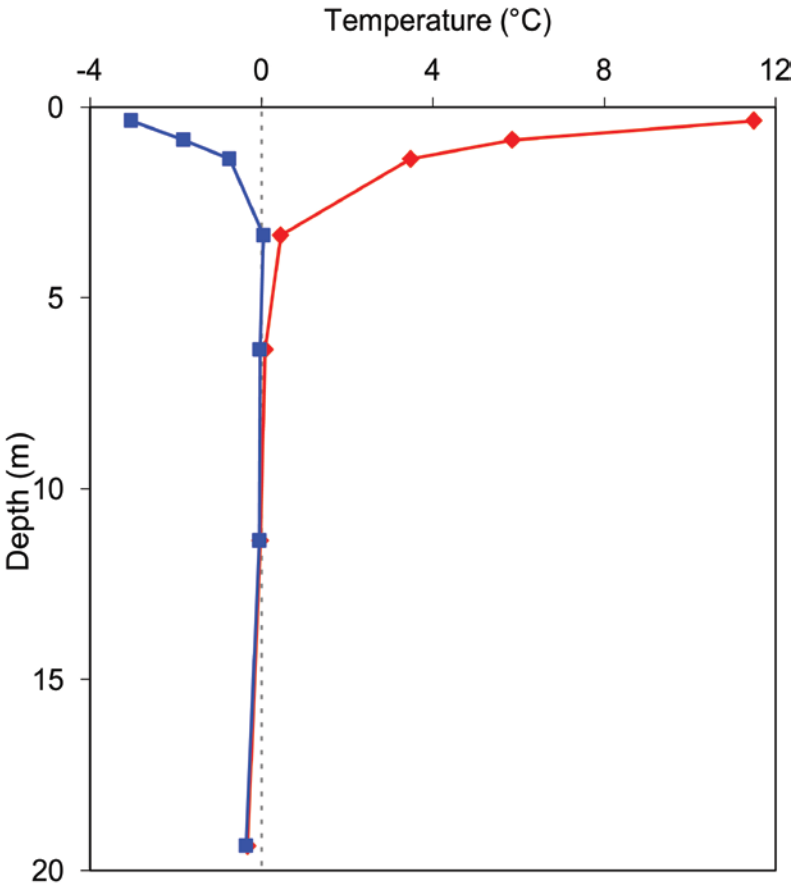


Depth (m)	Max (°C)	Min (°C)
0.45	25.00	-20.81
0.95	10.18	-1.39
1.45	5.31	0.06
1.95	2.67	0.12
3.95	1.23	0.34
5.95	0.91	0.40
9.95	0.29	0.15
14.95	-0.25	-0.27

Little Smith Creek— LS-02

Sahtu Settlement Region

Latitude: 64.43 N Longitude: 124.73 W
Elevation: 112 m a.s.l.
Landform: Glaciofluvial outwash plain
Vegetation cover: Tamarack birch poplar, and pine forest transition to spruce
Thaw Depth: 10.22 m
Site visit: September 20, 2014

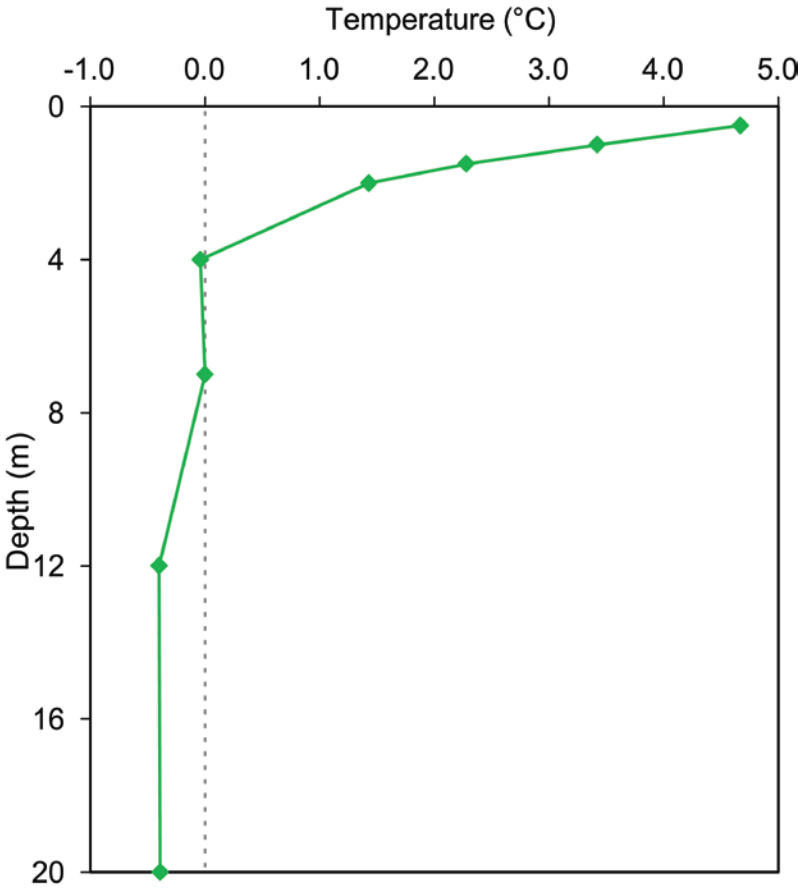


Depth (m)	Max (°C)	Min (°C)
0.36	11.49	-3.03
0.86	5.85	-1.82
1.36	3.48	-0.74
3.36	0.45	0.05
6.36	0.08	-0.03
11.36	-0.02	-0.05
19.36	-0.33	-0.36

Saline River — SR-02

Sahtu Settlement Region

Latitude: 64.29 N Longitude: 124.49 W
Elevation: 140 m a.s.l.
Landform: Glaciofluvial veneer over lacustrine
Vegetation cover: Burnt black spruce forest
Thaw Depth: 3.95 m
Site visit: September 23, 2014

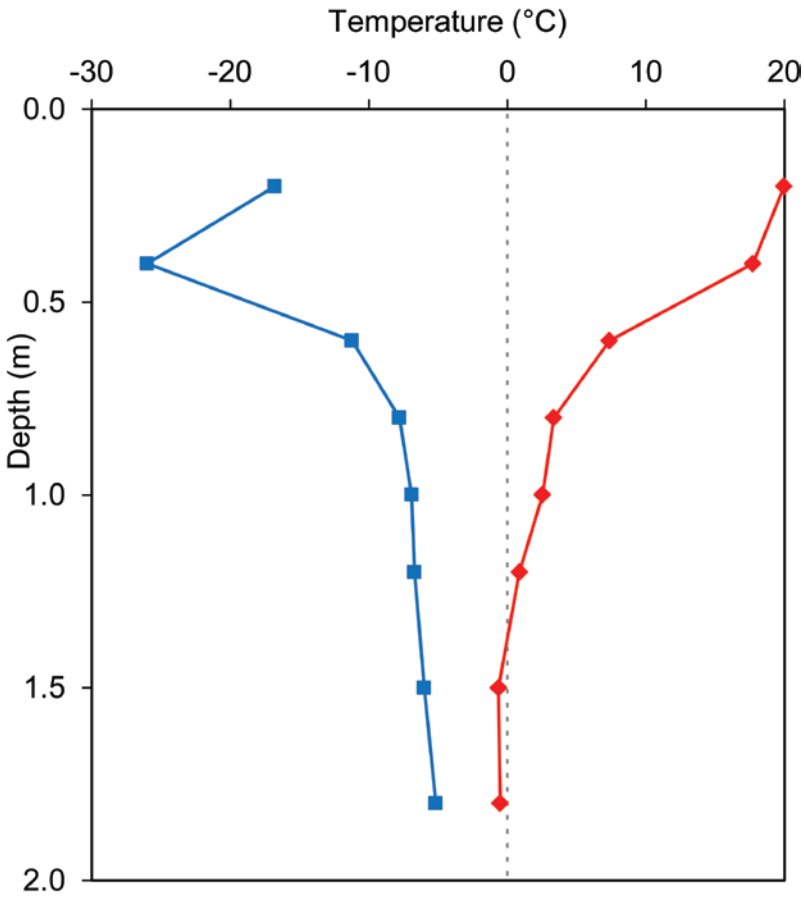


Depth (m)	Temp (°C)
0.5	4.67
1	3.42
1.5	2.28
2	1.43
4	-0.04
7	0
12	-0.4
20	-0.39

KP182 — Bottom

Sahtu Settlement Region

Latitude: 64.28 N Longitude: 124.47 W
Elevation: 133 m a.s.l.
Landform: Lacustrine plain
Vegetation cover: Forested (recovering burn, burned 1994)- Aspen, willow, birch, tamarack
Thaw Depth: 1.37 m for 2013, n/a for 2014
Site visit: September 20, 2014



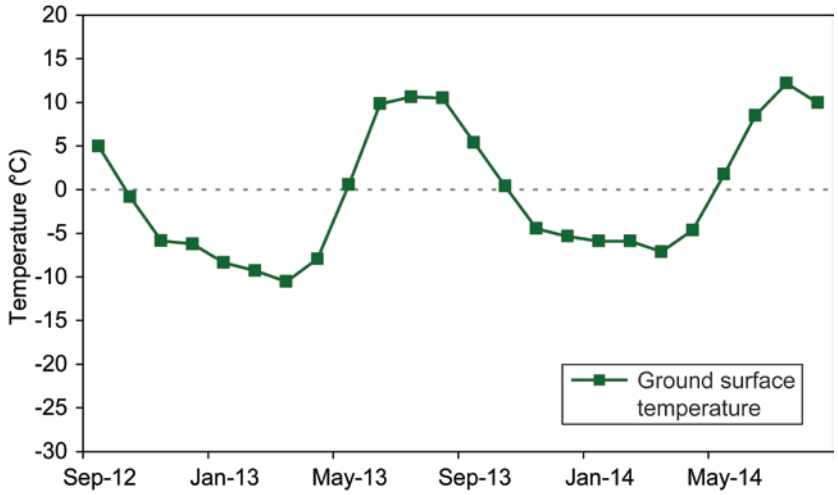
Sep 2012 – Aug 2013		
Depth (m)	Max (°C)	Min (°C)
0.2	19.97	-16.81
0.4	17.71	-26.01
0.6	7.36	-11.23
0.8	3.34	-7.79
1.0	2.52	-6.92
1.2	0.87	-6.71
1.5	-0.65	-6.02
1.8	-0.52	-5.17

KP182 — Bottom

Sahtu Settlement Region

Month / Year	Temperature (°C)	
	Air	Surface
Sept / 2012	n/a	4.97
Oct / 2012	n/a	-0.82
Nov / 2012	n/a	-5.85
Dec / 2012	n/a	-6.22
Jan / 2013	n/a	-8.37
Feb / 2013	n/a	-9.28
Mar / 2013	n/a	-10.54
Apr / 2013	n/a	-7.93
May / 2013	n/a	0.58
Jun / 2013	n/a	9.83
Jul / 2013	n/a	10.63
Aug / 2013	n/a	10.49

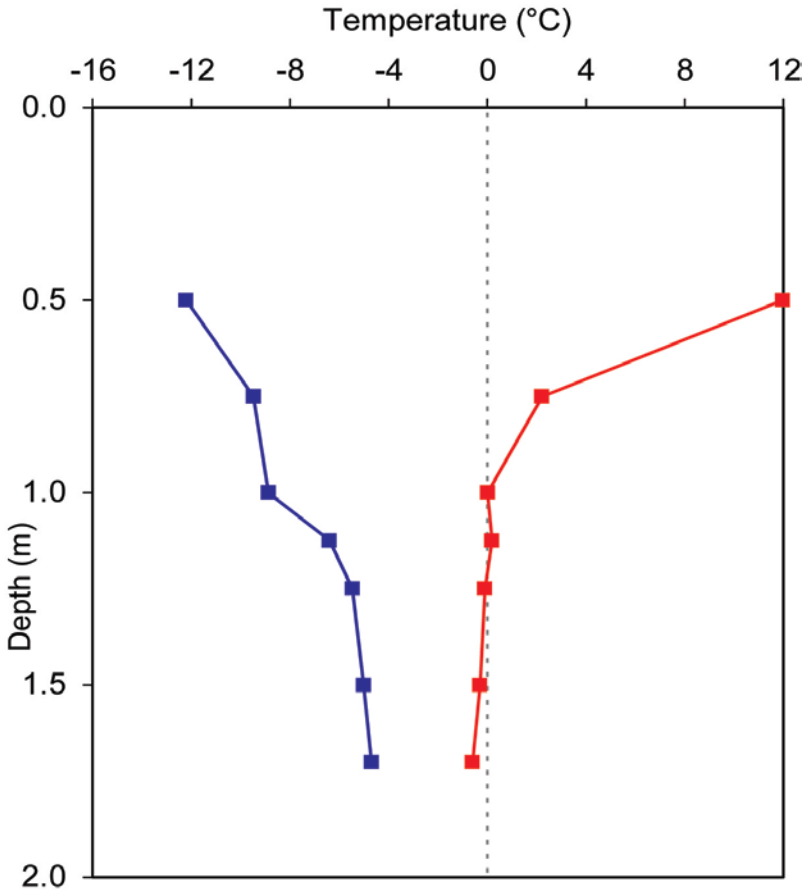
Month / Year	Temperature (°C)	
	Air	Surface
Sept / 2013	n/a	5.40
Oct / 2013	n/a	0.41
Nov / 2013	n/a	-4.46
Dec / 2013	n/a	-5.36
Jan / 2014	n/a	-5.89
Feb / 2014	n/a	-5.89
Mar / 2014	n/a	-7.11
Apr / 2014	n/a	-4.63
May / 2014	n/a	1.76
Jun / 2014	n/a	8.49
Jul / 2014	n/a	12.19
Aug / 2014	n/a	9.94



KP182 — Mid Slope HT192

Sahtu Settlement Region

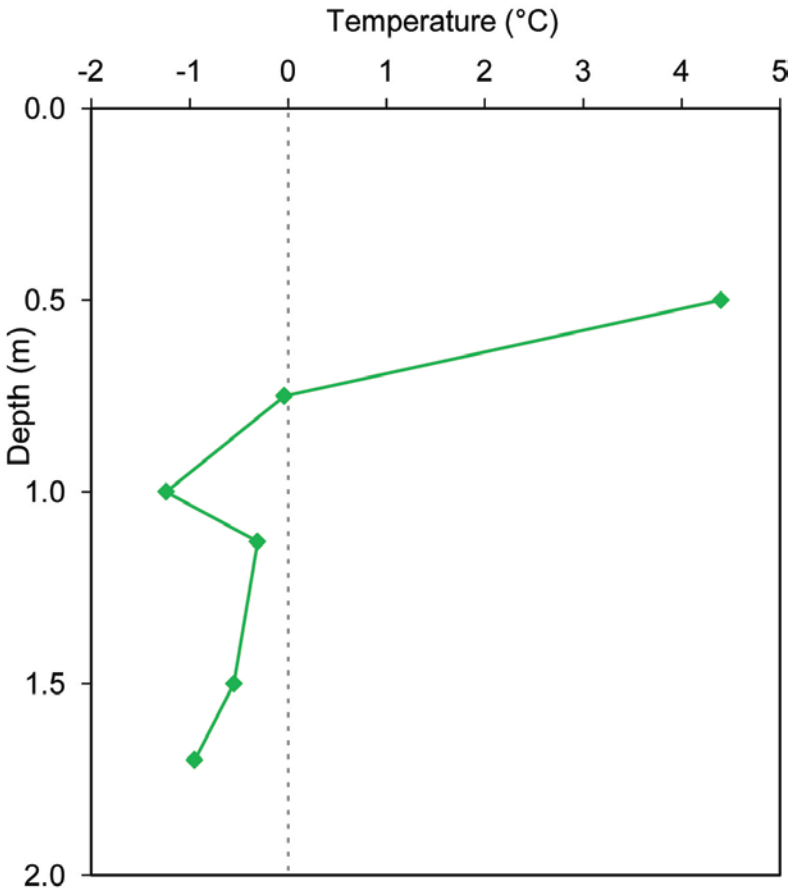
Latitude: 64.28 N Longitude: 124.47 W
Elevation: 138 m a.s.l.
Landform: Lacustrine plain
Vegetation cover: Forested (recovering burn, burned 1994) - Aspen, willow, birch, tamarack
Thaw Depth: 1.21 m for 2013, 0.75 m for 2014
Site visit: September 20, 2014 (Logger malfunctioned in March 2014)



Sep 2012 – Aug 2013		
Depth (m)	Max (°C)	Min (°C)
0.5	11.98	-12.21
0.75	2.22	-9.48
1	0.01	-8.87
1.125	0.19	-6.40
1.25	-0.10	-5.47
1.5	-0.30	-5.01
1.7	-0.60	-4.70

KP182 — Mid Slope HT192

Sahtu Settlement Region



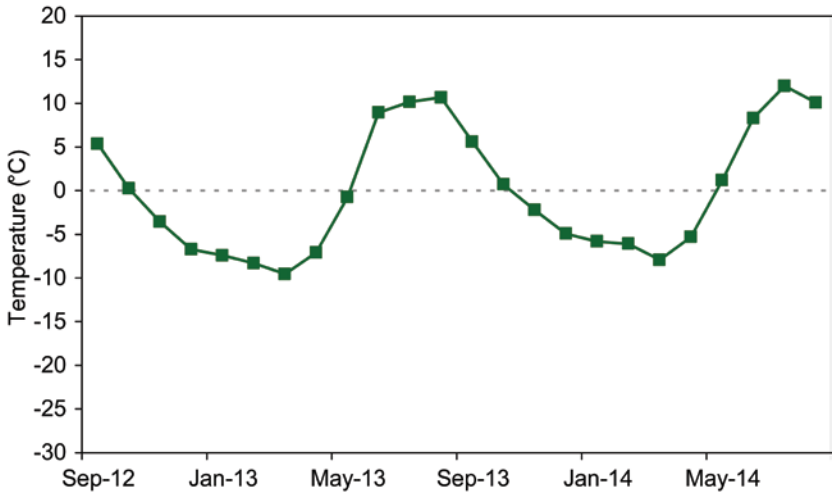
Depth (m)	Temp (°C)
0.5	4.4
0.75	-0.04
1	-1.24
1.125	-0.31
1.5	-0.55
1.7	-0.95

KP182 — Mid Slope HT192

Sahtu Settlement Region

Month / Year	Temperature (°C)	
	Air	Surface
Sept / 2012	n/a	5.36
Oct / 2012	n/a	0.27
Nov / 2012	n/a	-3.58
Dec / 2012	n/a	-6.72
Jan / 2013	n/a	-7.42
Feb / 2013	n/a	-8.31
Mar / 2013	n/a	-9.54
Apr / 2013	n/a	-7.08
May / 2013	n/a	-0.75
Jun / 2013	n/a	8.94
Jul / 2013	n/a	10.17
Aug / 2013	n/a	10.67

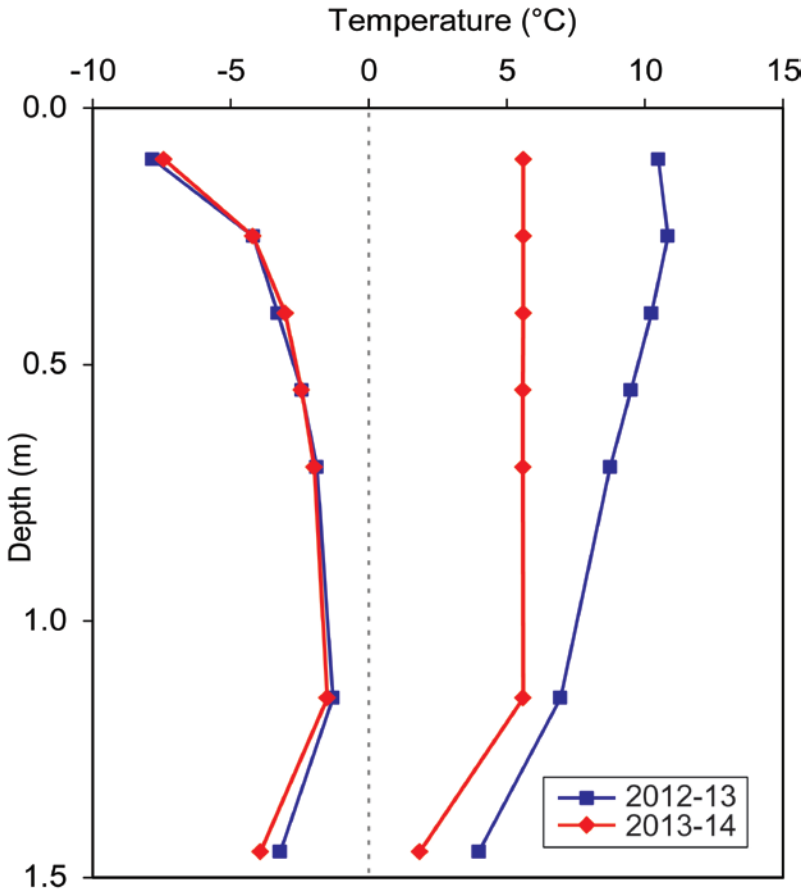
Month / Year	Temperature (°C)	
	Air	Surface
Sept / 2013	n/a	5.60
Oct / 2013	n/a	0.71
Nov / 2013	n/a	-2.23
Dec / 2013	n/a	-4.93
Jan / 2014	n/a	-5.82
Feb / 2014	n/a	-6.08
Mar / 2014	n/a	-7.93
Apr / 2014	n/a	-5.30
May / 2014	n/a	1.17
Jun / 2014	n/a	8.30
Jul / 2014	n/a	11.98
Aug / 2014	n/a	10.09



KP182 — Top of Slope

Sahtu Settlement Region

Latitude: 64.28 N Longitude: 124.47 W
Elevation: 144 m a.s.l.
Landform: Lacustrine plain
Vegetation cover: Forested (recovering burn, burned 1994)- Aspen, willow, birch, tamarack
Thaw Depth: n/a for 2013, n/a for 2014
Site visit: September 20, 2014



Sep 2012 – Aug 2013		
Depth (m)	Max (°C)	Min (°C)
0.10	10.49	-7.83
0.25	10.83	-4.19
0.40	10.24	-3.30
0.55	9.49	-2.43
0.70	8.75	-1.89
1.15	6.94	-1.31
1.45	3.99	-3.21

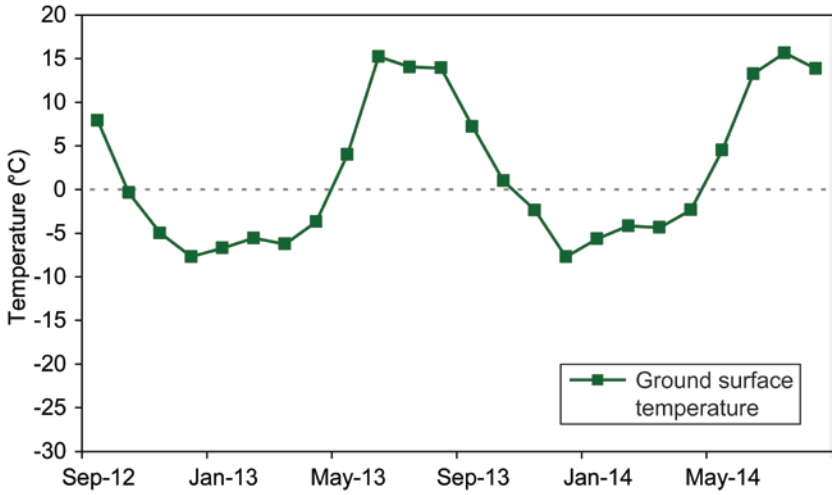
Sep 2013 – Aug 2014		
Depth (m)	Max (°C)	Min (°C)
0.10	5.60	-7.43
0.25	5.60	-4.20
0.40	5.60	-3.03
0.55	5.58	-2.44
0.70	5.58	-1.98
1.15	5.59	-1.51
1.45	1.84	-3.93

KP182 — Top of Slope

Sahtu Settlement Region

Month / Year	Temperature (°C)	
	Air	Surface
Sept / 2012	n/a	7.91
Oct / 2012	n/a	-0.37
Nov / 2012	n/a	-4.99
Dec / 2012	n/a	-7.69
Jan / 2013	n/a	-6.71
Feb / 2013	n/a	-5.56
Mar / 2013	n/a	-6.25
Apr / 2013	n/a	-3.69
May / 2013	n/a	4.02
Jun / 2013	n/a	15.23
Jul / 2013	n/a	14.04
Aug / 2013	n/a	13.94

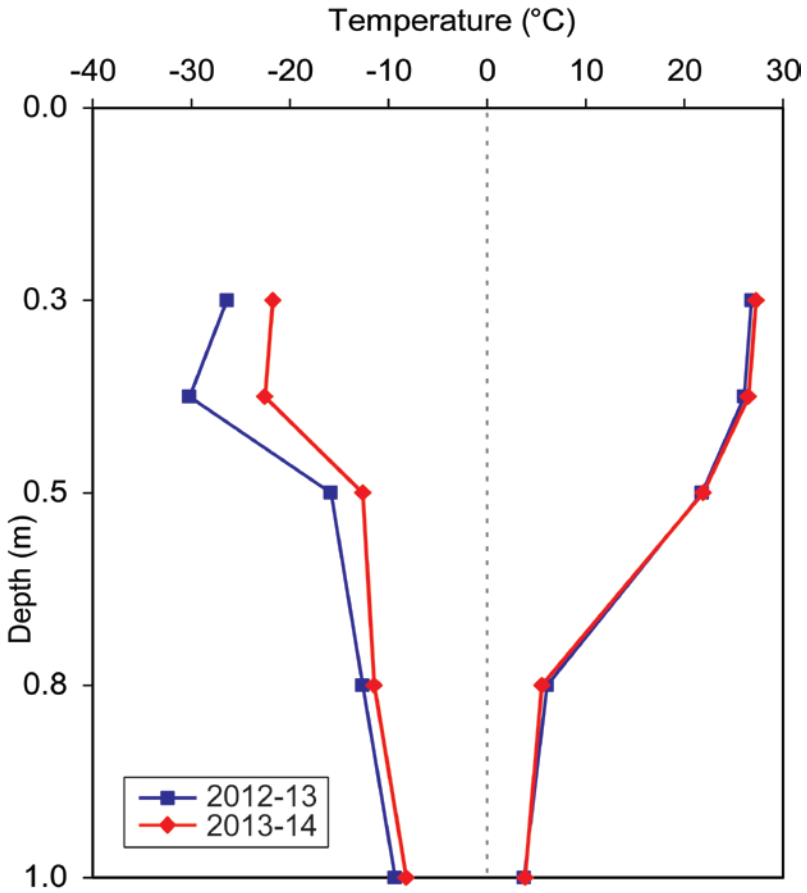
Month / Year	Temperature (°C)	
	Air	Surface
Sept / 2013	n/a	7.22
Oct / 2013	n/a	0.99
Nov / 2013	n/a	-2.36
Dec / 2013	n/a	-7.71
Jan / 2014	n/a	-5.64
Feb / 2014	n/a	-4.18
Mar / 2014	n/a	-4.35
Apr / 2014	n/a	-2.33
May / 2014	n/a	4.50
Jun / 2014	n/a	13.25
Jul / 2014	n/a	15.66
Aug / 2014	n/a	13.86



KP182 — Crest of Slope

Sahtu Settlement Region

Latitude: 64.28 N Longitude: 124.47 W
Elevation: 139 m a.s.l.
Landform: Lacustrine plain
Vegetation cover: Forested (recovering burn, burned 1994)– Aspen, willow, birch, tamarack
Thaw Depth: n/a for 2013, n/a for 2014
Site visit: September 20, 2014



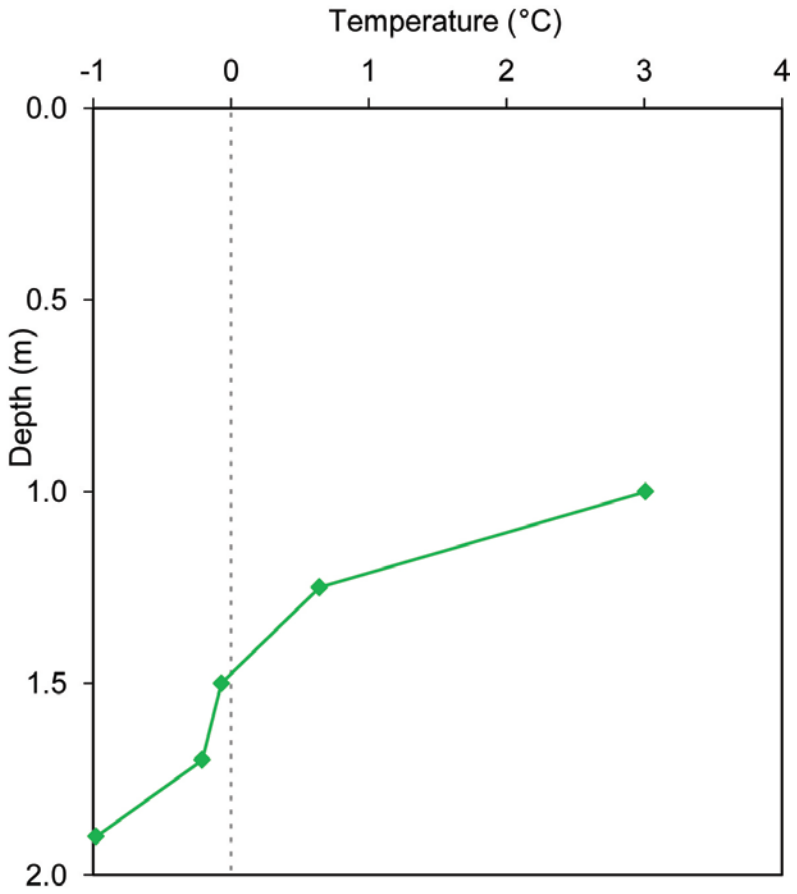
Sep 2012 – Aug 2013		
Depth (m)	Max (°C)	Min (°C)
0.250	26.82	-26.39
0.375	26.06	-30.18
0.500	21.79	-15.84
0.750	6.07	-12.62
1.000	3.74	-9.33

Sep 2013 – Aug 2014		
Depth (m)	Max (°C)	Min (°C)
0.250	27.28	-21.72
0.375	26.49	-22.54
0.500	21.90	-12.60
0.750	5.57	-11.44
1.000	3.86	-8.20

KP182 — Unburnt

Sahtu Settlement Region

Latitude: 64.28 N Longitude: 124.47 W
Elevation: 141 m a.s.l.
Landform: Lacustrine plain
Vegetation cover: Forested - white spruce, white birch with black spruce, moss and peat ground cover
Thaw Depth: 1.48 m
Site visit: September 20, 2014

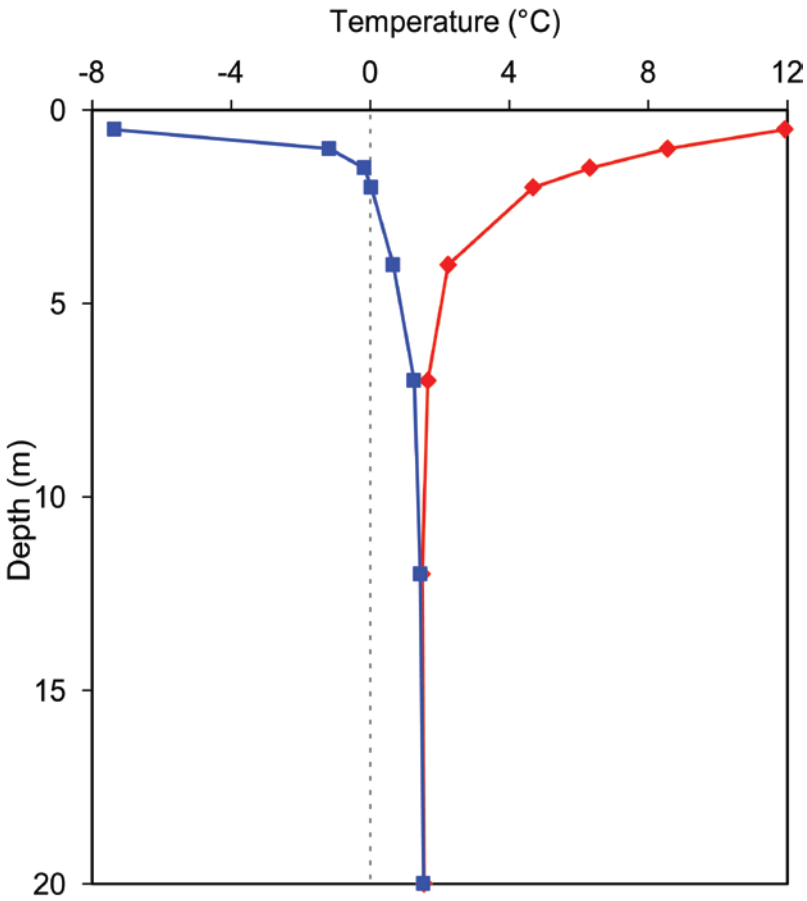


Depth (m)	Temp (°C)
1	3.01
1.25	0.64
1.5	-0.07
1.7	-0.21
1.9	-0.98

Steep Creek Top — Steep-02

Sahtu Settlement Region

Latitude: 64.18 N Longitude: 124.38 W
Elevation: 134 m a.s.l.
Landform: Alluvial and colluvial, north facing slope of stream valley (site at edge of cleared right-of-way)
Vegetation cover: Mixed, white spruce, jackpine, aspen, birch
Thaw Depth: n/a
Site visit: September 22, 2014

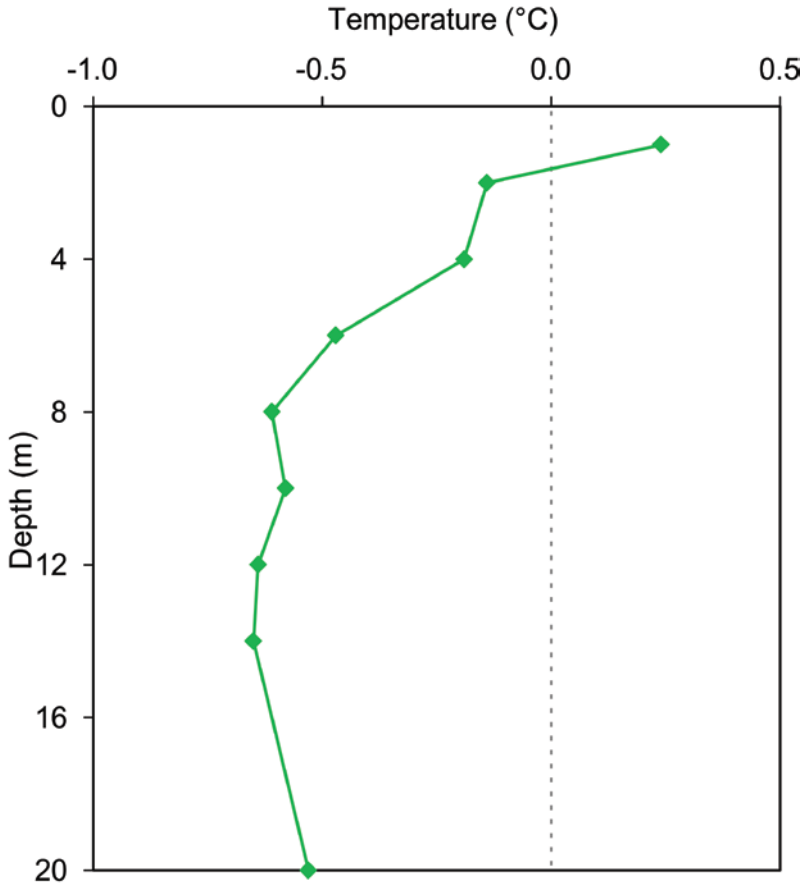


Depth (m)	Max (°C)	Min (°C)
0.5	11.92	-7.36
1	8.56	-1.18
1.5	6.32	-0.18
2	4.68	0.03
4	2.24	0.65
7	1.65	1.26
12	1.49	1.44
20	1.55	1.53

85-7A-HA108

Deh cho Settlement Region

Latitude: 63.61 N Longitude: 123.64 W
Elevation: 255 m a.s.l.
Landform: Ground moraine
Vegetation cover: Lichen, moss, ericaceous shrubs with black spruce and alder
Thaw Depth: 1.63 m
Site visit: September 23, 2014

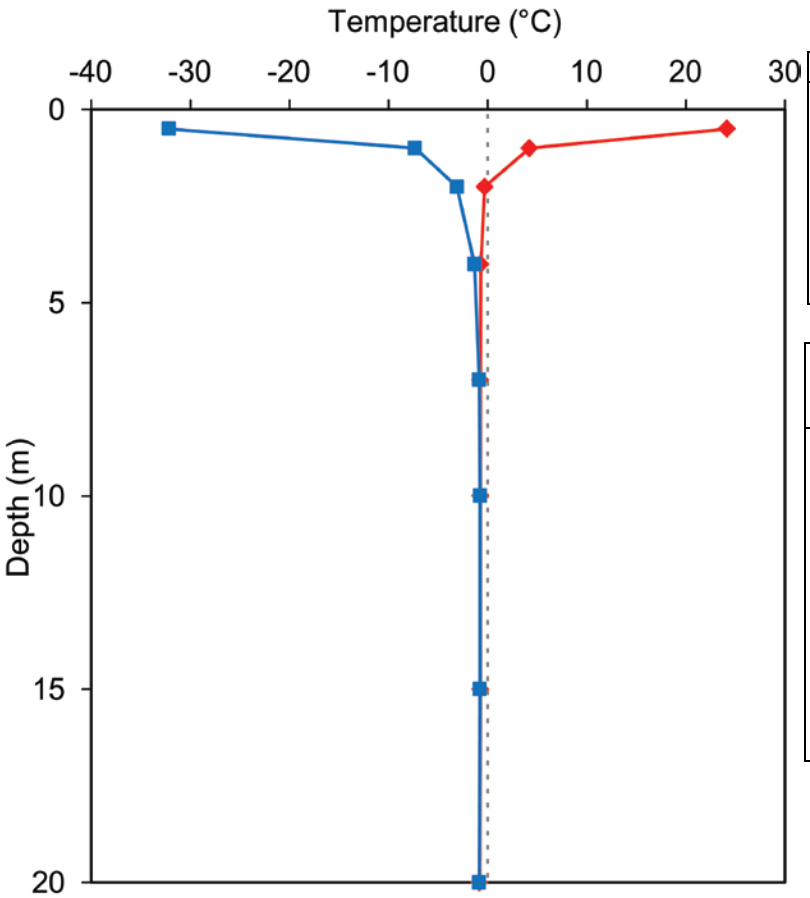


Depth (m)	Temp (°C)
1	0.24
2	-0.14
4	-0.19
6	-0.47
8	-0.61
10	-0.58
12	-0.64
14	-0.65
20	-0.53

KP313 T2

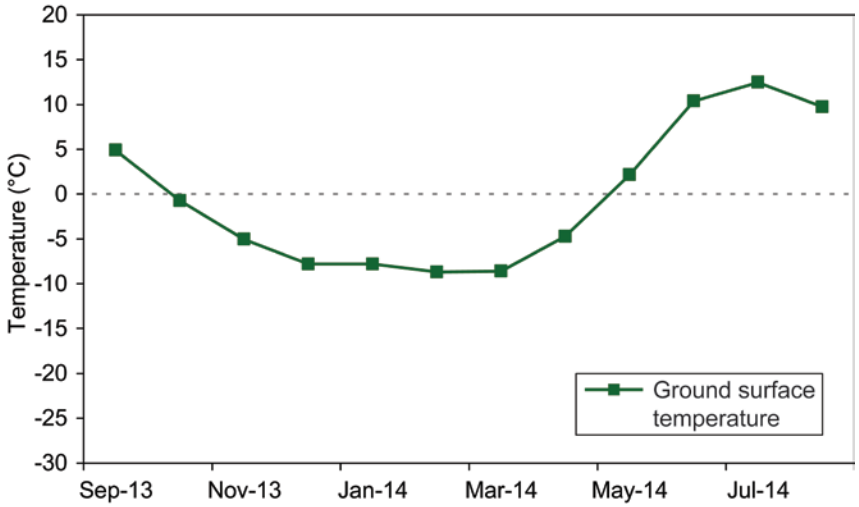
Deh cho Settlement Region

Latitude: 63.26 N Longitude: 123.43 W
Elevation: 250 m a.s.l.
Landform: Lacustrine plain, bottom of slope
Vegetation cover: Moss cover and peat, forested, mix of birch and spruce
Thaw Depth: 1.93 m
Site visit: September 22, 2014



Depth (m)	Max (°C)	Min (°C)
0.5	24.13	-32.16
1	4.22	-7.32
2	-0.30	-3.11
4	-0.71	-1.33
7	-0.75	-0.86
10	-0.75	-0.77
15	-0.75	-0.78
20	-0.82	-0.86

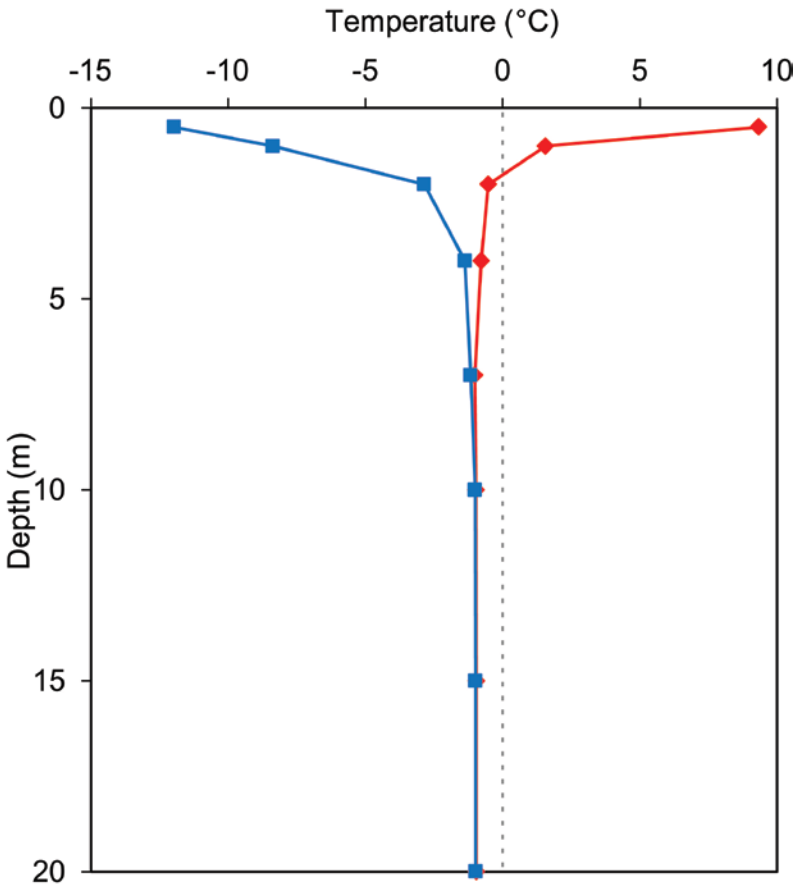
Month / Year	Temperature (°C)	
	Air	Surface
Sept / 2013	n/a	4.88
Oct / 2013	n/a	-0.74
Nov / 2013	n/a	-5.03
Dec / 2013	n/a	-7.80
Jan / 2014	n/a	-7.80
Feb / 2014	n/a	-8.69
Mar / 2014	n/a	-8.59
Apr / 2014	n/a	-4.71
May / 2014	n/a	2.14
Jun / 2014	n/a	10.37
Jul / 2014	n/a	12.47
Aug / 2014	n/a	9.74



KP313 T4

Deh cho Settlement Region

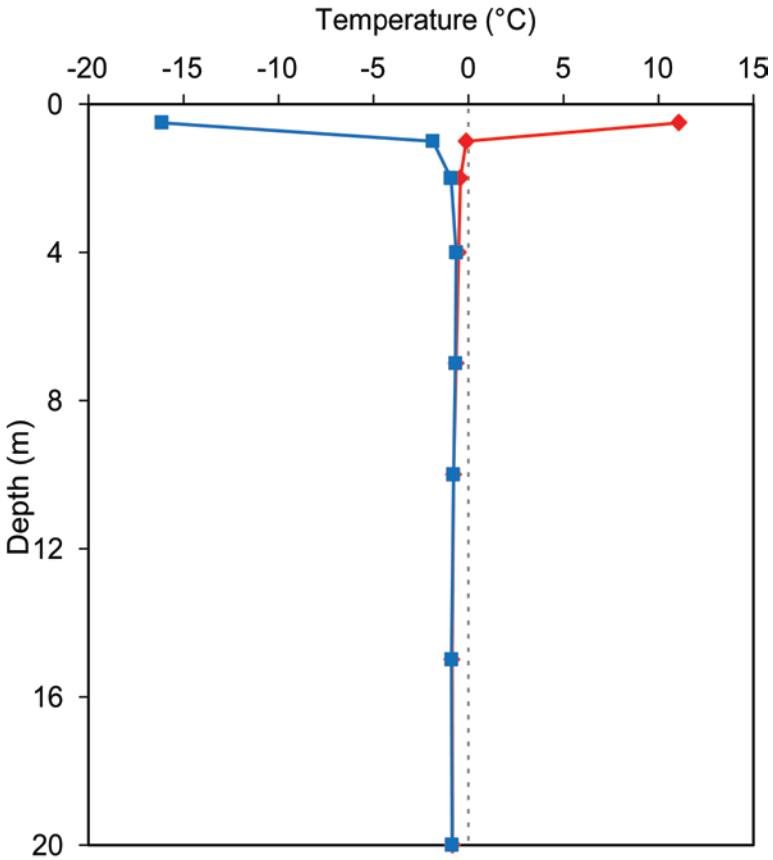
Latitude: 63.26 N Longitude: 123.43 W
Elevation: 250 m a.s.l.
Landform: Lacustrine plain, mid slope, W side of ROW
Vegetation cover: Moss cover and peat, forested, mix of birch and spruce
Thaw Depth: 1.75 m
Site visit: September 22, 2014



Depth (m)	Max (°C)	Min (°C)
0.5	9.33	-11.97
1	1.56	-8.38
2	-0.52	-2.86
4	-0.79	-1.38
7	-1.02	-1.17
10	-0.97	-1.01
15	-0.96	-1.00
20	-0.96	-0.98

KP313 T5
Deh cho Settlement Region

Latitude: 63.26 N Longitude: 123.43 W
Elevation: 250 m a.s.l.
Landform: Lacustrine plain, mid slope, E side of ROW
Vegetation cover: Moss cover and peat, forested, mix of birch and spruce
Thaw Depth: 0.99 m
Site visit: September 22, 2014

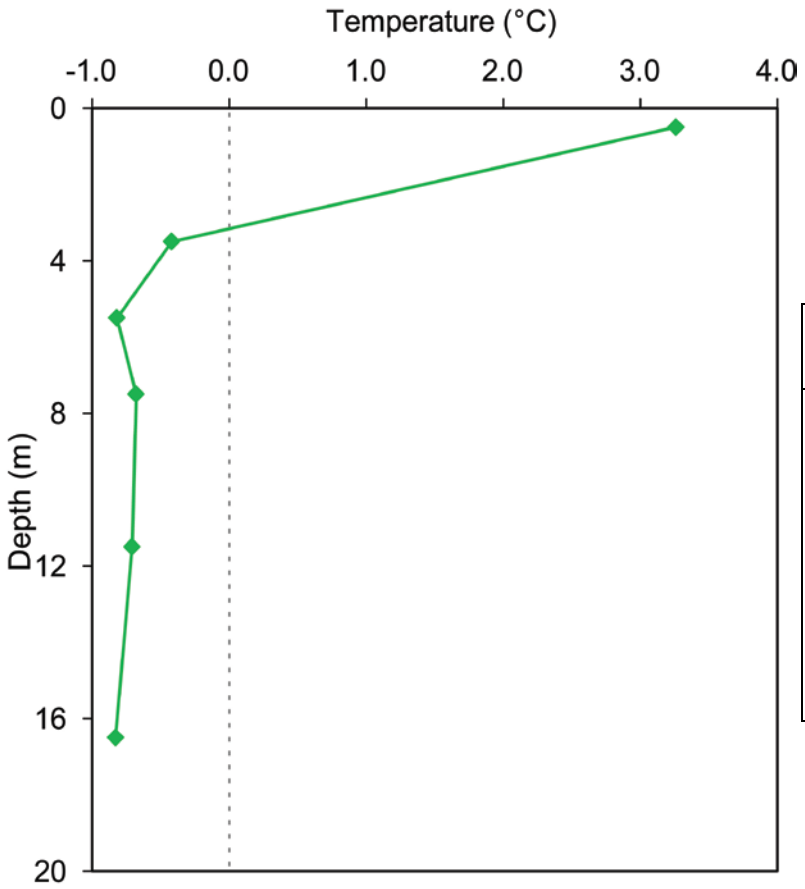


Depth (m)	Max (°C)	Min (°C)
0.5	11.09	-16.13
1.0	-0.12	-1.87
2.0	-0.42	-0.92
4.0	-0.53	-0.64
7.0	-0.65	-0.69
10.0	-0.78	-0.79
15.0	-0.86	-0.90
20.0	-0.83	-0.86

KP313 T6

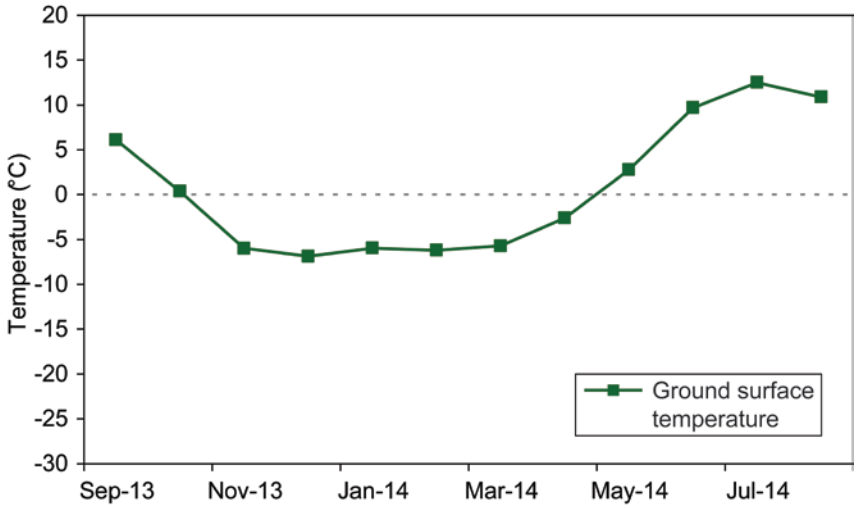
Deh cho Settlement Region

Latitude: 63.26 N Longitude: 123.43 W
Elevation: 250 m a.s.l.
Landform: Lacustrine plain, top of slope
Vegetation cover: Thin moss and organic cover, forested, mix of birch and spruce
Thaw Depth: 3.16 m
Site visit: September 22, 2014



Depth (m)	Temp (°C)
0.5	3.26
3.5	-0.42
5.5	-0.82
7.5	-0.68
11.5	-0.71
16.5	-0.83

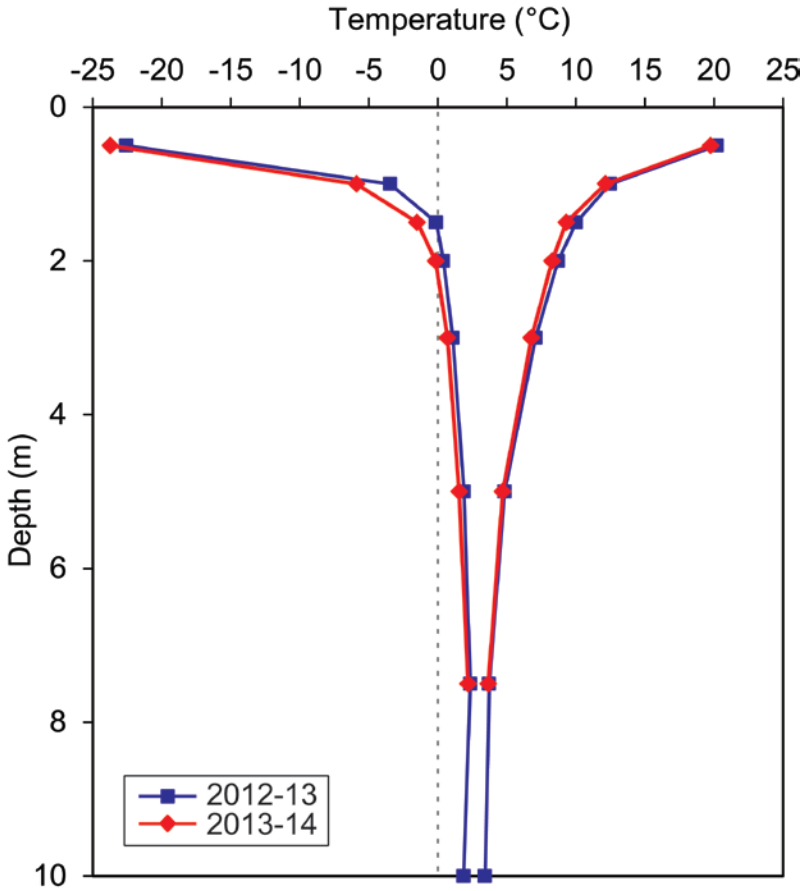
Month / Year	Temperature (°C)	
	Air	Surface
Sept / 2013	n/a	6.11
Oct / 2013	n/a	0.38
Nov / 2013	n/a	-5.99
Dec / 2013	n/a	-6.88
Jan / 2014	n/a	-5.97
Feb / 2014	n/a	-6.21
Mar / 2014	n/a	-5.71
Apr / 2014	n/a	-2.61
May / 2014	n/a	2.76
Jun / 2014	n/a	9.69
Jul / 2014	n/a	12.51
Aug / 2014	n/a	10.87



TR-01 — Trail River

Deh cho Settlement Region

Latitude: 62.09 N Longitude: 121.76 W
Elevation: 181 m a.s.l.
Landform: Lacustrine plain and eolian landforms
Vegetation cover: Black spruce and tamarack forest with sphagnum and feathermoss ground cover
Thaw Depth: n/a for 2013, n/a for 2014
Site visit: September 22, 2014



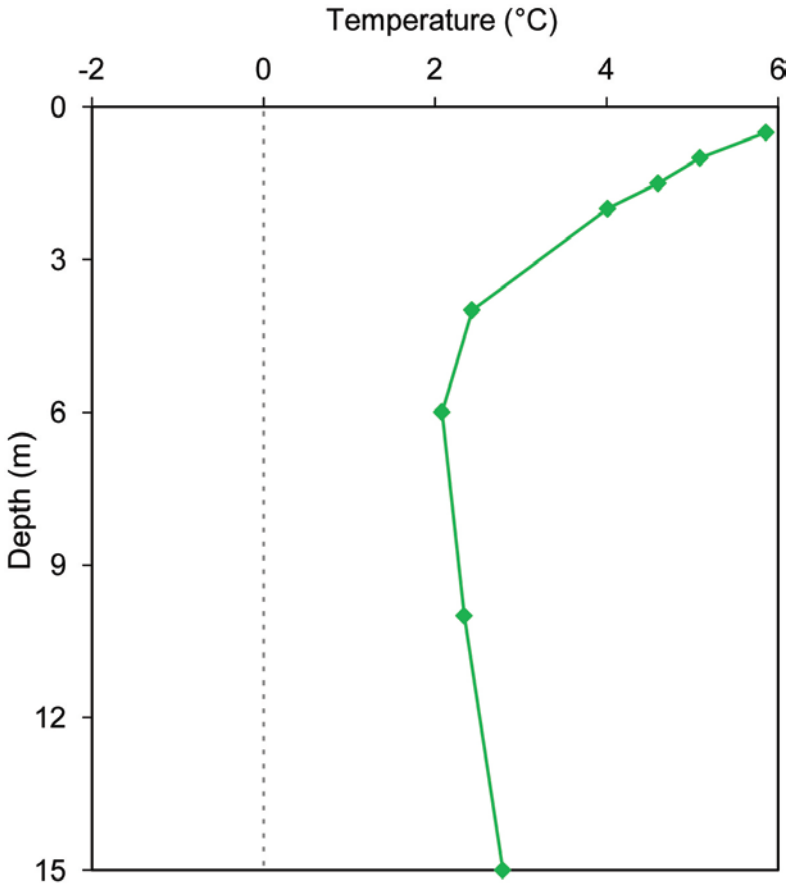
Sep 2012 – Aug 2013		
Depth (m)	Max (°C)	Min (°C)
0.5	20.20	-22.56
1	12.47	-3.46
1.5	10.01	-0.13
2	8.71	0.39
3	7.08	1.09
5	4.84	1.88
7.5	3.72	2.35
10	3.42	1.86

Sep 2013 – Aug 2014		
Depth (m)	Max (°C)	Min (°C)
0.5	19.76	-23.73
1	12.14	-5.89
1.5	9.30	-1.50
2	8.27	-0.16
3	6.77	0.70
5	4.70	1.54
7.5	3.65	2.19

HAR-01 — Harris River

Deh cho Settlement Region

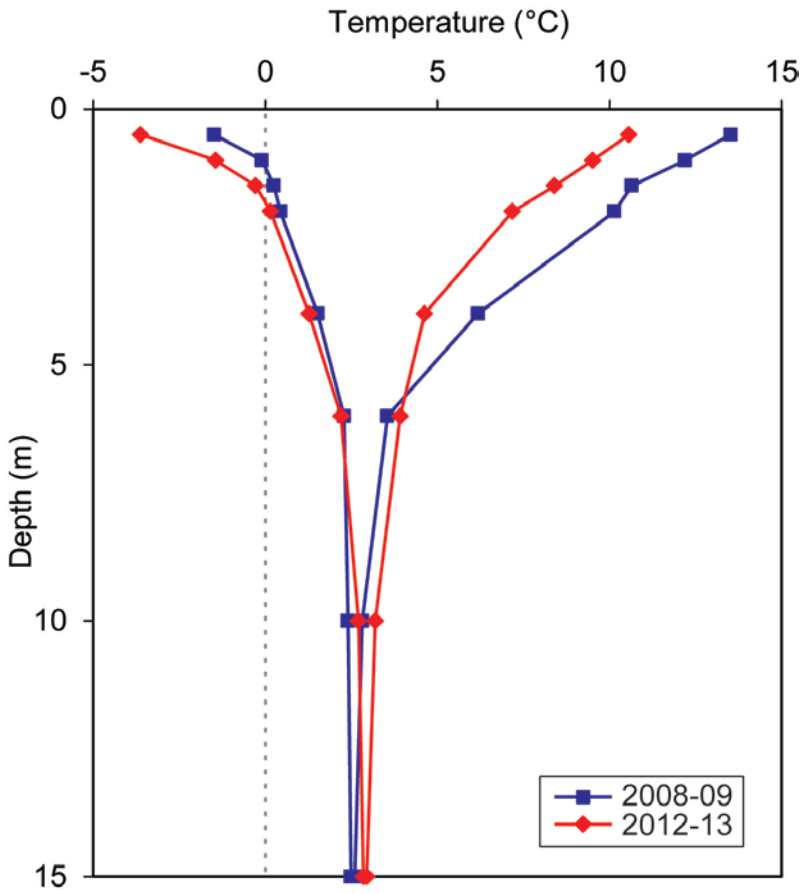
Latitude: 61.88 N Longitude: 121.29 W
Elevation: 146 m a.s.l.
Landform: Moraine
Vegetation cover: Predominantly birch
Thaw Depth: n/a for 2013, n/a for 2014
Site visit: September 22, 2014 (Not visited since 2008, logger failed January 2014)



Depth (m)	Temp (°C)
0.5	5.86
1	5.09
1.5	4.6
2	4.01
4	2.43
6	2.08
10	2.34
15	2.79

HAR-01 — Harris River

Deh cho Settlement Region



Sep 2008 – Aug 2009		
Depth (m)	Max (°C)	Min (°C)
0.5	13.52	-1.49
1	12.19	-0.10
1.5	10.64	0.25
2	10.14	0.44
4	6.18	1.52
6	3.55	2.29
10	2.82	2.40
15	2.59	2.49

Sep 2009 – Aug 2010		
Depth (m)	Max (°C)	Min (°C)
0.5	15.03	-2.95
1	13.87	-0.84
1.5	12.42	0.01
2	11.02	0.30
4	6.32	1.28
6	3.86	2.19
10	2.95	2.46
15	2.68	2.55

Sep 2010 – Aug 2011		
Depth (m)	Max (°C)	Min (°C)
0.5	14.71	-2.22
1	13.33	-0.44
1.5	12.05	0.01
2	10.61	0.03
4	6.18	1.05
6	3.81	2.39
10	3.01	2.54
15	2.77	2.64

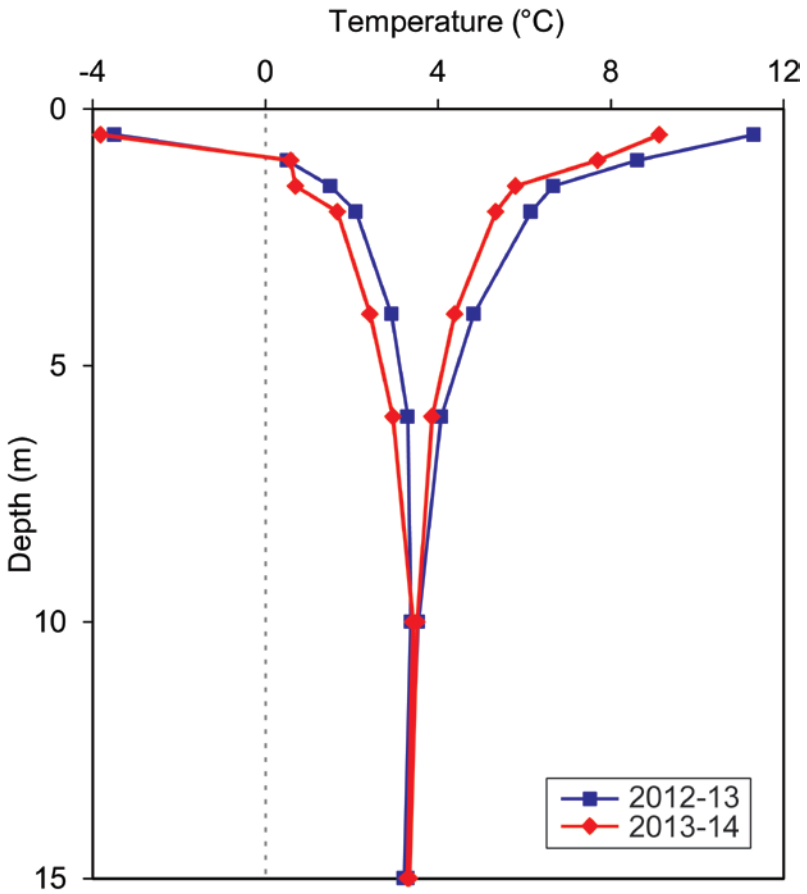
Sep 2011 – Aug 2012		
Depth (m)	Max (°C)	Min (°C)
0.5	14.30	-3.09
1	12.40	-1.06
1.5	10.58	-0.11
2	9.86	0.24
4	6.40	1.38
6	4.18	2.35
10	3.22	2.66
15	2.90	2.74

Sep 2012 – Aug 2013		
Depth (m)	Max (°C)	Min (°C)
0.5	10.56	-3.62
1	9.51	-1.44
1.5	8.40	-0.28
2	7.18	0.15
4	4.63	1.27
6	3.92	2.20
10	3.20	2.70
15	2.95	2.85

MS-01 (Fen) — Manners Sources

Deh cho Settlement Region

Latitude: 61.63 N Longitude: 121.11 W
Elevation: 182 m a.s.l.
Landform: Eolian interdune
Vegetation cover: Theomokarst shrub fen
Thaw Depth: n/a for 2013, n/a for 2014
Site visit: September 21, 2014



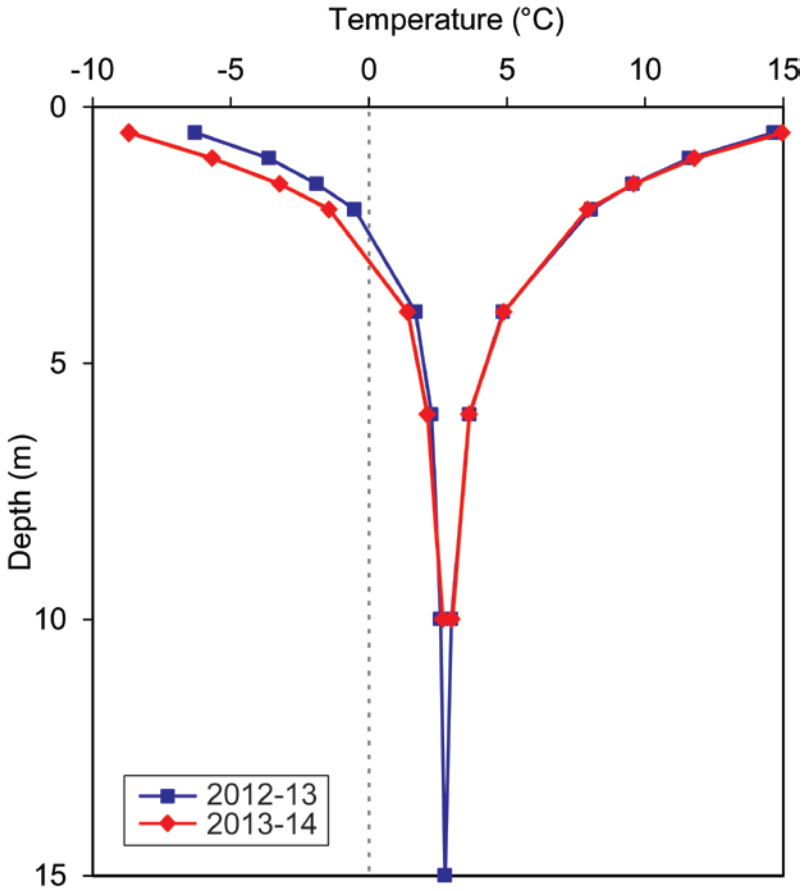
Sep 2012 – Aug 2013		
Depth (m)	Max (°C)	Min (°C)
0.5	11.31	-3.50
1	8.61	0.50
1.5	6.67	1.50
2	6.15	2.09
4	4.82	2.92
6	4.07	3.29
10	3.54	3.37
15	3.29	3.21

Sep 2013 – Aug 2014		
Depth (m)	Max (°C)	Min (°C)
0.5	9.13	-3.82
1	7.69	0.58
1.5	5.80	0.70
2	5.34	1.66
4	4.38	2.42
6	3.86	2.96
10	3.51	3.42
15	3.34	3.29

MS-02 (Crest) — Manners Sources

Deh cho Settlement Region

Latitude: 61.63 N Longitude: 121.10 W
Elevation: 182 m a.s.l.
Landform: Eolian dune crest
Vegetation cover: Pine forest
Thaw Depth: n/a for 2013, n/a for 2014
Site visit: September 21, 2014



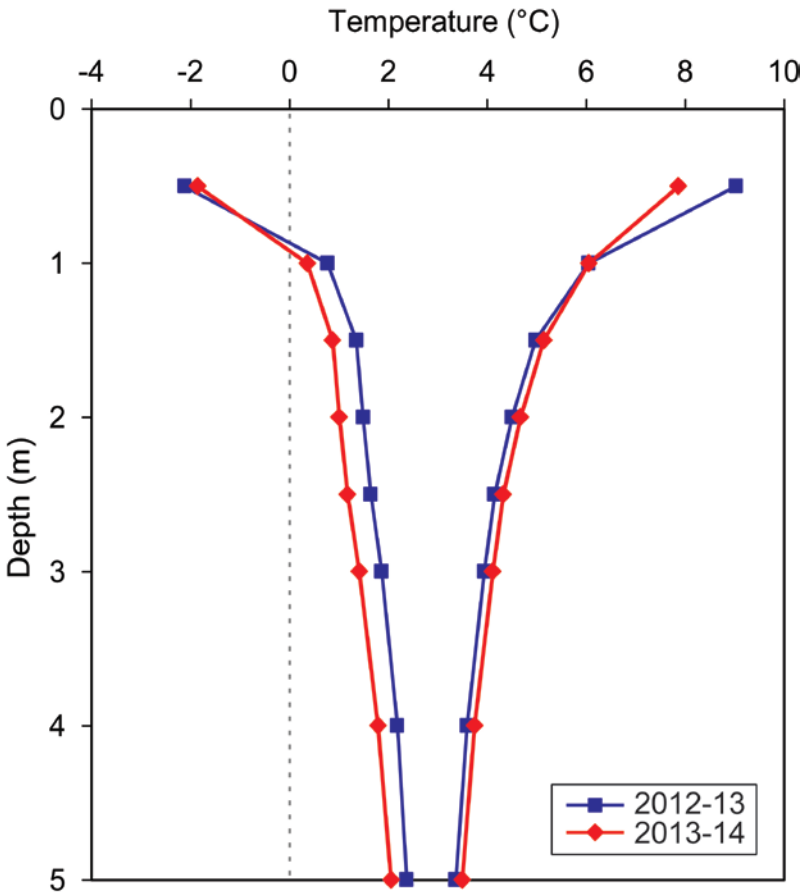
Sep 2012 – Aug 2013		
Depth (m)	Max (°C)	Min (°C)
0.5	14.65	-6.29
1	11.59	-3.62
1.5	9.54	-1.89
2	8.04	-0.52
4	4.85	1.69
6	3.64	2.27
10	2.98	2.59
15	2.75	2.75

Sep 2013 – Aug 2014		
Depth (m)	Max (°C)	Min (°C)
0.5	14.97	-8.68
1	11.78	-5.67
1.5	9.58	-3.22
2	7.92	-1.44
4	4.88	1.40
6	3.63	2.12
10	3.01	2.68

JMC-01 — Jean-Marie Creek

Deh cho Settlement Region

Latitude: 61.44 N Longitude: 120.95 W
Elevation: 198 m a.s.l.
Landform: Transition alluvial flood plain to organic (fen) over lacustrine plain
Vegetation cover: Poorly drained shrub fen
Thaw Depth: n/a for 2013, n/a for 2014
Site visit: September 21, 2014



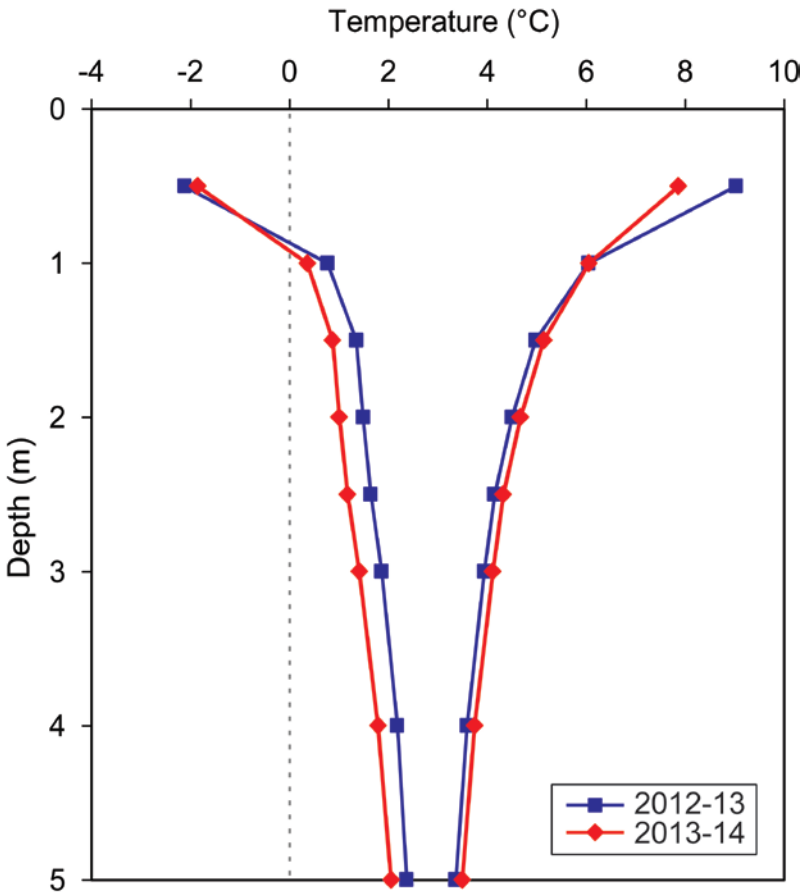
Sep 2012 – Aug 2013		
Depth (m)	Max (°C)	Min (°C)
0.5	9.02	-2.12
1	6.05	0.77
1.5	4.98	1.35
2	4.50	1.49
2.5	4.15	1.64
3	3.94	1.86
4	3.59	2.18
5	3.36	2.37

Sep 2013 – Aug 2014		
Depth (m)	Max (°C)	Min (°C)
0.5	7.86	-1.86
1	6.05	0.36
1.5	5.14	0.87
2	4.67	1.01
2.5	4.32	1.17
3	4.11	1.41
4	3.74	1.79
5	3.49	2.05

JMC-02 — Jean-Marie Creek

Deh cho Settlement Region

Latitude: 61.44 N Longitude: 120.95 W
Elevation: 198 m a.s.l.
Landform: Transition alluvial flood plain to organic (fen) over lacustrine plain
Vegetation cover: Sandy ridge with spruce, pine forest
Thaw Depth: n/a for 2013, n/a for 2014
Site visit: September 21, 2014



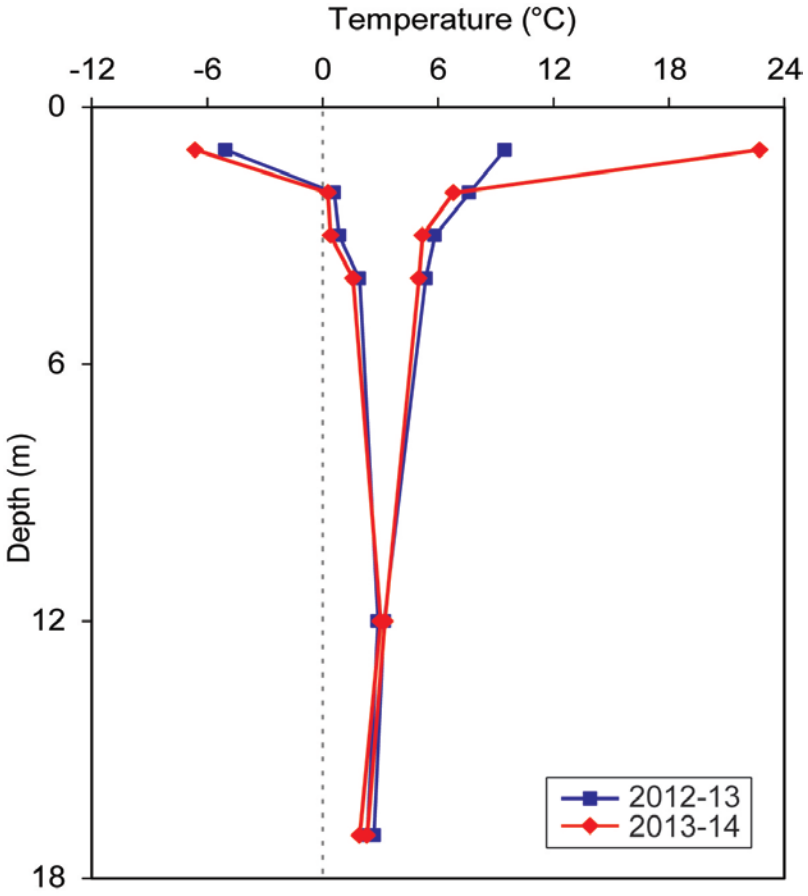
Sep 2012 – Aug 2013		
Depth (m)	Max (°C)	Min (°C)
0.5	14.04	-3.47
1	10.91	-0.48
1.5	9.21	0.46
2	7.98	0.77
2.5	6.85	1.03
3	6.08	1.38
4	5.05	1.74
5	4.29	2.01

Sep 2013 – Aug 2014		
Depth (m)	Max (°C)	Min (°C)
0.5	14.21	-5.49
1	10.55	-1.64
1.5	8.38	-0.03
2	7.46	0.43
2.5	6.43	0.71
3	5.76	1.08
4	4.82	1.47
5	4.14	1.79

85-9-T4 — Pump Station 3

Deh cho Settlement Region

Latitude: 61.24 N Longitude: 120.54 W
Elevation: 223 m a.s.l.
Landform: Lacustrine veneer over ground moraine (unfrozen granular)
Vegetation cover: Open black spruce, eriraceous shrubs, moss-lichen woodland
Thaw Depth: n/a for 2013, n/a for 2014
Site visit: August 21, 2014



Sep 2012 – Aug 2013		
Depth (m)	Max (°C)	Min (°C)
1	9.47	-5.05
2	7.62	0.60
3	5.83	0.87
4	5.35	1.89
12	3.20	2.87
17	2.67	2.31

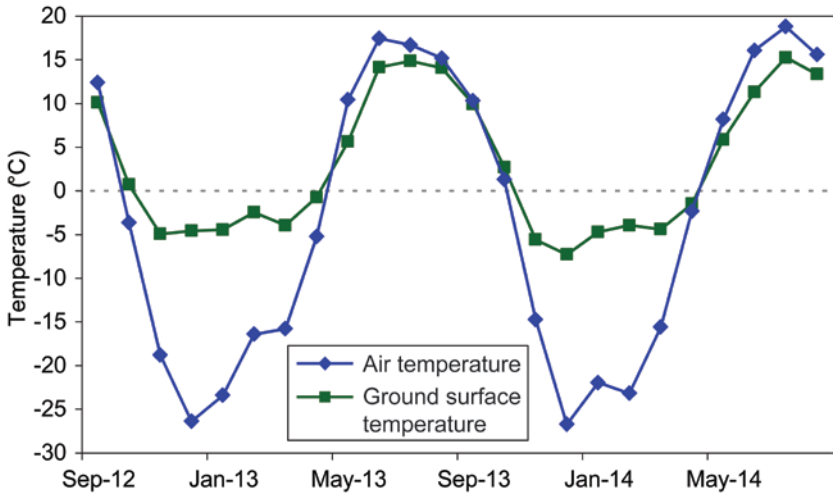
Sep 2013 – Aug 2014		
Depth (m)	Max (°C)	Min (°C)
1	22.73	-6.62
2	6.80	0.28
3	5.19	0.41
4	5.00	1.59
12	3.23	3.02
17	2.31	1.93

85-9-T4 — Pump Station 3

Deh cho Settlement Region

Month / Year	Temperature (°C)	
	Air	Surface
Sept / 2012	12.41	10.11
Oct / 2012	-3.63	0.72
Nov / 2012	-18.80	-4.93
Dec / 2012	-26.38	-4.58
Jan / 2013	-23.40	-4.44
Feb / 2013	-16.40	-2.45
Mar / 2013	-15.78	-3.95
Apr / 2013	-5.24	-0.73
May / 2013	10.42	5.62
Jun / 2013	17.45	14.15
Jul / 2013	16.70	14.86
Aug / 2013	15.18	14.09

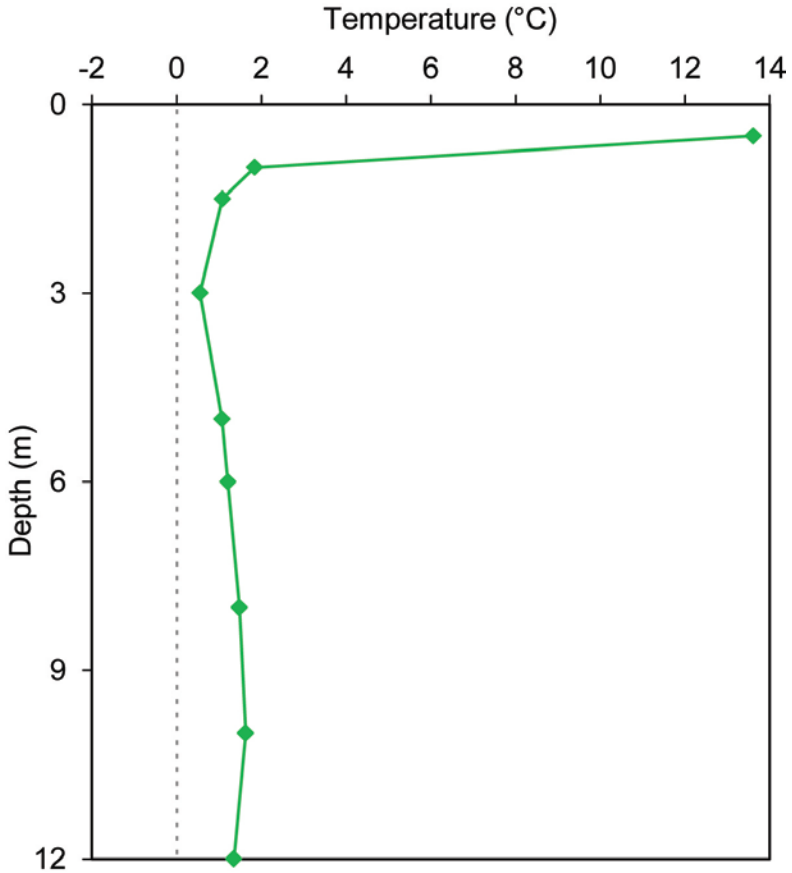
Month / Year	Temperature (°C)	
	Air	Surface
Sept / 2013	10.31	9.93
Oct / 2013	1.30	2.70
Nov / 2013	-14.72	-5.58
Dec / 2013	-26.72	-7.28
Jan / 2014	-21.96	-4.71
Feb / 2014	-23.17	-3.94
Mar / 2014	-15.60	-4.39
Apr / 2014	-2.32	-1.48
May / 2014	8.17	5.87
Jun / 2014	16.07	11.32
Jul / 2014	18.80	15.26
Aug / 2014	15.60	13.36



85-12A-T4 Off Row — Jean Marie Creek A

Deh cho Settlement Region

Latitude: 61.11 N Longitude: 120.42 W
Elevation: 300 m a.s.l.
Landform: Ground moraine
Vegetation cover: Open black spruce, ericaceous shrubs, moss-lichen woodland (peat plateau)
Thaw Depth: n/a
Site visit: September 21, 2014

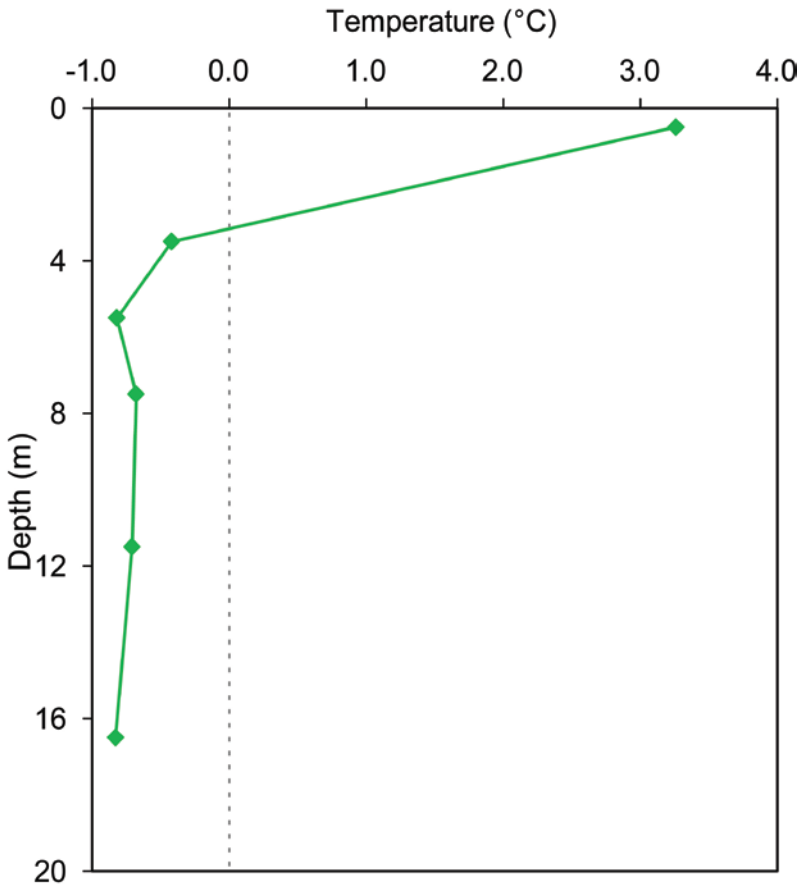


Depth (m)	Temp (°C)
0.5	13.61
1	1.84
1.5	1.08
3	0.55
5	1.07
6	1.21
8	1.48
10	1.63
12	1.35

85-12B-T4 Off Row — Jean Marie Creek B

Deh cho Settlement Region

Latitude: 61.12 N Longitude: 120.42 W
Elevation: 300 m a.s.l.
Landform: Ground moraine
Vegetation cover: Open black spruce, ericaceous shrubs, moss-lichen woodland (peat plateau)
Thaw Depth: 1.49 m
Site visit: September 21, 2014



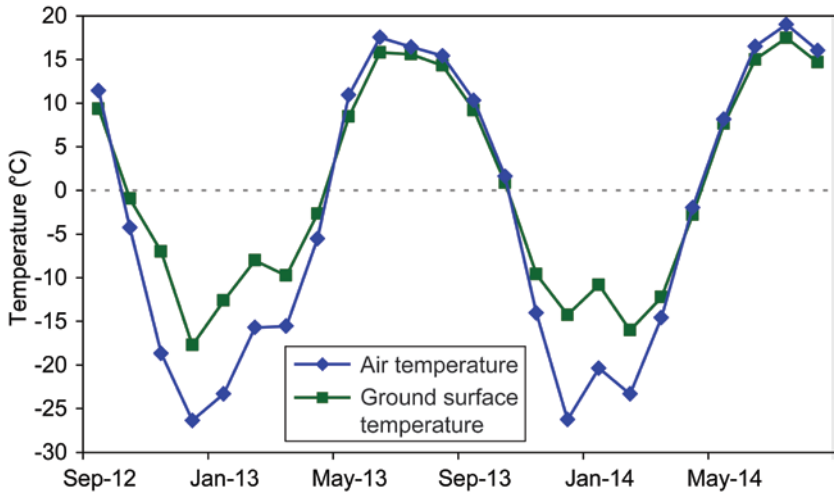
Depth (m)	Temp (°C)
0.5	14.49
1	3.2
1.5	-0.08
2	-0.01
2.5	-0.03
3.5	-0.12
5.5	0.73
8	0.75

85-12B-T4 Off Row — Jean Marie Creek B

Deh cho Settlement Region

Month / Year	Temperature (°C)	
	Air	Surface
Sept / 2012	11.42	9.32
Oct / 2012	-4.27	-0.96
Nov / 2012	-18.67	-7.01
Dec / 2012	-26.36	-17.73
Jan / 2013	-23.30	-12.62
Feb / 2013	-15.71	-8.01
Mar / 2013	-15.55	-9.76
Apr / 2013	-5.55	-2.68
May / 2013	10.92	8.44
Jun / 2013	17.52	15.80
Jul / 2013	16.43	15.60
Aug / 2013	15.41	14.33

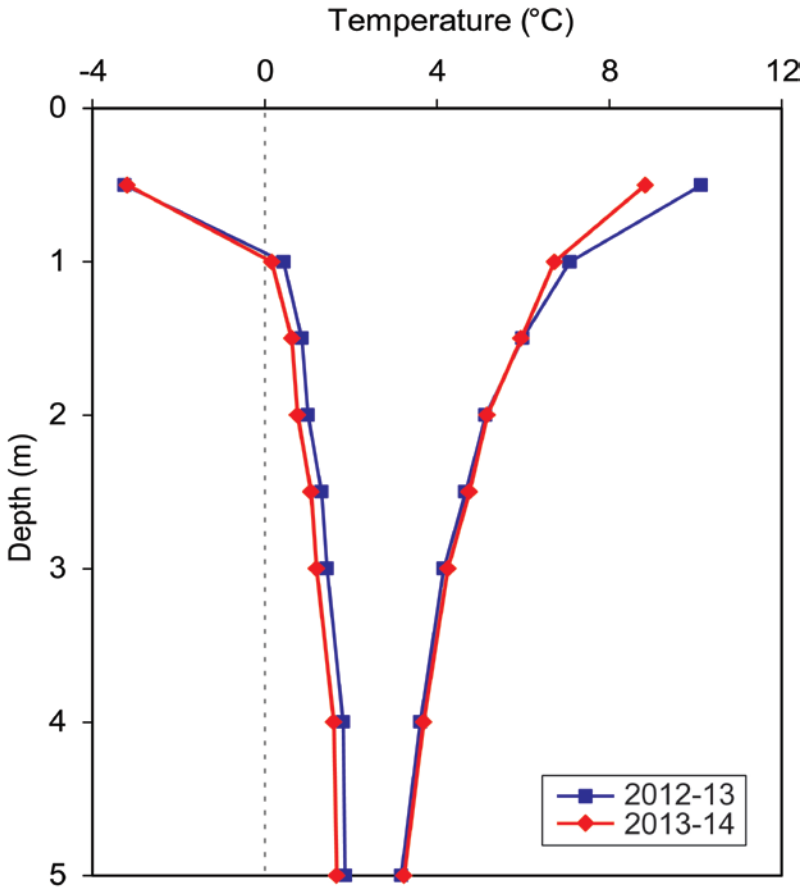
Month / Year	Temperature (°C)	
	Air	Surface
Sept / 2013	10.32	9.20
Oct / 2013	1.63	0.89
Nov / 2013	-14.05	-9.60
Dec / 2013	-26.27	-14.27
Jan / 2014	-20.37	-10.82
Feb / 2014	-23.33	-16.01
Mar / 2014	-14.57	-12.24
Apr / 2014	-1.96	-2.80
May / 2014	8.14	7.64
Jun / 2014	16.51	15.00
Jul / 2014	19.01	17.47
Aug / 2014	16.03	14.67



Trout R — Trout River

Deh cho Settlement Region

Latitude: 61.02 N Longitude: 120.59 W
Elevation: 350 m a.s.l.
Landform: Organic terrain
Vegetation cover: Peatland with scattered spruce and sphagnum ground cover
Thaw Depth: n/a for 2013, n/a for 2014
Site visit: September 21, 2014



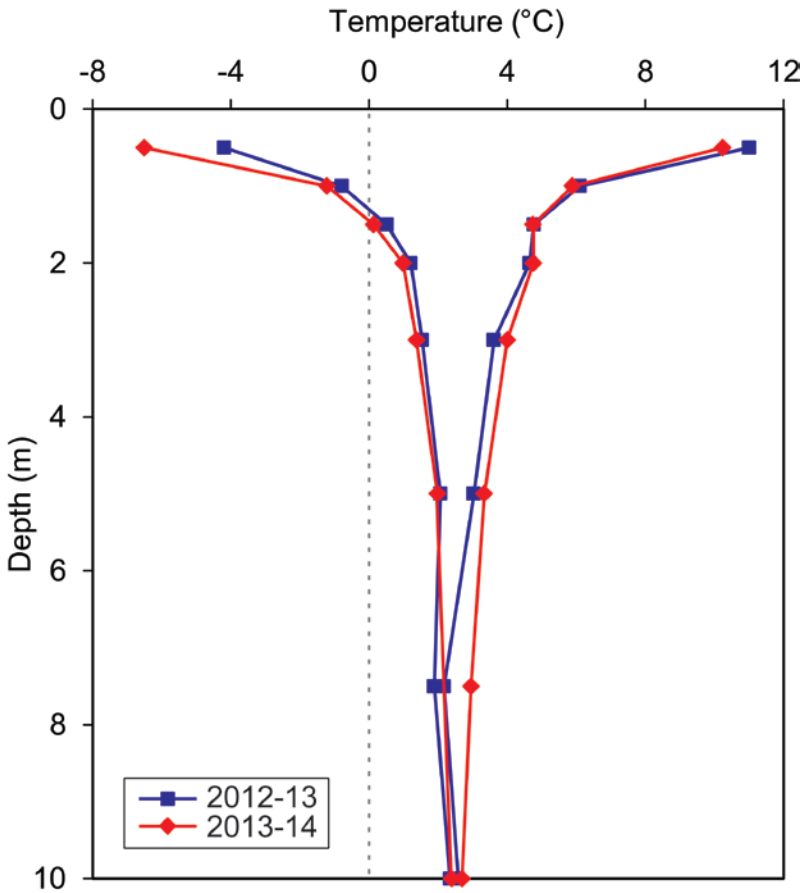
Sep 2012 – Aug 2013		
Depth (m)	Max (°C)	Min (°C)
0.5	10.14	-3.25
1	7.08	0.44
1.5	5.98	0.86
2	5.13	1.00
2.5	4.66	1.32
3	4.15	1.44
4	3.61	1.82
5	3.17	1.86

Sep 2013 – Aug 2014		
Depth (m)	Max (°C)	Min (°C)
0.5	8.83	-3.19
1	6.72	0.16
1.5	5.95	0.63
2	5.16	0.76
2.5	4.75	1.07
3	4.25	1.20
4	3.69	1.60
5	3.24	1.67

TRC-01 — Trout Road Crossing

Deh cho Settlement Region

Latitude: 60.83 N Longitude: 120.48 W
Elevation: 420 m a.s.l.
Landform: Bog-dominated moraine plain
Vegetation cover: Dry peatland vegetation consisting of black spruce, tamarack, and feathermoss
Thaw Depth: n/a for 2013, n/a for 2014
Site visit: September 21, 2014



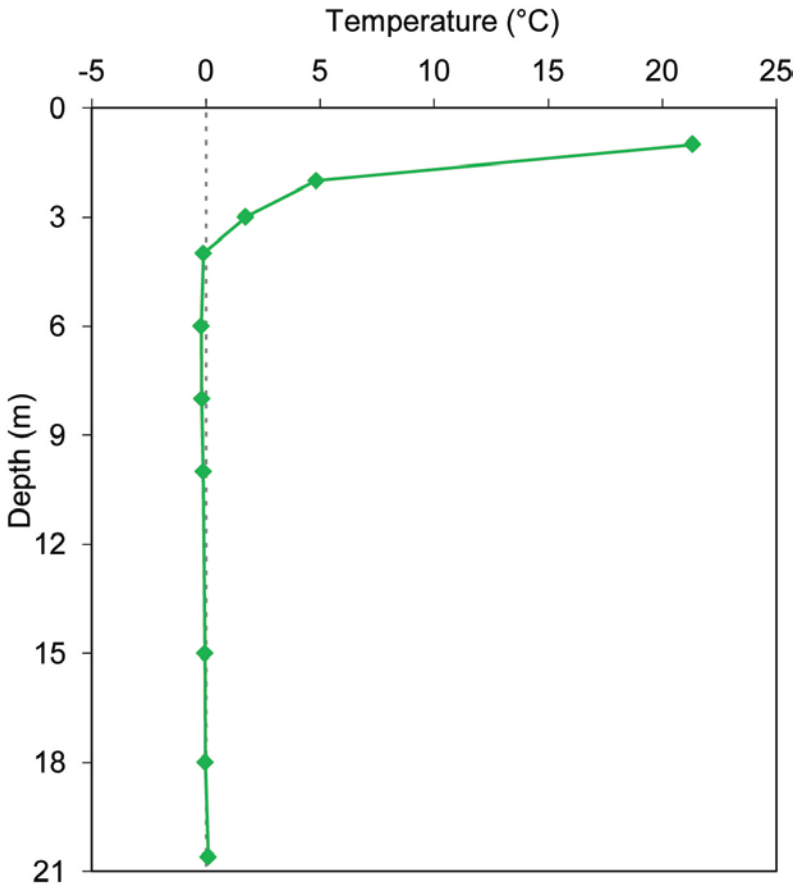
Sep 2012 – Aug 2013		
Depth (m)	Max (°C)	Min (°C)
0.5	11.01	-4.19
1	6.10	-0.79
1.5	4.77	0.51
2	4.65	1.20
3	3.62	1.54
5	3.03	2.06
7.5	2.17	1.89
10	2.58	2.35

Sep 2013 – Aug 2014		
Depth (m)	Max (°C)	Min (°C)
0.5	10.24	-6.51
1	5.89	-1.22
1.5	4.75	0.13
2	4.76	0.99
3	4.00	1.38
5	3.34	1.98
7.5	2.95	n/a
10	2.69	2.40

84-5A-T4 — Petitot River North B Off Row

Deh cho Settlement Region

Latitude: 59.75 N Longitude: 119.50 W
Elevation: 552 m a.s.l.
Landform: Ground moraine
Vegetation cover: Recovering burn (burned 2004), originally stunted black spruce, ericaceous shrubs, moss woodland (peat plateau)
Thaw Depth: 3.94 m for 2014
Site visit: September 21, 2014

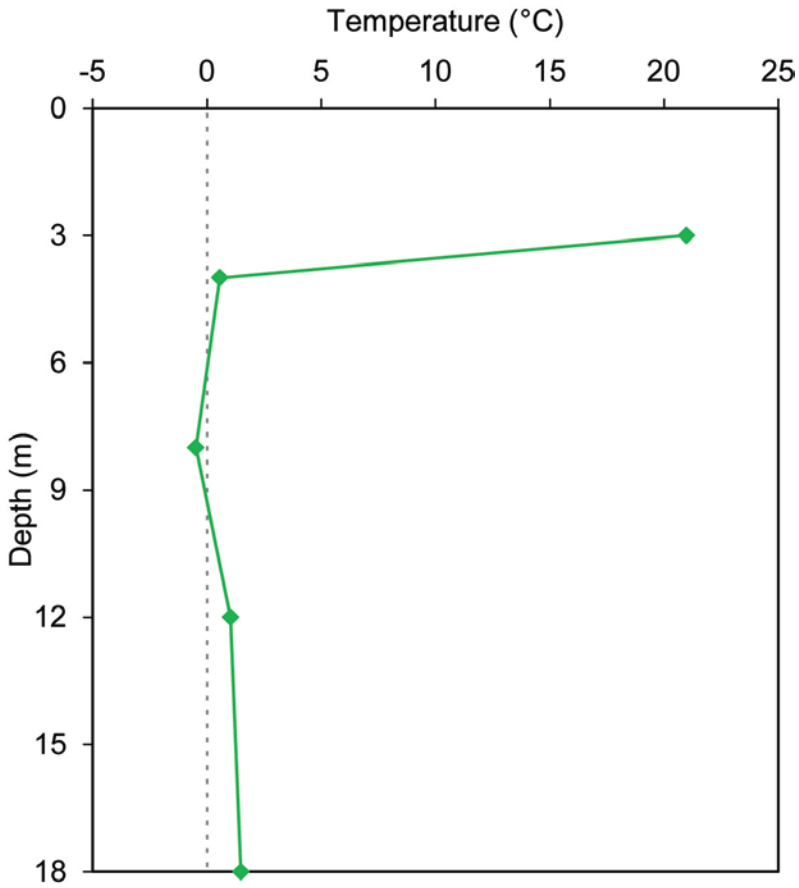


Depth (m)	Temp (°C)
1	21.33
2	4.83
3	1.74
4	-0.11
6	-0.21
8	-0.18
10	-0.12
15	-0.05
18	-0.03
20.6	0.1

84-5B-T4 — Petitot River North B Off Row

Deh cho Settlement Region

Latitude: 59.76 N Longitude: 119.51 W
Elevation: 552 m a.s.l.
Landform: Ground moraine
Vegetation cover: Recovering burn (burned 2004), originally stunted black spruce, ericaceous shrubs, moss woodland (peat plateau)
Thaw Depth: 6.15 m for 2014
Site visit: September 21, 2014



Depth (m)	Temp (°C)
3	20.98
4	0.56
8	-0.48
12	1.03
18	1.49

84-5B-T4 — Petitot River North B Off Row

Deh cho Settlement Region

Month / Year	Temperature (°C)	
	Air	Surface
Sept / 2012	10.92	7.47
Oct / 2012	-4.34	-0.10
Nov / 2012	-18.42	-2.60
Dec / 2012	-23.82	-3.79
Jan / 2013	-21.12	-3.94
Feb / 2013	-13.31	-4.36
Mar / 2013	-14.57	-4.35
Apr / 2013	-6.14	-1.14
May / 2013	9.71	3.91
Jun / 2013	15.98	11.36
Jul / 2013	15.12	12.03
Aug / 2013	14.58	12.25

Month / Year	Temperature (°C)	
	Air	Surface
Sept / 2013	10.28	8.02
Oct / 2013	1.65	1.05
Nov / 2013	-13.65	-2.50
Dec / 2013	-25.84	-3.00
Jan / 2014	-16.71	-4.32
Feb / 2014	-22.52	-4.51
Mar / 2014	-14.61	-5.89
Apr / 2014	-1.89	-1.41
May / 2014	7.27	4.47
Jun / 2014	14.35	10.39
Jul / 2014	18.09	15.01
Aug / 2014	14.72	12.97