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**GEOLOGICAL SURVEY OF CANADA
OPEN FILE 8125**

**Report on 2015 field activities and collection of ground
thermal and active layer data in the Mackenzie Corridor,
Northwest Territories**

S.L. Smith, J. Chartrand, C. Duchesne, and M. Ednie

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ABSTRACT

This report presents a summary of field activities conducted in 2015 in the Mackenzie corridor, Northwest Territories (NWT). Air temperature, ground thermal and active layer data acquired from permafrost monitoring sites visited in 2015 throughout the corridor are provided in graphical and tabular format. Ground temperature records for the 2007-2015 period are also presented and indicate that permafrost is currently warmer at the majority of sites than the baseline established during the International Polar Year (2007-09). 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 improves the characterization of regional baseline ground thermal conditions and can support development decisions in the Mackenzie corridor.

This report provides a summary of the field activities to collect air and ground temperature and active layer data during summer and fall 2015 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 2007-2015 period. A summary of changes in active layer thickness since 1991 is also provided.

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 between late July and early October 2015. The location and brief description of each site visited in 2015 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 $\pm 0.01^\circ\text{C}$ and an accuracy of $\pm 0.1^\circ\text{C}$. 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 during site visits using a multimeter (accuracy $\pm 0.1^\circ\text{C}$). 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 2015. Sites that were not visited in 2015 are included in the Table 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 2015 in Appendix A.

The GSC also maintains about 40 active layer monitoring sites throughout the Mackenzie corridor (Table 2, Figure 1 and 3) many of which have been in operation since the early 1990s. In late July and early August 2015, sites in the Gwich'in, Inuvait and Deh Cho regions were visited. 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 2015 site visits therefore allow the determination of the active layer thickness for 2014. For sites visited in 2015 but not in 2014, such as those in the Deh Cho, 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 2013-2014). Table 2 provides a list of sites from which data were obtained in summer 2015. 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).

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 is inserted 3 to 5 cm below the ground surface. The data loggers have a resolution of 0.5°C at -20°C and an accuracy ranging from 0.5°C at -20°C to 0.2°C at 0°C and record temperature every 3 hours.

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

Settlement region	Site name	Borehole name	Elevation (m a.s.l.)	Latitude (N)	Longitude (W)	Landform	Vegetation Cover	Air / ground surface temperature	Date visited in 2015
Inuvialuit	North Head Shore	90TT13	3	69.72	134.46	Thermokarst coastal plain	Tundra	Air (partial) / Ground	30/07/2015
Inuvialuit	Big Lake	Big Lake 1	n/a	69.39	134.96	Polygonal wetlands	Sedge	None	29/07/2015
Inuvialuit		Big Lake 2	n/a	69.39	134.97	Polygonal wetlands	Sedge	None	29/07/2015
Inuvialuit	Taglu	TAG04 Sedge	n/a	69.37	134.99	Point bar	Horsetail	None	29/07/2015
Inuvialuit		TAG04 SWIL	n/a	69.37	134.98	Point bar	Dwarf willow shrubs	None	29/07/2015
Inuvialuit		91TTC	15	69.37	134.95	Surface of Holocene Mackenzie delta	Low shrub tundra	Air / Ground	29/07/2015
Inuvialuit	Kumak	KUM02 SWIL	n/a	69.32	135.21	Point bar	Dwarf willow shrubs	None	29/07/2015
Inuvialuit		KUM02 TWIL	n/a	69.32	135.21	Point bar	Tall willow shrubs	None	29/07/2015
Inuvialuit		KC-07	n/a	69.31	135.25	Tundra upland	Grass and moss tundra	None	29/07/2015
Inuvialuit	Dennis Lake	T7 Upland	n/a	69.31	134.54	Moraine uplands	Dwarf birch tundra with willow and alder shrubs	None	30/07/2015
Inuvialuit	Lousy Point Ridge	90TT05	39	69.22	134.28	Glaciofluvial ridge	Low shrub tundra	Air (failed) / Ground	30/07/2015
Inuvialuit	Lousy Point Low Terrace	90TT06	9	69.22	134.28	Glaciofluvial ridge	Low shrub tundra	Air (partial) / Ground	30/07/2015
Inuvialuit	Yaya Lake Low	90TT04	10	69.14	134.70	Ice contact complex	Shrub tundra	Air / Ground	30/07/2015
Inuvialuit	East Channel	T6 Upland	n/a	69.12	134.19	Moraine uplands	Dwarf birch tundra with willow and alder shrubs	None	31/07/2015
Inuvialuit	Ellice Island	H-01	n/a	69.17	136.01	Surface of Holocene Mackenzie delta	Grass and shrub tundra	None	Not visited

Table 1. (Continued)

Settlement region	Site name	Borehole name	Elevation (m a.s.l.)	Latitude (N)	Longitude (W)	Landform	Vegetation Cover	Air / ground surface temperature	Date visited in 2015
Inuvialuit	Parson's Lake	T5 Upland	n/a	68.96	133.84	Moraine uplands	Dwarf birch tundra with willow and alder shrubs	None	31/07/2015
Inuvialuit		T5 Slump	n/a	68.96	133.84	Thaw slump	Willow and alder shrubs	None	31/07/2015
Inuvialuit	Reindeer Station plateau	91TT12	152	68.69	134.11	Plateau surface, till plain	Shrub tundra	Air / Ground	31/07/2015
Inuvialuit	Reindeer Depot (Williams Island)	91TT13	5	68.68	134.15	Surface of bar in Mackenzie Delta	Riparian willow and alder shrub	Air / Ground	31/07/2015
Inuvialuit	Jimmy Creek Valley	JV-1 bottom	n/a	68.63	133.63	Moraine uplands	Dwarf birch tundra with willow and alder shrubs	None	31/07/2015
Inuvialuit	Navy Channel	03TC1	5	68.42	133.79	Surface of Holocene Mackenzie delta adjacent to eastern edge rising to till plain	Riparian high willow shrub, open, incomplete ground cover of forbs and sedge (forest tundra)	Air (failed) / Ground	01/08/2015
Gwich'in	Norris Creek	NC-01	15	68.41	133.29	Thick organic material over moraine plain	Shrub tundra	None	29/07/2015
Gwich'in	Navy Road	01TC1	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	28/07/2015
Gwich'in	Inuvik Airport Trees	01TC2	84	68.32	133.44	Fluted till plain, glacial (>10Ka)	Taiga open black spruce, heath ground cover	Ground	28/07/2015
Gwich'in	Inuvik Airport Bog	12TC1	68	68.32	133.43	Bog between ridges on fluted till plain, glacial (>10Ka)	Taiga open bog, scattered shrub, heath ground cover (forest tundra)	None	28/07/2015
Gwich'in	Inuvik Airport Bog	01TC3	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	28/07/2015

Table 1. (Continued)

Settlement region	Site name	Borehole name	Elevation (m a.s.l.)	Latitude (N)	Longitude (W)	Landform	Vegetation Cover	Air / ground surface temperature	Date visited in 2015
Gwich'in	Campbell Lake	CaL-01	115	68.24	133.10	Moraine plain	Peatland	None	29/07/2015
		CaL-02	118	68.24	133.10	Moraine plain	Cutline	None	29/07/2015
		CaL-03	118	68.24	133.10	Moraine plain	Black spruce forest	None	29/07/2015
Gwich'in	North Caribou Lake	NCL-01	209	68.15	132.93	Moraine plain	Peatland	None	29/07/2015
		NCL-02	217	68.15	132.93	Moraine plain	Stunted black spruce forest	None	29/07/2015
Gwich'in	Hill Lake	HL-01	229	67.99	132.49	Moraine plain	Tundra	None	29/07/2015
		HL-02	234	67.99	132.49	Moraine plain	Shrub tundra	None	29/07/2015
Gwich'in	Wood Bridge Lake	WBL-01	204	67.90	132.18	Alluvial plain	Black spruce forest	None	29/07/2015
Gwich'in	Rengleng River mouth	91TT14	8	67.80	134.13	Alluvial plain	Mixed spruce and hardwood forest	Air (failed) / Ground	02/08/2015
Sahtu	Jackfish Creek	JF-02	90	66.29	128.47	Eolian dune on moraine plain, well drained, elevated area	Black spruce forest and moss cover	None	01/10/2015
Sahtu	Fort Good Hope South	FGHS-01	134	66.21	128.50	Hummocky peatland	Dense shrub and open black spruce	Air / Ground	01/10/2015
		FGHS-02	134	66.21	128.50	Hummocky peatland	Peat plateau, lichen, open black spruce	None	01/10/2015
Sahtu	Snafu Creek	SC-01	100	66.00	128.35	Moraine plain	Peat bog, open black spruce forest, and lichen cover	None	01/10/2015
Sahtu	Chick Lake	CL-01	122	65.90	128.24	Moraine plain	Peat and organic soil with open black spruce forest and shrubs	None	01/10/2015

Table 1. (Continued)

Settlement region	Site name	Borehole name	Elevation (m a.s.l.)	Latitude (N)	Longitude (W)	Landform	Vegetation Cover	Air / ground surface temperature	Date visited in 2015
Sahtu	Gibson Lake	GL-01	228	65.75	127.89	Hummocky moraine plain	Recovering burnt area with peat and shrubs	Air / Ground	01/10/2015
Sahtu	Hanna River	HR-01	104	65.67	127.83	Lacustrine plain	Boggy burnt area	None	01/10/2015
Sahtu	Elliot Creek	EC-01	54	65.52	127.62	Lacustrine undulating plain, well drained elevated area	Peat cover on edge of open, mature black spruce forest	None	01/10/2015
		EC-02	54	65.52	127.62	Lacustrine plain overlain by alluvial sediments	Peat cover on edge of dense, mature black spruce forest	None	01/10/2015
Sahtu	Oscar Creek	OC-01	64	65.44	127.44	Undulating glaciolacustrine terrain overlain by alluvial sediments	Peat cover with dense-forested birch and black spruce	None	01/10/2015
Sahtu	Billy Creek North	BCN-01	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	01/10/2015 (new cable installed)
Sahtu	Kee Scarp	Kee Scarp-HT	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 shrubs	None	02/10/2015
Sahtu	NW Fen	99TC5	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	61	65.29	126.89	Ground moraine	Moss, lichen, ericaceous shrubs with black spruce and tamarack	None	30/09/2015
Sahtu	Kp5 BH6 Off-row Cable	85-11-T2	90	65.29	126.79	Lacustrine plain	Forested, moss, lichen, black spruce	None	Not visited

Table 1. (Continued)

Settlement region	Site name	Borehole name	Elevation (m a.s.l.)	Latitude (N)	Longitude (W)	Landform	Vegetation Cover	Air / ground surface temperature	Date visited in 2015
Sahtu	Normal Wells Town	Arena	80	65.28	126.83	Ground moraine	Disturbed area adjacent to parking lot	None	30/09/2015
		Water Treatment Plant	80	65.28	126.84	Ground Moraine	Disturbed area adjacent to parking lot	None	30/09/2015
Sahtu	Van Everdingen	30m	n/a	65.27	126.75	Lacustrine plain	Open forest, moss, shrub, spruce/tamarack	None	30/09/2015
Sahtu	Canyon Creek North A	84-2A-HT	110	65.23	126.50	Ground moraine	Lichen, moss, ericaceous shrubs with black spruce and tamarack	None	01/10/2015
		84-2A-T4	110	65.23	126.50	Ground moraine	Lichen, moss, ericaceous shrubs with black spruce and tamarack	None	01/10/2015
Sahtu	Canyon Creek North B	84-2B-T4	110	65.23	126.52	Ground moraine	Moss with white spruce	Air / Ground	01/10/2015
Sahtu	Vermillion Creek	VC-01	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	01/10/2015
		VC-02	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	01/10/2015
Sahtu	Police Island	PI-01	113	64.83	125.012	Lacustrine plain	White birch, alder, small spruce (recovering black spruce burn)	None	02/10/2015
		PI-02	113	64.83	125.01	Lacustrine plain	Unburnt, black spruce forest with moss and lichen ground cover	None	02/10/2015
Sahtu	Old Fort Point	OFP-01	112	64.65	124.84	Lacustrine plain	Open mixed spruce, pine deciduous forest adjacent to open, low-lying fen	None	02/10/2015

Table 1. (Continued)

Settlement region	Site name	Borehole name	Elevation (m a.s.l.)	Latitude (N)	Longitude (W)	Landform	Vegetation Cover	Air / ground surface temperature	Date visited in 2015
Sahtu	Little Smith Creek	LS-01	80	64.43	124.74	Alluvial flood plain	Open mature black spruce forest	None	02/10/2015
		LS-02	112	64.43	124.73	Glaciofluvial outwash plain	Tamarack, birch, poplar, and pine forest transition to spruce	None	02/10/2015
Sahtu	Saline River	SR-02	140	64.29	124.49	Glaciofluvial veneer over lacustrine	Burnt black spruce forest	None	02/10/2015
Sahtu	KP182	Bottom	133	64.28	124.47	Lacustrine plain	Forested (recovering burn, burned 1994)- Aspen, willow, birch, tamarack	Ground	02/10/2015
		Mid Slope HT192	138	64.28	124.47	Lacustrine plain	Forested (recovering burn, burned 1994)- Aspen, willow, birch, tamarack	Ground	02/10/2015
Sahtu	KP182	Top of Slope	144	64.28	124.47	Lacustrine plain	Forested (recovering burn, burned 1994)- Aspen, willow, birch, tamarack	Ground	02/10/2015
		Crest of Slope	139	64.28	124.47	Lacustrine plain	Forested (recovering burn, burned 1994)- Aspen, willow, birch, tamarack	Air / Ground	02/10/2015
		Unburnt	141	64.28	124.47	Lacustrine plain	Forested - white spruce, white birch with black spruce, moss and peat ground cover	Ground	02/10/2015 (No data)
Sahtu	Steep Creek	Steep-02 (crest)	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	02/10/2015

Table 1. (Continued)

Settlement region	Site name	Borehole name	Elevation (m a.s.l.)	Latitude (N)	Longitude (W)	Landform	Vegetation Cover	Air / ground surface temperature	Date visited in 2015
Deh cho	Table Mountain A	85-7A-HA108	255	63.61	123.64	Ground moraine	Lichen, moss, ericaceous shrubs with black spruce and alder	None	02/10/2015
Deh cho	Ochre River cabin	92TT10	97	63.47	123.69	Low fluvial terrace cut into glacio-lacustrine plain	Moss ground cover under mixed black spruce and birch	Air / Ground	09/08/2015
Deh cho	KP313	KP313 T2	250	63.26	123.43	Lacustrine plain, bottom of slope	Moss cover and peat, forested, mix of birch and spruce	Ground	02/10/2015
		KP313 T4	250	63.26	123.43	Lacustrine plain, mid slope, W side of ROW	Moss cover and peat, forested, mix of birch and spruce	None	02/10/2015
		KP313 T5	250	63.26	123.43	Lacustrine plain, mid slope, E side of ROW	Moss cover and peat, forested, mix of birch and spruce	None	02/10/2015
		KP313 T6	250	63.26	123.43	Lacustrine plain, top of slope	Thin moss and organic cover, forested, mix of birch and spruce	Air (partial) / Ground	02/10/2015
Deh cho	River Between Two Mountains	RBTM-01	120	62.95	123.21	Transition lacustrine to alluvial to moraine terrain	Dense black spruce forest	None	07/08/2015
		92TT8	120	62.95	123.20	Transition lacustrine to alluvial to moraine terrain	Dense black spruce forest	Air / Ground	07/08/2015
		RBTM-02	150	62.93	123.18	Transition lacustrine to alluvial to moraine terrain	Dense black spruce forest	None	07/08/2015
Deh cho	Willow Lake River	WLR-01	122	62.71	123.08	Alluvial fan	Open mixed forest	None	07/08/2015
Deh cho	Willow Lake Burn	93AG04	n/a	62.70	123.06	Top of inactive fluvial bar	Dense deciduous forest	Ground	07/08/2015

Table 1. (Continued)

Settlement region	Site name	Borehole name	Elevation (m a.s.l.)	Latitude (N)	Longitude (W)	Landform	Vegetation Cover	Air / ground surface temperature	Date visited in 2015
Deh cho	Wrigley Pines	94AG2	n/a	62.32	122.69	Upland till plain	Dense canopy of Jack Pine	Air / Ground	08/08/2015
Deh cho	Wrigley Peatland	99TC4	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	08/08/2015
Deh cho	Trail River	TR-01	181	62.09	121.76	Lacustrine plain and eolian landforms	Black spruce and tamarack forest with sphagnum and feathermoss ground cover	None	Not visited
Deh cho	Fort Simpson Bog	93AG2	n/a	61.98	121.88	Raised bog with collapse depression on lacustrine plain	Open Black spruce with ground cover of moss.	Ground	08/08/2015
Deh cho	Fort Simpson Bog High	99TC1	165	61.98	121.88	Peat plateau on surface of glaciolacustrine delta, post glacial (>10Ka)	Boreal, open black spruce (coniferous forest)	None	08/08/2015 Problem with cable, not data)
Deh cho	Fort Simpson Bog Low	99TC2	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	165	61.98	121.88	Surface of glaciolacustrine delta, post glacial	Boreal, open spruce (coniferous forest)	Air / Ground	08/08/2015
Deh cho	Spruce Cutline	93AG3	n/a	61.97	121.82	Lacustrine plain	Closed canopy upland spruce with hardwood, complete ground cover of moss	Ground	08/08/2015

Table 1. (Continued)

Settlement region	Site name	Borehole name	Elevation (m a.s.l.)	Latitude (N)	Longitude (W)	Landform	Vegetation Cover	Air / ground surface temperature	Date visited in 2015
Deh cho	Aspen (Wrigley Highway)	97TC1	165	61.95	121.76	Surface of glaciolacustrine delta, post glacial (>10Ka)	Boreal, aspen grove (deciduous forest)	Air / Ground	08/08/2015
Deh cho	Mature Black Spruce (Wrigley highway)	97TC2	165	61.92	121.71	Surface of glaciolacustrine delta, post glacial (>10Ka)	Boreal, black spruce (coniferous forest)	Air (failed) / Ground	08/08/2015
Deh cho	Martin River	92TT6	165	61.89	121.60	Glaciolacustrine plain	Mixed spruce, low to moderate density canopy	Air (partial) / Ground	08/08/2015
Deh cho	Harris River	HAR-01	146	61.88	121.29	Moraine	Predominantly birch	None	Not visited
Deh cho	Open Black Spruce	99TC3	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	10/08/2015
Deh cho	Manners Sources	MS-01 (Fen)	182	61.63	121.11	Eolian interdune	Thermokarst shrub fen	None	Not visited
Deh cho		MS-02 (Crest)	182	61.63	121.10	Eolian dune crest	Pine forest	None	Not visited
Deh cho	Liard Spruce	97TC4	180	61.55	121.39	Surface of glaciolacustrine delta, late glacial (>10Ka)	Boreal, wetland shrub and sedge	Ground	10/08/2015
Deh cho	Jean-Marie Creek	JMC-01	198	61.44	120.95	Transition alluvial flood plain to organic (fen) over lacustrine plain	Poorly drained shrub fen	None	Not visited
Deh cho	Jean-Marie Creek	JMC-02	198	61.44	120.95	Transition alluvial flood plain to organic (fen) over lacustrine plain	Sandy ridge with spruce, pine forest	None	Not visited

Table 1. (Continued)

Settlement region	Site name	Borehole name	Elevation (m a.s.l.)	Latitude (N)	Longitude (W)	Landform	Vegetation Cover	Air / ground surface temperature	Date visited in 2015
Deh cho	85-9-T4	Pump Station 3	223	61.397	120.90	Lacustrine veneer over ground moraine (unfrozen granular)	Open black spruce, ericaceous shrubs, moss-lichen woodland	Air / Ground	Not visited
Deh cho	85-12A-T4	Off Row – Jean Marie Creek A	300	61.11	120.42	Ground moraine	Open black spruce, ericaceous shrubs, moss-lichen woodland (peat plateau)	None	Not visited
Deh cho	85-12B-T4	Off Row – Jean Marie Creek B	300	61.12	120.42	Ground moraine	Open black spruce, ericaceous shrubs, moss-lichen woodland (peat plateau)	Air / Ground	Not visited
Deh cho	Trout River	Trout R	350	61.02	120.59	Organic terrain	Peatland with scattered spruce and sphagnum ground cover	None	Not visited
Deh cho	Trout Road Crossing	TRC	420	60.83	120.48	Bog-dominated moraine plain	Dry peatland vegetation consisting of black spruce, tamarack, and feathermoss	None	Not visited
Deh cho	Petitot River North B Off Row	84-5B-T4	552	59.76	119.51	Ground moraine	Recovering burn (burned 2004), originally stunted black spruce, ericaceous shrubs, moss woodland (peat plateau)	Air / Ground	Not visited
Deh cho	Petitot River North B Off Row	84-5A-T4	552	59.75	119.50	Ground moraine	Recovering burn (burned 2004), originally stunted black spruce, ericaceous shrubs, moss woodland (peat plateau)	None	Not visited

Table 2. Active layer and air/ground surface temperature monitoring sites throughout the corridor. Active layer thickness for 2014 determined from thaw tubes at active layer monitoring sites is provided. Sites visited in 2015 but not in 2014 are highlighted in red text and for these sites the active layer thickness provided represents the maximum active layer over the previous two years.

Note: Site IDs that include “AG” are only air and ground surface temperature sites and do not have a thaw tube. Probed thaw depths (where indicated in table) are taken on day of visit and are for the 2015 thaw season. Probed active layer values at ground temperature sites are presented in Appendix A.

Site Name	Site ID	Lat (°N)	Long (°W)	2014 Active Layer (m)	Air / Ground Temperature Record	Date Visited
North Head shore	90TT13	69.72	134.46	n/a	Air / Ground	30/07/2015
North Point summit	90TT02	69.66	134.39	0.53	None	Not visited
North Point mid-slope	90TT11	69.66	134.38	0.63	None	30/07/2015
North Point shore	90TT12	69.66	134.36	0.43	None	30/07/2015
Mason Bay high	90TT08	69.53	134.02	0.8	None	30/07/2015
Mason Bay shore	90TT09	69.53	134.01	0.67	None	30/07/2015
Mason Bay inlet	90TT10	69.53	134.04	n/a	None	Not visited
Illasarvik	94TT01	69.49	134.55	0.56	None	30/07/2015
Harry Channel mouth	91TTA	69.48	134.83	0.81	None	29/07/2015
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	31/07/2015
Kendall Island Meadow	91TTF	69.45	135.34	n/a	None	29/07/2015
Taglu	91TTC	69.37	134.95	>1.35 (probe)	Air / Ground	29/07/2015
Lousy Point hollow	91TT09	69.22	134.30	0.32	None	30/07/2015
Lousy Point ridge	90TT05	69.22	134.28	0.81	Air / Ground	30/07/2015
Lousy Point low terrace	90TT06	69.22	134.28	n/a	Air / Ground	30/07/2015
Lousy Point flood plain	90TT07	69.22	134.27	n/a	None	Not visited
YaYa Lake high	90TT03	69.15	134.71	1.01	None	30/07/2015
YaYa Lake low	90TT04	69.14	134.70	0.97	Air / Ground	30/07/2015
Swimming Point slope	91TT01	69.11	134.40	0.59	None	30/07/2015
Swimming Point shore	91TT02	69.11	134.38	thawed	None	Not visited
Reindeer Station plateau	91TT12	68.69	134.11	0.73	Air / Ground	31/07/2015
Williams Island	91TT13	68.68	134.14	1.44	Air / Ground	01/08/2015
Navy Channel	90TT17	68.42	133.79	>1.35 (probe)	Air / Ground	01/08/2015
Inuvik Airport	01TT02	68.32	133.43	n/a	None	Not visited
Upper Air	90TT16	68.32	133.53	0.81	None	04/08/2015
Havikpak Creek	93TT02	68.32	133.52	0.64	None	04/08/2015
Caribou Creek	93TT01	68.11	133.48	0.74	None	04/08/2015

Table 2. (Continued)

Site Name	Site ID	Lat (°N)	Long (°W)	2014 Active Layer (m)	Air / Ground Temperature Record	Date Visited
Rengleng River mouth	91TT14	67.80	134.13	1.03 (probed)	Air / Ground	02/08/2015
Tsiigehtchic	91TT16	67.48	133.77	n/a	Air / Ground	Not visited
Ochre River cabin	92TT10	63.47	123.69	0.72	None	09/08/2015
Ochre River	92TT09	63.46	123.70	n/a	None	09/08/2015
River between two mountains	92TT08	62.96	123.21	n/a	Air / Ground	07/08/2015
Willow Lake burn	93AG4	62.70	123.06	n/a	Air / Ground	07/08/2015
Willow Lake River	92TT7	62.70	123.06	0.89	Air / Ground	07/08/2015
Wrigley Pines	94AG2	62.32	122.69	n/a	Air / Ground	08/08/2015
Fort Simpson bog	93AG2	61.98	122.88	n/a	Air / Ground	08/08/2015
Spruce cutline	93AG3	61.97	121.82	n/a	Air / Ground	08/08/2015
Martin River	92TT6	61.89	121.60	n/a	Air / Ground	08/08/2015
FS deep	94AG1	61.84	121.34	n/a	Air / Ground	10/08/2015
Manners Creek mouth	92TT 4	61.77	121.19	1.54	Ground	10/08/2015
Manners Creek upper	92TT 5	61.77	121.19	n/a	Air / Ground	10/08/2015

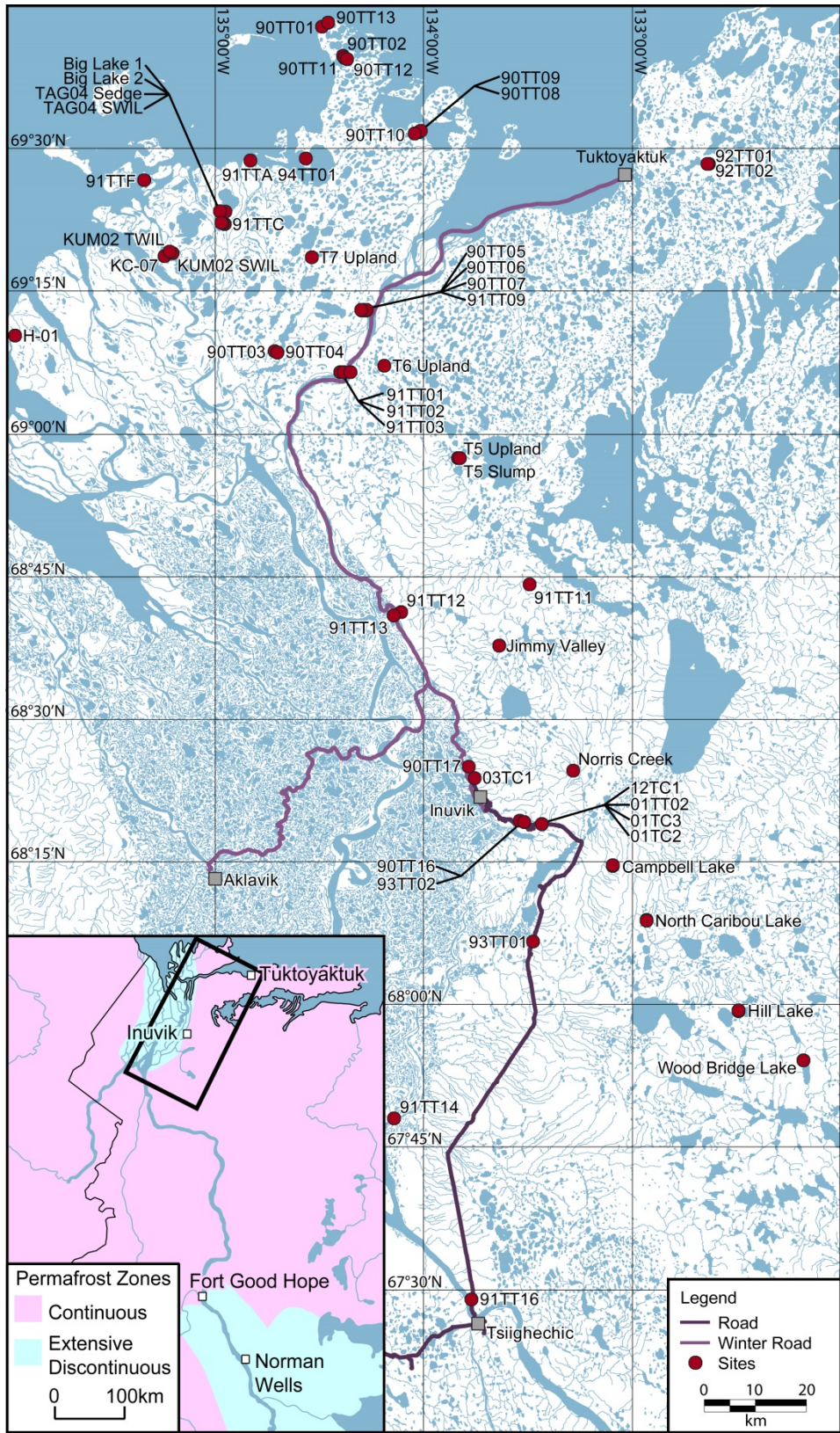


Figure 1. Permafrost and active layer monitoring sites north and south of Inuvik.

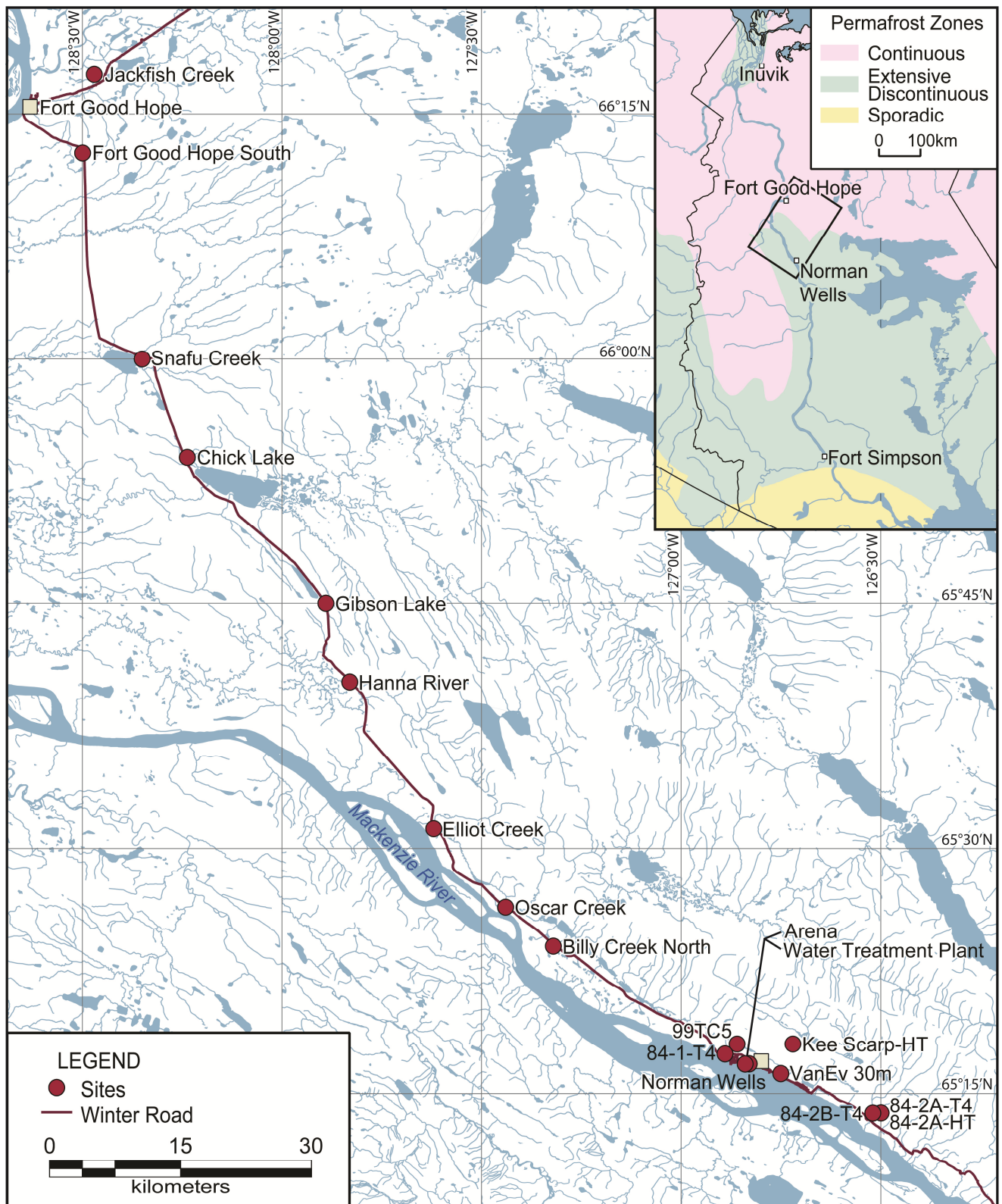


Figure 2. Permafrost monitoring sites between Fort Good Hope and Norman Wells in the Sahtu Settlement Region.

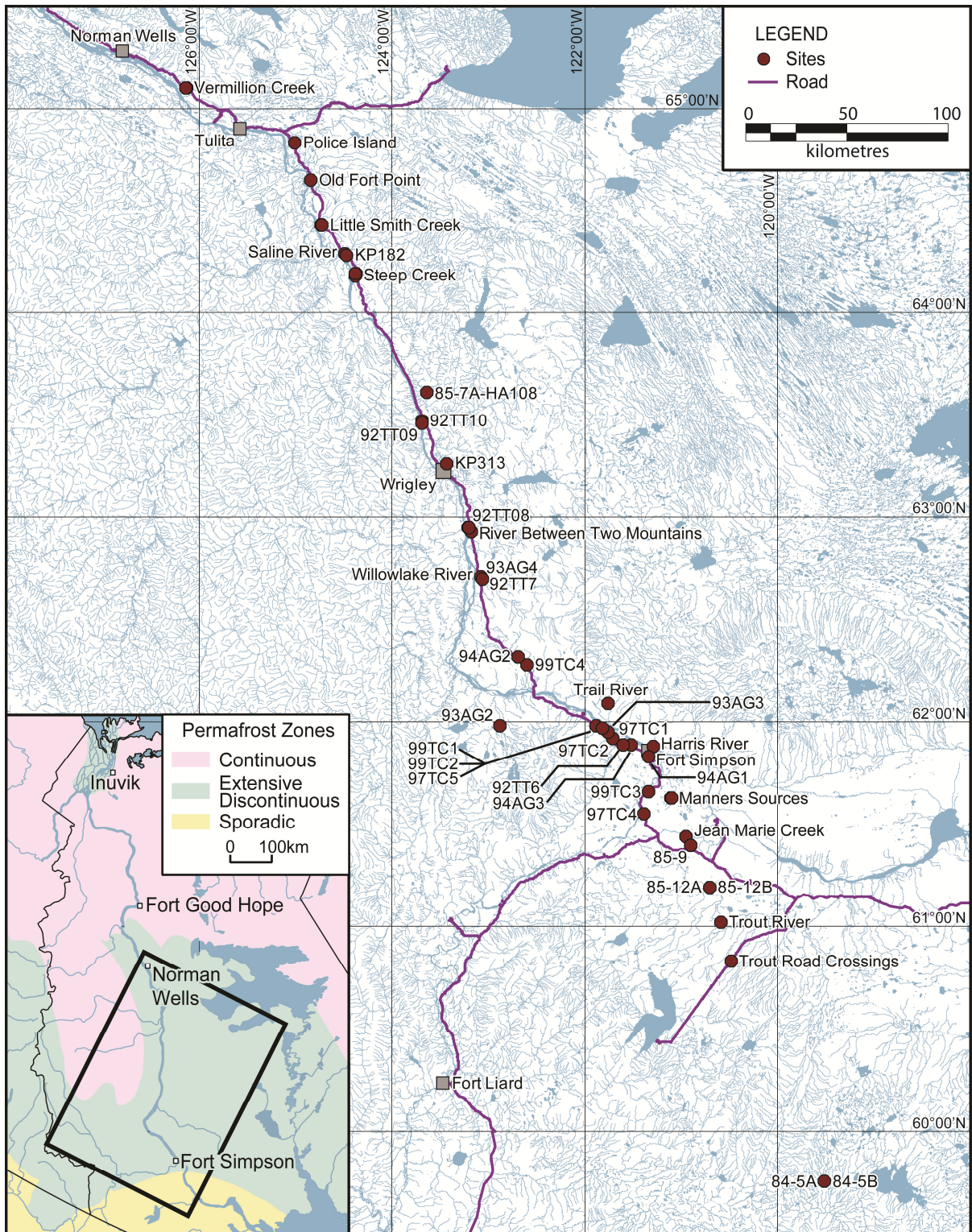


Figure 3. Permafrost and active layer monitoring sites south of Norman Wells in the Sahtu and Deh Cho Settlement Regions.

3. DATA COLLECTION AND PRESENTATION

Site visits were conducted between late July and early October 2015 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 record was then assessed for completeness and daily, monthly and yearly averages were calculated.

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 2014-2015 period. For sites that had not been visited in the previous two or more years, the annual ground temperature envelopes for 2014-15 and the previous years are presented. For some sites that had not been visited in more than two years, the data logger may have stopped recording. This was the case for a few sites in the northern portion of the corridor that were instrumented in collaboration with Indigenous and Northern Affairs Canada in 2006-07 but had not been visited since 2009 (see Wolfe et al. 2010 and Stevens et al. 2011 for previous data collected from these sites). For these sites, the temperature for the most recent annual period is presented. Temperature envelopes 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 been presented in previous annual reports (e.g. Smith et al. 2015a).

At some sites the data logger malfunctioned or instrumentation was damaged so that a continuous temperature record could not be acquired. At other sites, cables are not connected to data loggers. For these sites the manual temperature measurements made during the summer or fall 2015 site visit are presented in Appendix A.

Mean annual ground temperature (MAGT) for each site was determined at the depth of zero annual amplitude (ZAA). 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 was determined for the depth of the shallowest sensor for which the seasonal variation is less than 0.1°C. For sites with cables shallower than the ZAA depth, MAGT at the deepest measurement depth was determined. The MAGT based on data collected for the 2013-15 period is shown in Figure 4. Throughout the discontinuous zone, MAGT is generally above -2°C with colder conditions at the transition between discontinuous and continuous permafrost zones, but still above -2.5°C. Permafrost in the northern portion of the corridor is generally much colder with MAGT below -4°C at many sites and lower than -6°C at tundra upland sites. However, permafrost can still be quite warm at some sites due to their proximity to water bodies and also deep snow covers (e.g. Burn and Kokelj 2009; Smith et al. 2010b).

Air and ground surface temperature records were visually checked and any irregularities were removed. The record was then assessed for completeness and daily, monthly and yearly averages were calculated. Monthly averages of air and ground surface temperatures are presented in graphical and tabular format in Appendix A. Tables 1 and 2 identify air and ground surface temperature records associated with or next to a permafrost monitoring site or an active layer monitoring site. The air and

ground surface temperature data collected prior to 2015 is summarized in Duchesne et al. (2014) as well as previous annual reports (e.g. Smith et al. 2015a).

The 2014 active layer thickness data determined from thaw tubes are presented in Table 2 for all active layer monitoring sites that were visited in late July or early August 2015. Data collected prior to 2015 have been published in Smith et al. (2009b) and previous annual reports (e.g. Smith et al. 2015) and have also been summarized in Duchesne et al. (2015a,b). For active layer monitoring sites not visited in 2014, the values represent the estimated maximum depth of thaw penetration of the previous two summers.

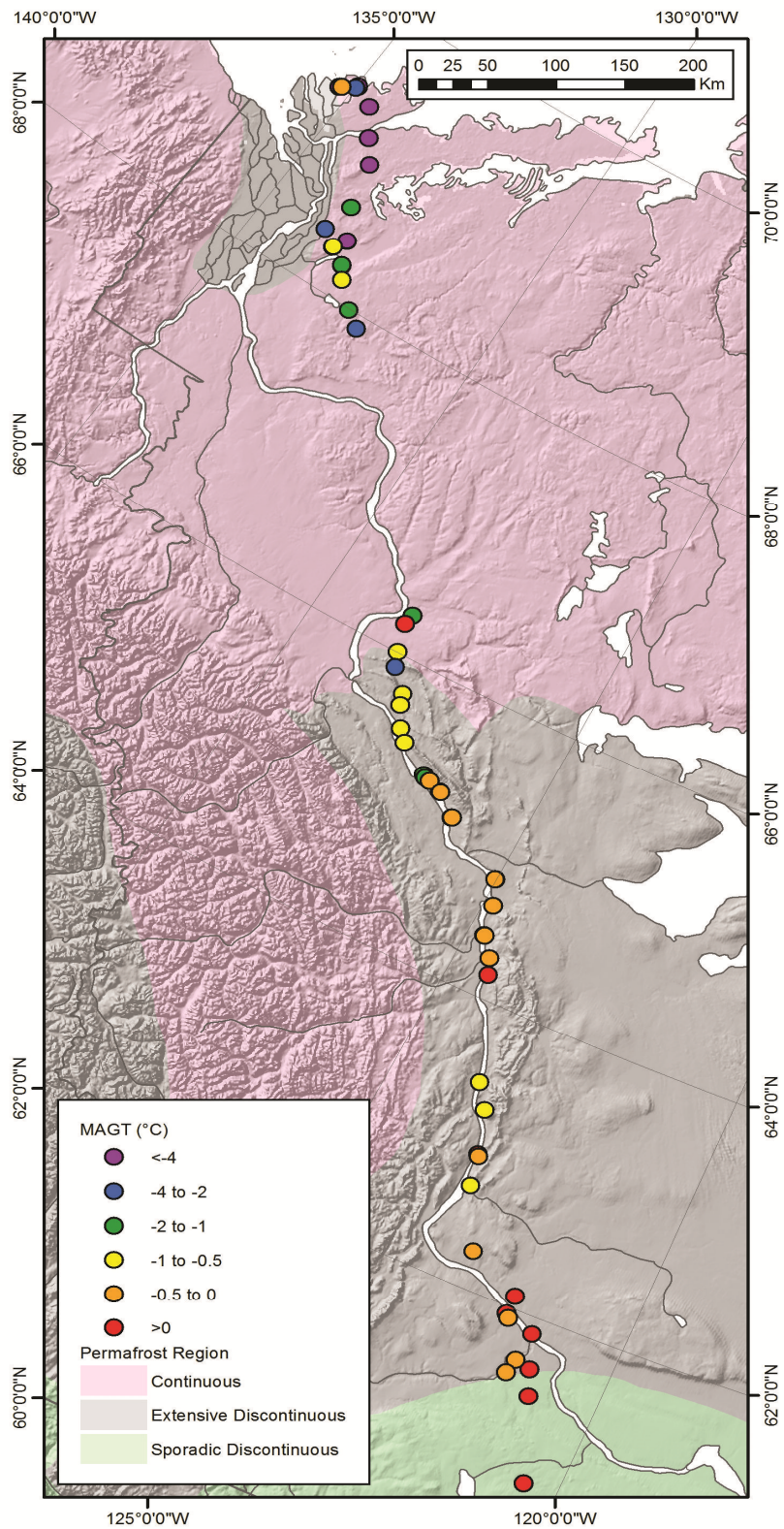


Figure 4. Current MAGT for the Mackenzie corridor based on temperature at ZAA depth or the measurement depth closest to it.

4. CHANGES OVER TIME

4.1 Changes in Ground Temperatures 2007-2015

Many of the monitoring sites were established in 2007 and data are now available for about eight 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.

MAGT at the ZAA depth or the measurement depth closest to it has been determined for each year for the 2007-15 period. 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 either September 1 to August 31 or August 1 to July 31 depending on the schedule for the site visit. Time series for selected permafrost sites are shown and discussed below for the following regions of the corridor: Northern-Delta area; Northern Inuvik area; Norman Wells to Fort Good Hope; Norman Wells to Wrigley; South of Wrigley.

Limited records to 2015 are available for the most northerly sites (Figure 5) since the loggers at many of these sites stopped prior to 2014. However, the available data suggests a general warming of permafrost since 2010 of about $0.04^{\circ}\text{C}\text{y}^{-1}$ based on the records for the tundra upland site at KC-07. A general warming of permafrost has also been observed for most of the sites in the Inuvik area (Figure 6) ranging from $<0.05^{\circ}\text{C}\text{y}^{-1}$ for warmer permafrost to about $0.1^{\circ}\text{C}\text{y}^{-1}$ for the colder permafrost sites with most of the change occurring since 2011 at most sites. It should be noted however that the measurement depths for these sites is shallower than for most of the more northerly sites which is part of the reason the change in ground temperature is greater.

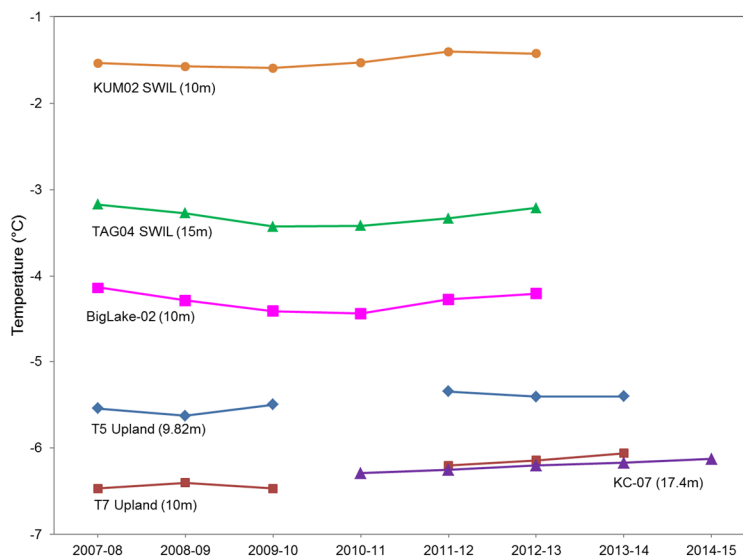


Figure 5. MAGT for selected northern-Delta sites. ZAA depth is below the measurement depth for all sites except KC-07.

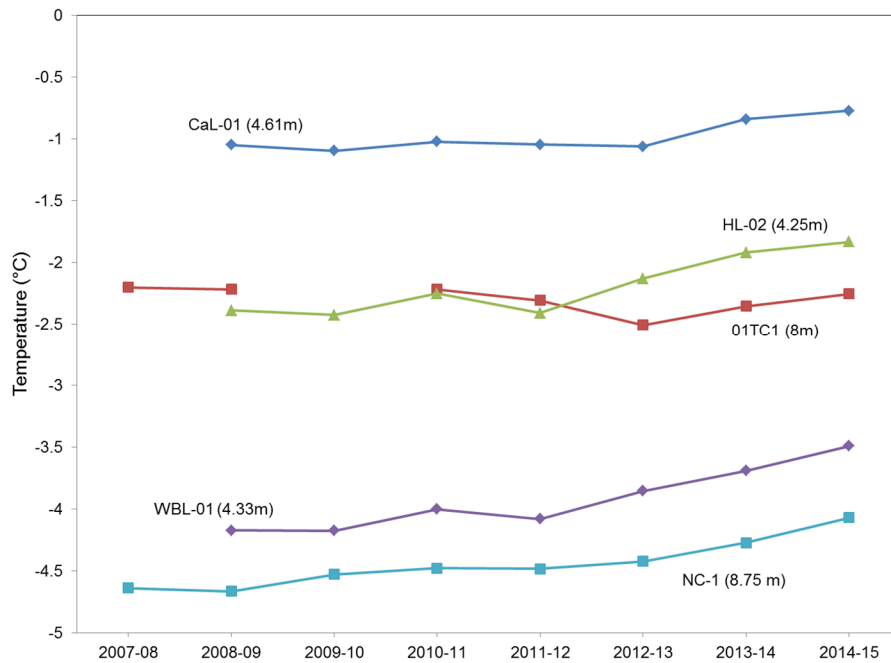


Figure 6. MAGT for selected Inuvik area sites. ZAA depth is below the measurement depth for all sites except CaL-01.

For warmer permafrost in the central and southern Mackenzie Valley, the change in MAGT has been relatively small compared to that for the colder permafrost sites in the continuous permafrost region. Between Norman Wells and Fort Good Hope, MAGT has increased over the last eight years by up to $0.03^{\circ}\text{C}\text{y}^{-1}$ (Figure 7). Further south at sites between Norman Wells and Wrigley, increases in MAGT have been less than $0.02^{\circ}\text{C}\text{y}^{-1}$ and, for some sites, little change or a slight cooling has recently been observed (Figure 8). Analysis of longer records for the central Mackenzie Valley (see Smith et al. 2015b) indicates a general warming of permafrost since the mid-1980s with a MAGT increasing at a lower rate more recently. At sites south of Wrigley there has been little change in permafrost temperatures (Figure 9) with a small increase at some sites ($<0.01^{\circ}\text{C}\text{y}^{-1}$). Cooling has been observed over the last three years at WLR-1, however it should be noted that the measurement depth is shallow and well above the ZAA depth, and therefore exhibits a greater amount of seasonal variation.

Air temperature records from Environment Canada weather stations (Figure 10) 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 portion of the corridor (Figure 5 and 6) appears to be consistent with the overall increase in air temperature. In the central valley MAGT has increased at some sites since 2010 (Figure 7 and 8) and this may be a result of the warmer air temperatures between 2010 and 2015 compared to those between 2007 and 2009. In the southern portion of the corridor the small increases in MAGT (Figure 9) may also be associated with warmer air temperatures over the last 5 years.

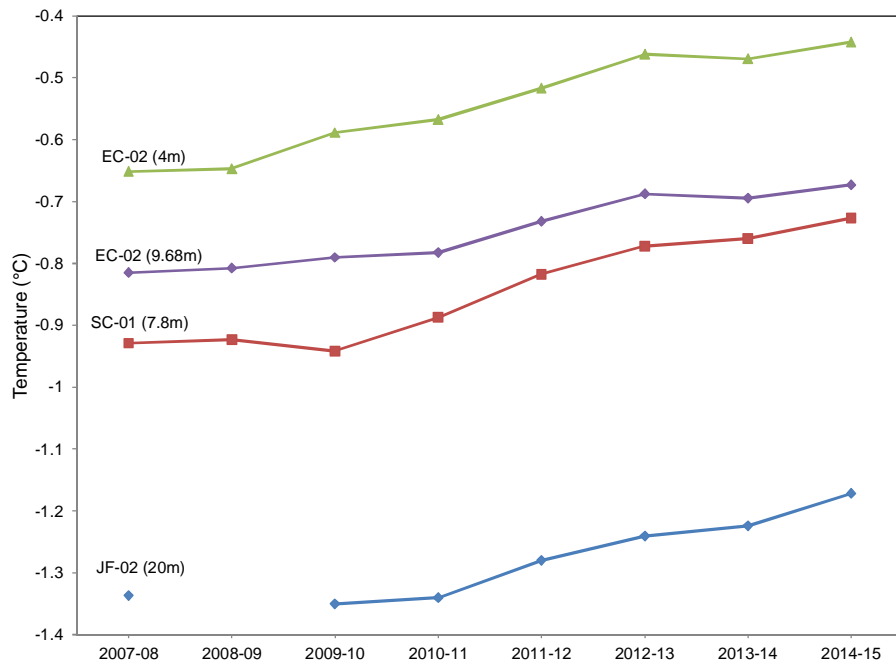


Figure 7. MAGT for selected sites between Norman Wells and Fort Good Hope.

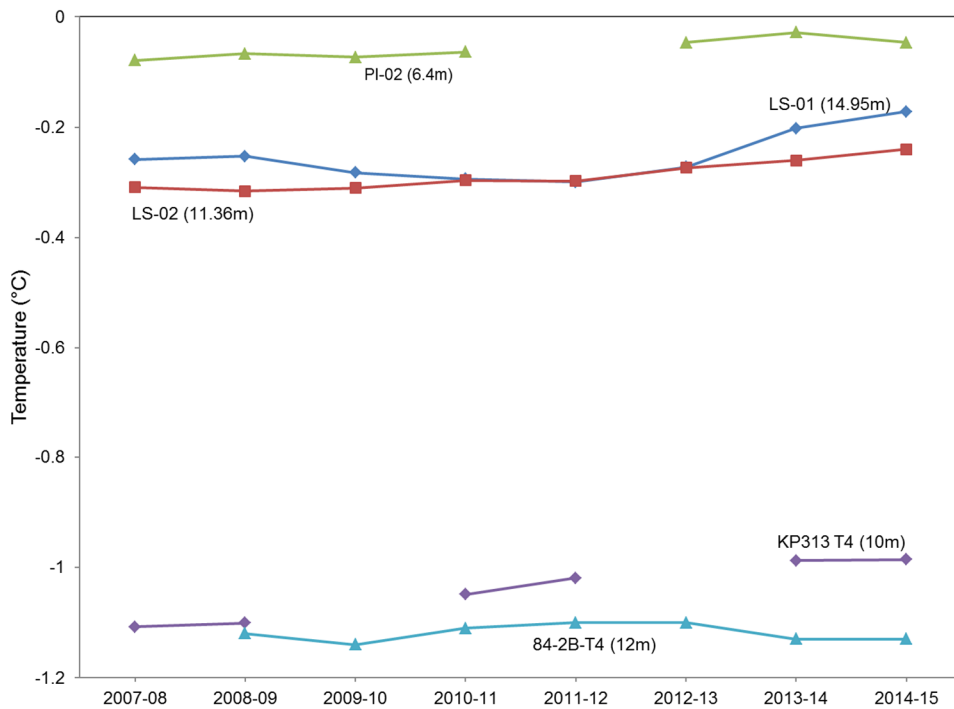


Figure 8. MAGT for selected sites between Norman Wells and Wrigley. ZAA depth at PI-02 is deeper than the measurement depth.

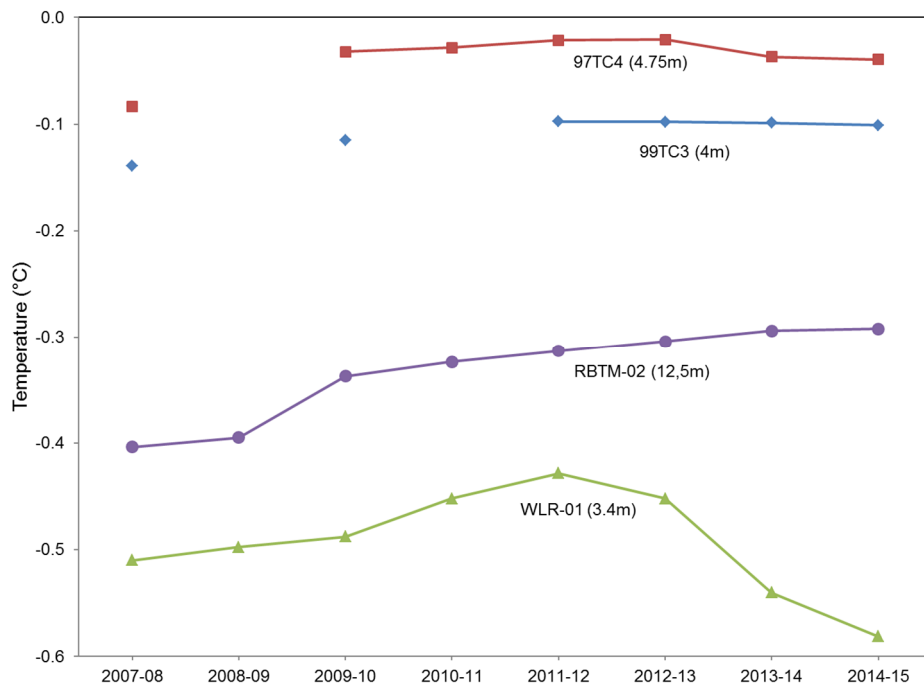


Figure 9. MAGT at selected sites south of Wrigley. ZAA depth for WLR-01 is below the measurement depth.

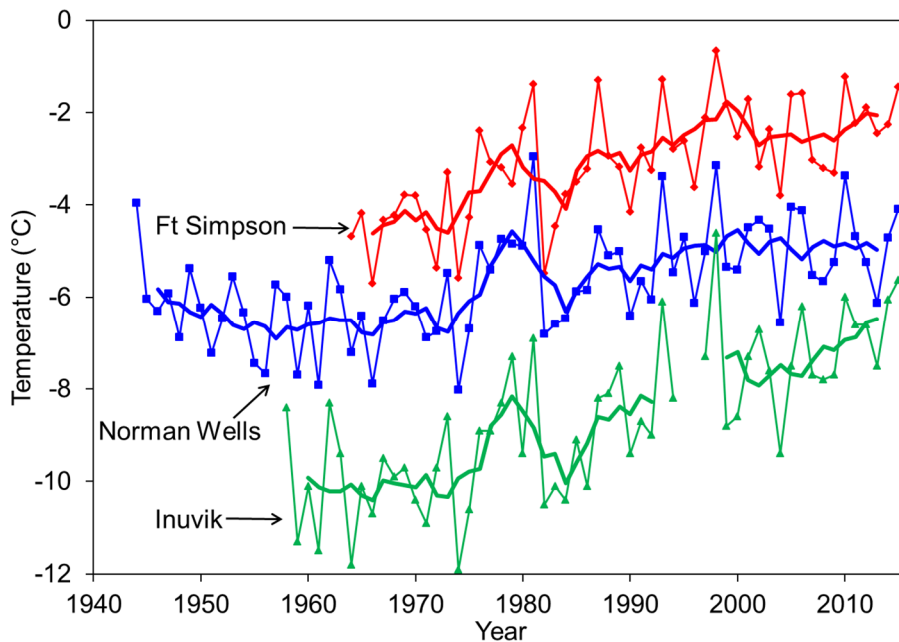


Figure 10. Mean annual air temperature for three Environment Canada weather stations in the Mackenzie Valley. The thick line represents the 5-year running mean. Data from Environment Canada (<http://climate.weather.gc.ca/>).

Overall, MAGTs are currently higher than when most of the sites were established in 2007. During the International Polar Year (IPY) a baseline was established for the 2007-09 period (Smith et al. 2010b). Figure 11 summarizes the difference between current MAGT and the IPY baseline for all sites in the Mackenzie Valley. In general, changes in MAGT over the last eight years have been greater for colder permafrost sites or unfrozen sites. At some colder permafrost sites, current MAGT is as much as 0.5°C higher than the IPY baseline. 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 (e.g. Bonnaventure et al. 2015; Smith et al. 2010b).

4.2 Changes in Active Layer Thickness

Active layer thickness (ALT) exhibits much greater interannual variation than the deeper ground temperature measurements. The change in ALT, relative to the 10 year mean for 2003-12 is summarized for 25 sites in Figure 12. ALT has generally increased since 2008 and exceeded the long-term mean since 2009, reaching a peak in 2012, but still less than the maximum in 1998 which was one of the warmest years on record (Duchesne et al. 2015a). This recent increase in ALT is likely in response to warmer air temperatures (Figure 10). ALT decreased slightly after 2012.

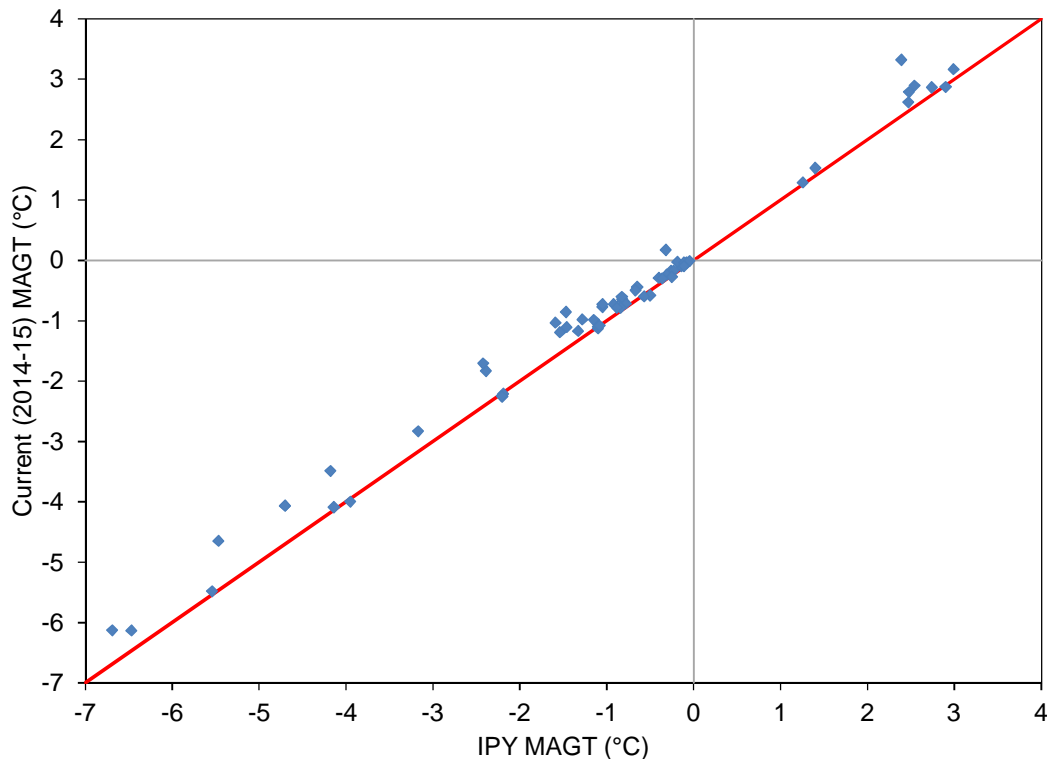


Figure 11. Comparison of current MAGT with the IPY baseline.

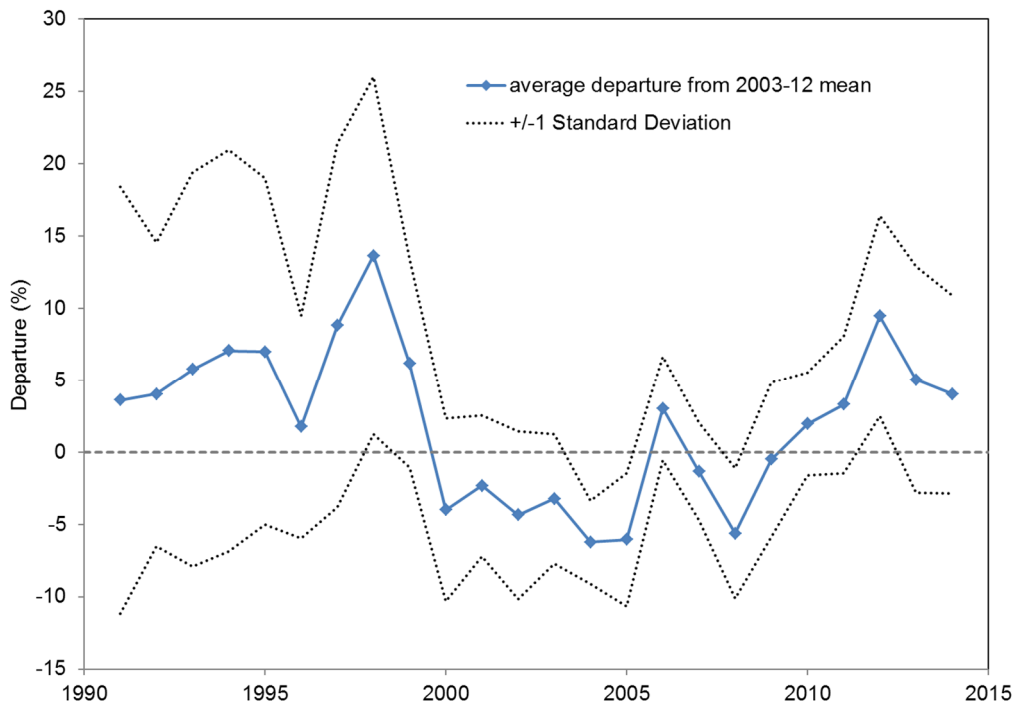


Figure 12. Mean ALT departures (%) from the 2003-12 mean for 25 thaw tube sites.

5. SUMMARY

This report provided a summary of field activities between late July and early October 2015 in the Mackenzie corridor. A summary of the ground thermal data collected at permafrost monitoring sites in 2015 for the previous one-year period has been presented in graphical and tabular format. The 2014 active layer thickness data for active layer monitoring sites visited in 2015 were also provided. 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

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APPENDIX A

GRAPHICAL AND TABULAR PRESENTATION OF AIR AND GROUND TEMPERATURE DATA FOR THE PERIOD 2014-15

The annual maximum (red line) and minimum (blue line) temperature profile, or ground temperature envelope, is provided for each site for which a continuous 2014-15 record of ground temperature is available. For sites that do not have a continuous record for 2014-15, the ground temperature profile based on a single manual measurement during the 2015 site visit (between late July and early October) is provided (green line). For sites not visited in 2014 but visited in 2015, the ground temperature envelope for 2013-14 and 2014-15 is provided. The thaw depth is provided for each site and is based on interpolation of temperature profiles unless otherwise noted. Where insufficient temperature data are available 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 2014-15 period (or 2013-15 period if site not visited in 2014) are 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.

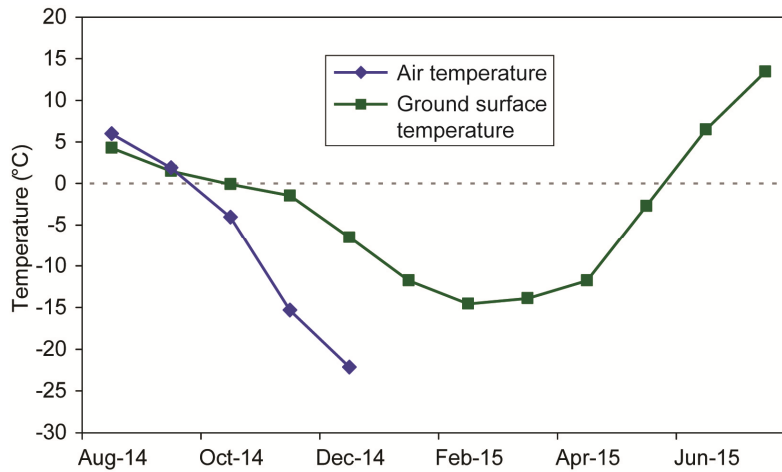
Landform: Thermokarst coastal plain

Vegetation cover: Tundra

Thaw Depth: 0.59 m (probed)

Site visit: July 30, 2015

Month / Year	Temperature (°C)	
	Air	Surface
Aug / 2014	5.96	4.28
Sept / 2014	1.87	1.49
Oct / 2014	-4.08	-0.09
Nov / 2014	-15.33	-1.48
Dec / 2014	-22.14	-6.54
Jan / 2015	n/a	-11.76
Feb / 2015	n/a	-14.55
Mar / 2015	n/a	-13.89
Apr / 2015	n/a	-11.77
May / 2015	n/a	-2.70
Jun / 2015	n/a	6.47
Jul / 2015	n/a	13.42



Big Lake 1

Inuvialuit Settlement Region

Latitude: 69.39 N

Longitude: 134.96 W

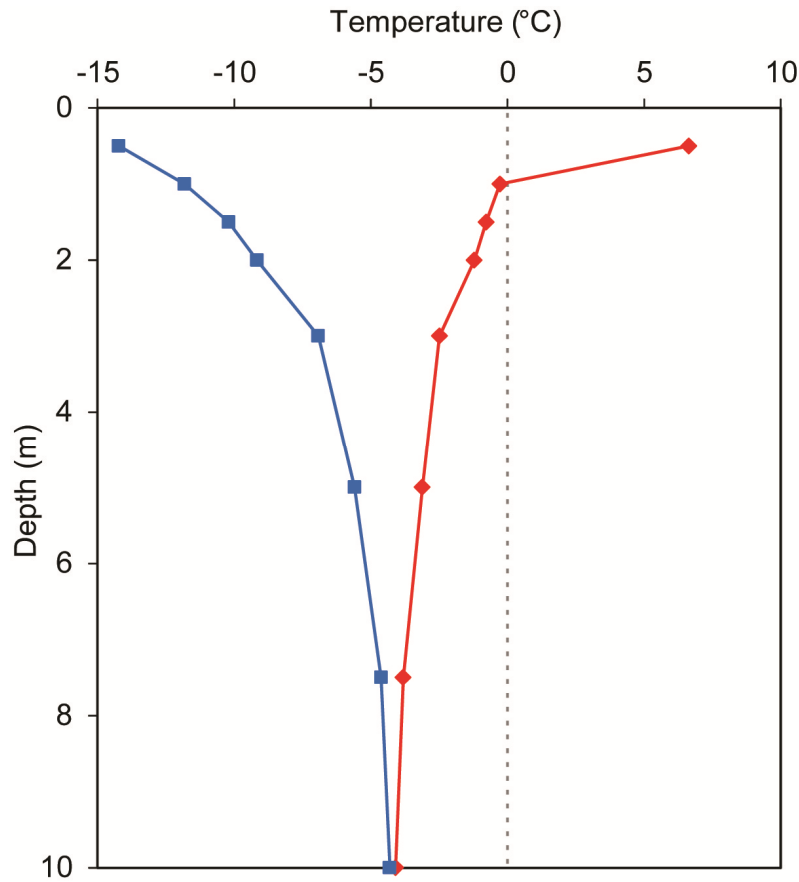
Elevation: n/a

Landform: Polygonal wetlands

Vegetation cover: Sedge

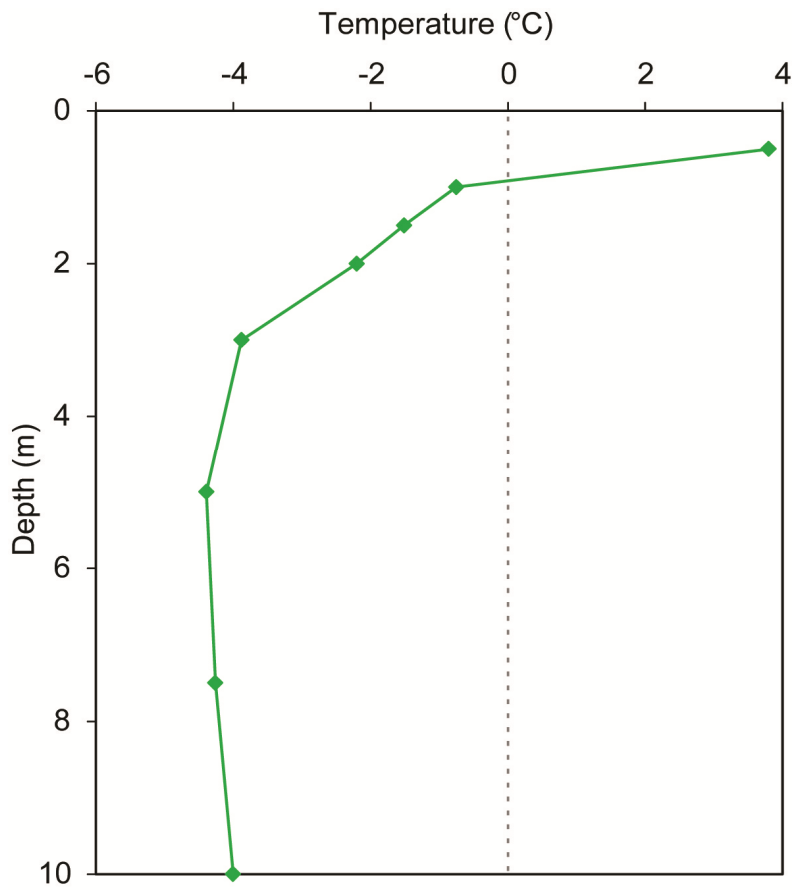
Thaw Depth: 0.98 m for 2012, 0.92 m for 2015

Site visit: July 29, 2015



Sep 2011 – Aug 2012		
Depth (m)	Max (°C)	Min (°C)
0.5	6.64	-14.22
1	-0.28	-11.82
1.5	-0.78	-10.20
2	-1.21	-9.16
3	-2.49	-6.92
5	-3.12	-5.59
7.5	-3.81	-4.62
10	-4.09	-4.30

Big Lake 1 (manual reading July 2015)



Depth (m)	Temp (°C)
0.5	3.8
1	-0.75
1.5	-1.51
2	-2.2
3	-3.88
5	-4.39
7.5	-4.26
10	-4

Big Lake 2

Inuvialuit Settlement Region

Latitude: 69.39 N

Longitude: 134.97 W

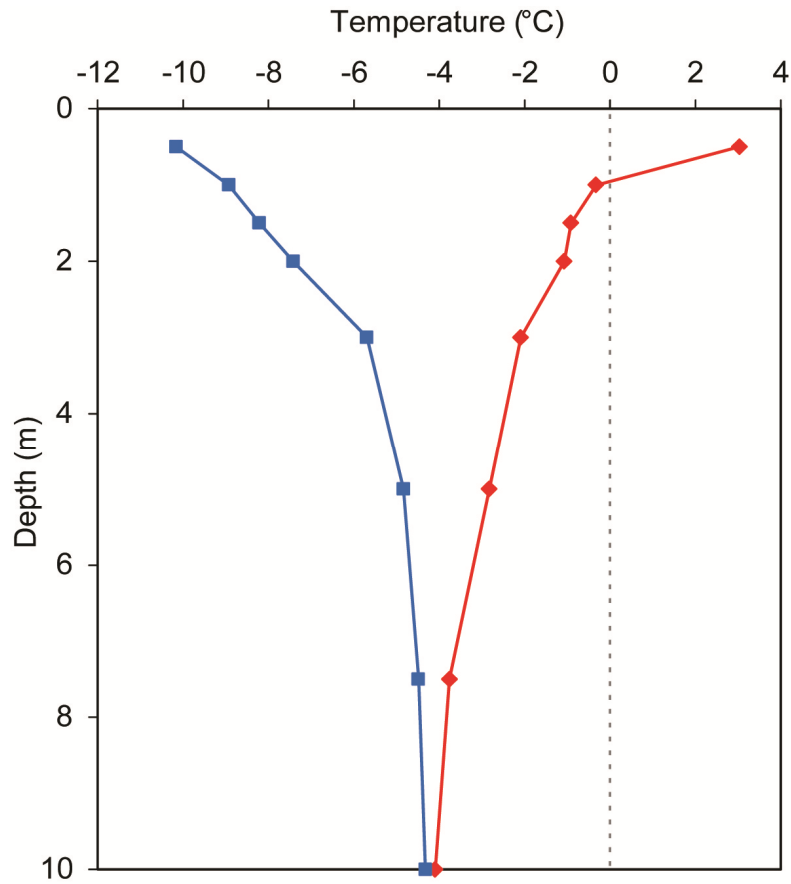
Elevation: n/a

Landform: Polygonal wetlands

Vegetation cover: Sedge

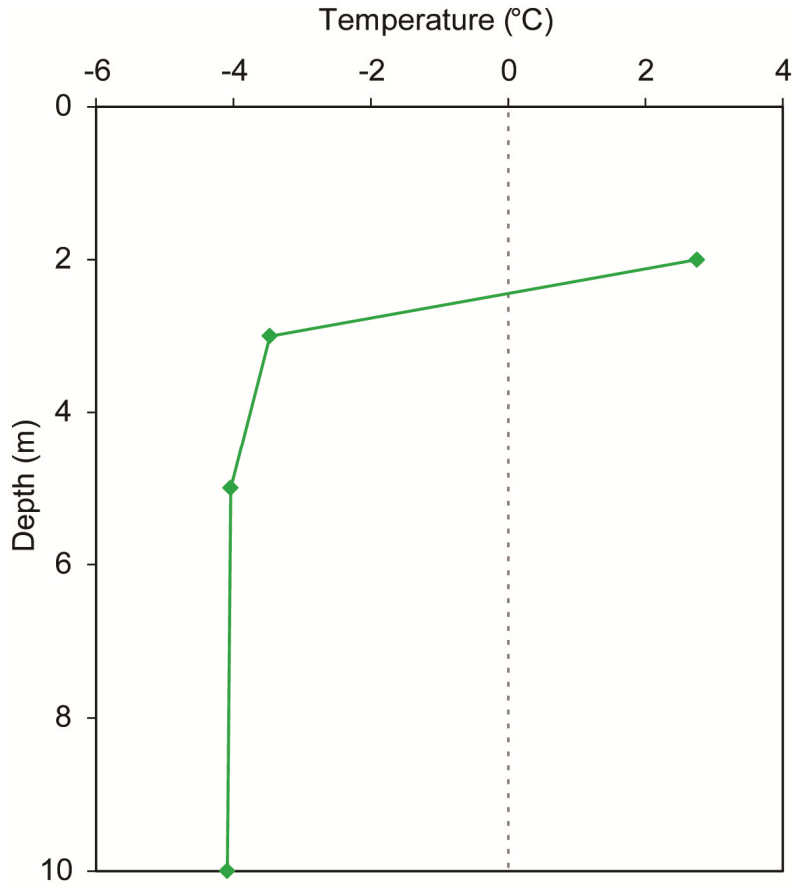
Thaw Depth: 0.95 m for 2013, 2.44 m for 2015

Site visit: July 29, 2015



Sep 2012 – Aug 2013		
Depth (m)	Max (°C)	Min (°C)
0.5	3.03	-10.16
1	-0.33	-8.93
1.5	-0.91	-8.21
2	-1.07	-7.42
3	-2.09	-5.70
5	-2.83	-4.83
7.5	-3.76	-4.48
10	-4.10	-4.32

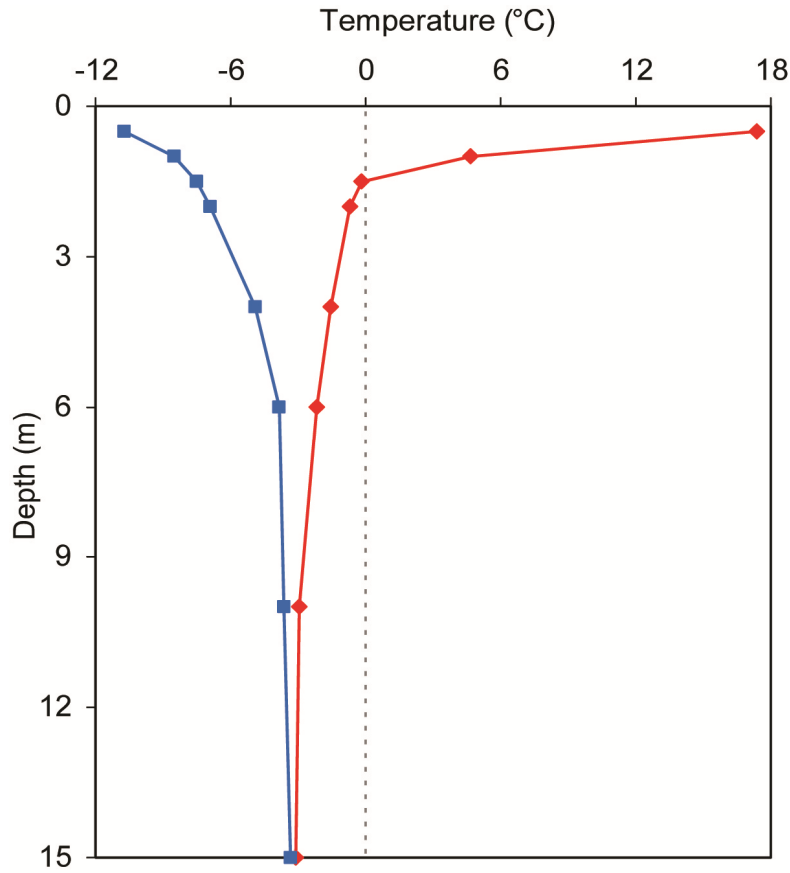
Big Lake 2 (manual reading July 2015)



Depth (m)	Temp (°C)
2	2.75
3	-3.47
5	-4.04
10	-4.09

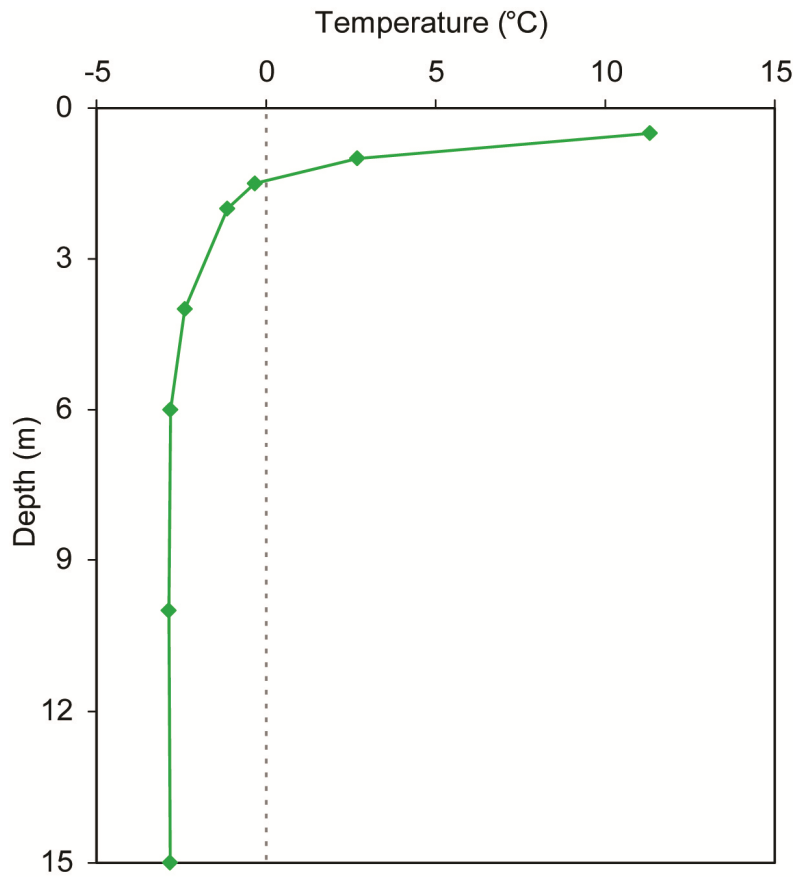
Taglu — TAG04 SWIL
Inuvialuit Settlement Region

Latitude: 69.37 N Longitude: 134.98 W
 Elevation: n/a
 Landform: Point Bar
 Vegetation cover: Dwarf willow shrubs
 Thaw Depth: 1.18 m for 2013, 1.16 m for 2015
 Site visit: July 29, 2015



Sep 2012 – Aug 2013		
Depth (m)	Max (°C)	Min (°C)
0.5	17.39	-10.73
1	4.66	-8.50
1.5	-0.18	-7.51
2	-0.70	-6.91
4	-1.55	-4.91
6	-2.17	-3.84
10	-2.95	-3.63
15	-3.10	-3.33

Taglu — TAG04 SWIL (manual reading July 2015)



Depth (m)	Temp (°C)
0.5	11.32
1	2.69
1.5	-0.33
2	-1.14
4	-2.4
6	-2.82
10	-2.87
15	-2.83

Taglu — 91TTC

Inuvialuit Settlement Region

Latitude: 69.37 N

Longitude: 134.95 W

Elevation: 15 m a.s.l.

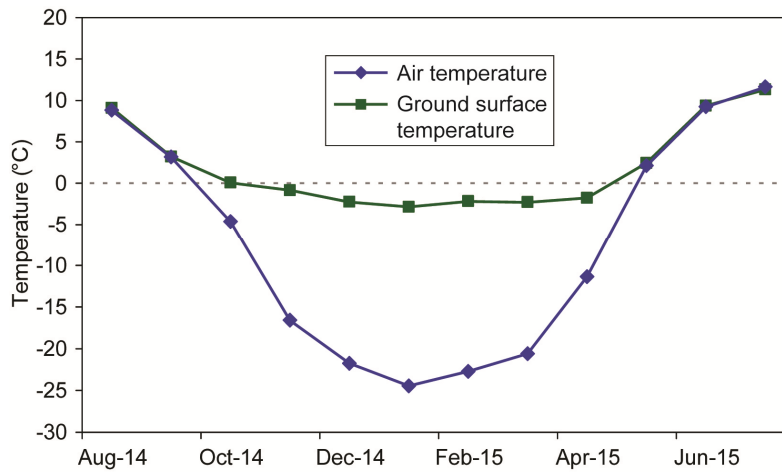
Landform: Surface of Holocene Mackenzie delta

Vegetation cover: Low shrub tundra

Thaw Depth: >1.35 m (probed)

Site visit: July 29, 2015

Month / Year	Temperature (°C)	
	Air	Surface
Aug / 2014	8.80	9.08
Sept / 2014	3.14	3.22
Oct / 2014	-4.66	0.05
Nov / 2014	-16.60	-0.86
Dec / 2014	-21.77	-2.27
Jan / 2015	-24.46	-2.87
Feb / 2015	-22.73	-2.19
Mar / 2015	-20.60	-2.31
Apr / 2015	-11.37	-1.78
May / 2015	2.10	2.44
Jun / 2015	9.22	9.36
Jul / 2015	11.62	11.30



Kumak — KUM02 SWIL

Inuvialuit Settlement Region

Latitude: 69.32 N

Longitude: 135.21 W

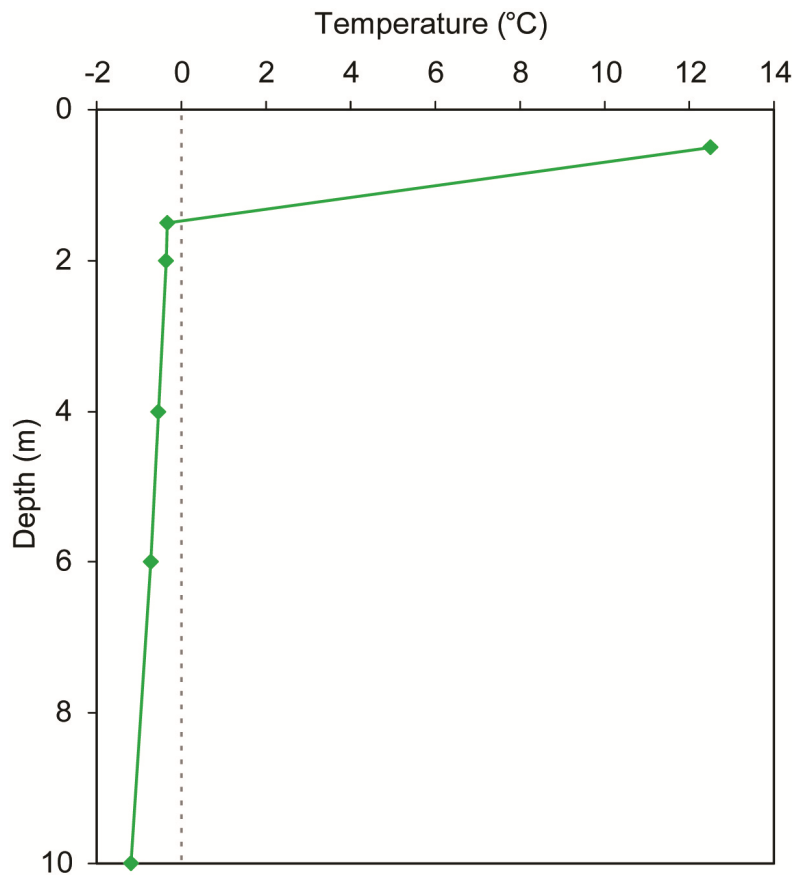
Elevation: n/a

Landform: Point bar

Vegetation cover: Dwarf willow shrubs

Thaw Depth: 1.47 m

Site visit: July 29, 2015



Depth (m)	Temp (°C)
0.5	12.5
1.5	-0.33
2	-0.36
4	-0.54
6	-0.72
10	-1.19

Kumak — KUM02 TWIL

Inuvialuit Settlement Region

Latitude: 69.32 N

Longitude: 135.21 W

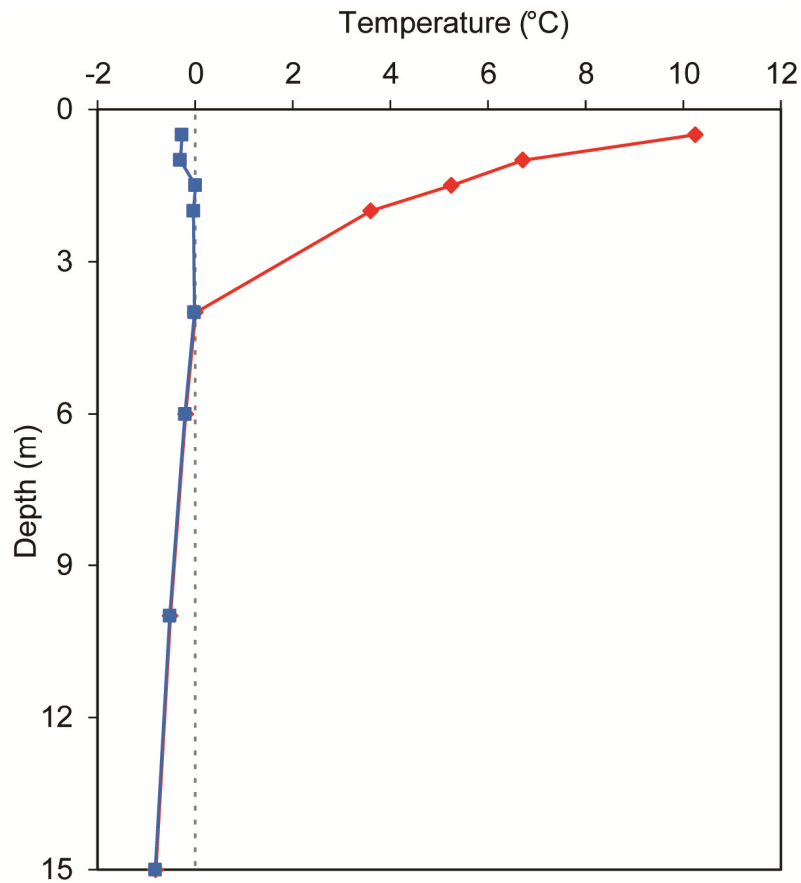
Elevation: n/a

Landform: Point bar

Vegetation cover: Tall willow shrubs

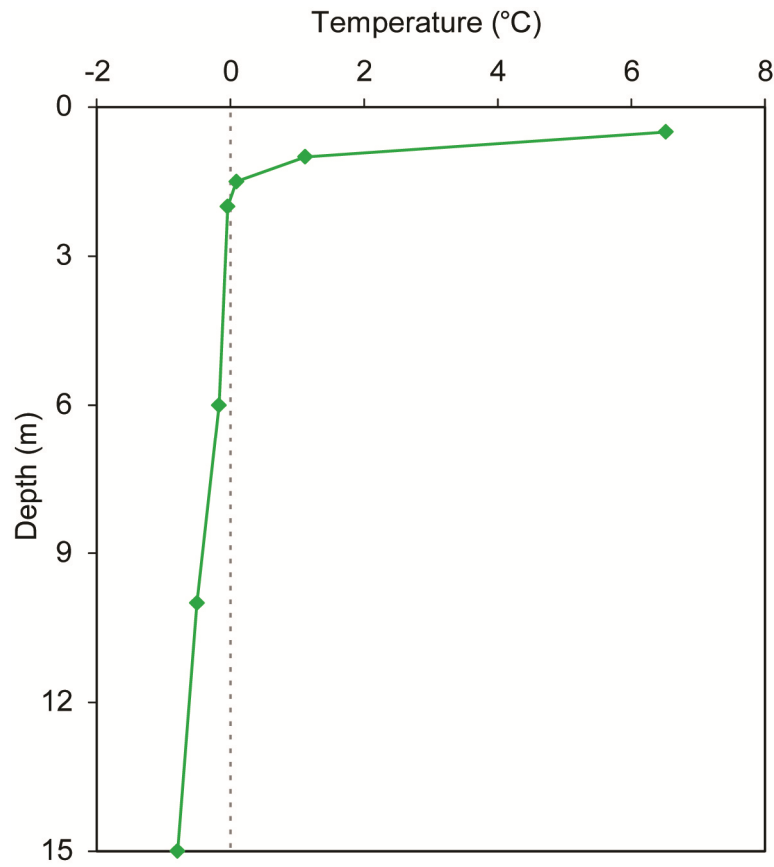
Thaw Depth: 4.0 m for 2012, 1.54 m for 2015

Site visit: July 29, 2015



Sep 2011 – Aug 2012		
Depth (m)	Max (°C)	Min (°C)
0.5	10.25	-0.27
1	6.71	-0.31
1.5	5.25	0.00
2	3.60	-0.04
4	0.00	-0.02
6	-0.19	-0.21
10	-0.51	-0.52
15	-0.81	-0.82

Kumak — KUM02 TWIL (manual reading July 2015)



Depth (m)	Temp (°C)
0.5	6.52
1	1.12
1.5	0.09
2	-0.04
6	-0.17
10	-0.5
15	-0.79

Kumak — KC-07

Inuvialuit Settlement Region

Latitude: 69.31 N

Longitude: 135.25 W

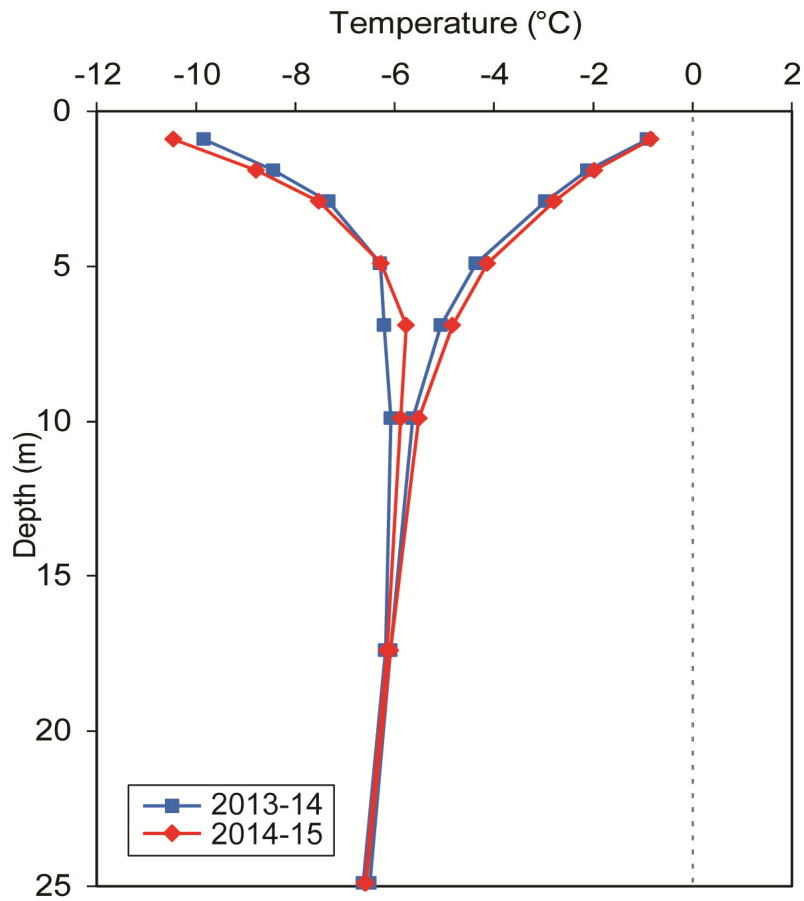
Elevation: n/a

Landform: Tundra upland

Vegetation cover: Grass and moss tundra

Thaw Depth: n/a

Site visit: July 29, 2015



Aug 2013 – Jul 2014		
Depth (m)	Max (°C)	Min (°C)
0.9	-0.91	-9.84
1.9	-2.12	-8.44
2.9	-2.97	-7.33
4.9	-4.36	-6.29
6.9	-5.07	-6.21
9.9	-5.64	-6.07
17.4	-6.08	-6.18
24.9	-6.50	-6.64

Aug 2014 – Jul 2015		
Depth (m)	Max (°C)	Min (°C)
0.9	-0.84	-10.45
1.9	-1.98	-8.79
2.9	-2.79	-7.52
4.9	-4.13	-6.27
6.9	-4.84	-5.77
9.9	-5.52	-5.88
17.4	-6.09	-6.15
24.9	-6.57	-6.60

Dennis Lake — T7 Upland

Inuvialuit Settlement Region

Latitude: 69.31 N

Longitude: 134.54 W

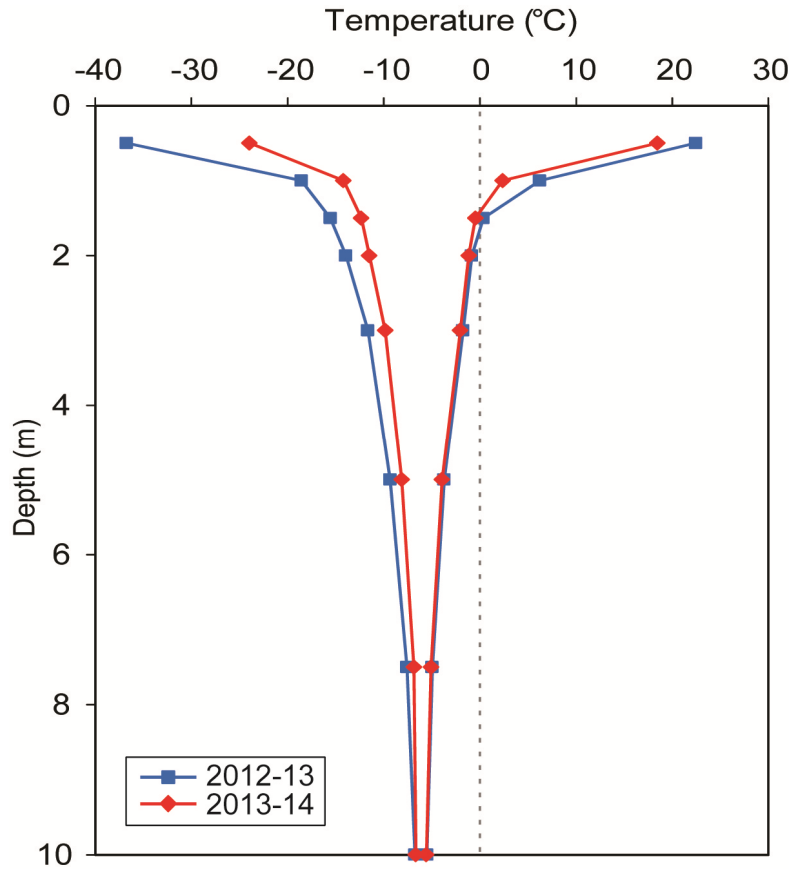
Elevation: n/a

Landform: Moraine uplands

Vegetation cover: Dwarf birch tundra with willow and alder shrubs

Thaw Depth: 1.53 m for 2013, 1.07 m for 2014, 1.07 m for 2015

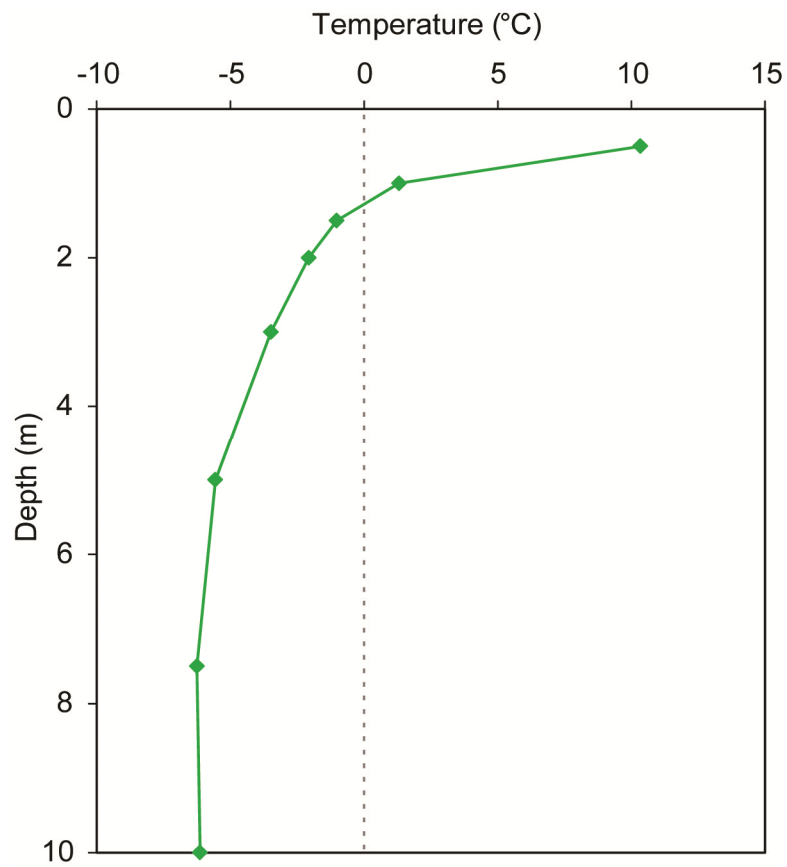
Site visit: July 30, 2015



Sep 2012 – Aug 2013		
Depth (m)	Max (°C)	Min (°C)
0.5	22.45	-36.76
1	6.22	-18.56
1.5	0.34	-15.56
2	-0.85	-13.94
3	-1.77	-11.65
5	-3.72	-9.34
7.5	-4.96	-7.59
10	-5.52	-6.76

Sep 2013 – Aug 2014		
Depth (m)	Max (°C)	Min (°C)
0.5	18.47	-23.97
1	2.35	-14.19
1.5	-0.48	-12.34
2	-1.17	-11.49
3	-2.06	-9.84
5	-3.94	-8.14
7.5	-5.08	-6.87
10	-5.59	-6.67

Dennis Lake — T7 Upland (manual reading July 2015)



Depth (m)	Temp (°C)
0.5	10.34
1	1.31
1.5	-1.02
2	-2.07
3	-3.48
5	-5.56
7.5	-6.25
10	-6.13

Lousy Point ridge — 90TT05

Inuvialuit Settlement Region

Latitude: 69.22 N

Longitude: 134.28 W

Elevation: 39 m a.s.l.

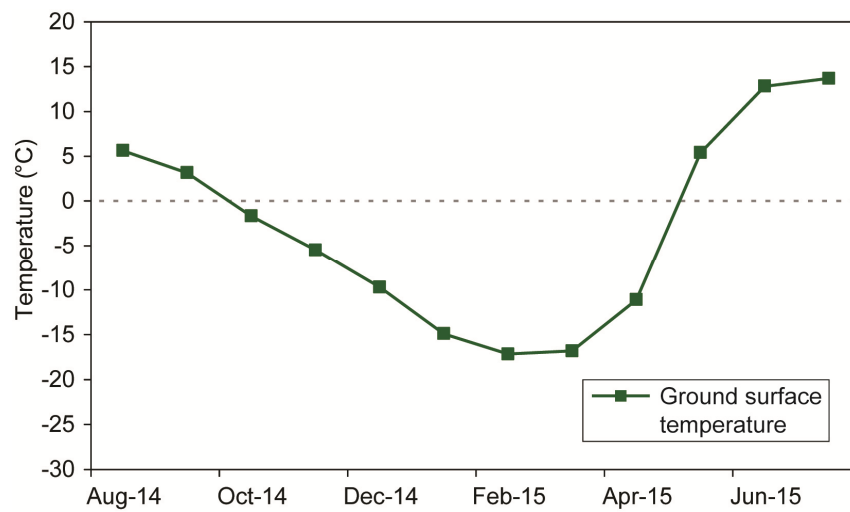
Landform: Glaciofluvial ridge

Vegetation cover: Low shrub tundra

Thaw depth: 0.84 m (probed)

Site visit: July 30, 2015

Month / Year	Temperature (°C)	
	Air	Surface
Aug / 2014	n/a	5.62
Sept / 2014	n/a	3.15
Oct / 2014	n/a	-1.69
Nov / 2014	n/a	-5.49
Dec / 2014	n/a	-9.70
Jan / 2015	n/a	-14.89
Feb / 2015	n/a	-17.16
Mar / 2015	n/a	-16.81
Apr / 2015	n/a	-11.11
May / 2015	n/a	5.39
Jun / 2015	n/a	12.81
Jul / 2015	n/a	13.68



Lousy Point Low Terrace — 90TT06

Inuvialuit Settlement Region

Latitude: 69.22 N

Longitude: 134.28 W

Elevation: 9 m a.s.l.

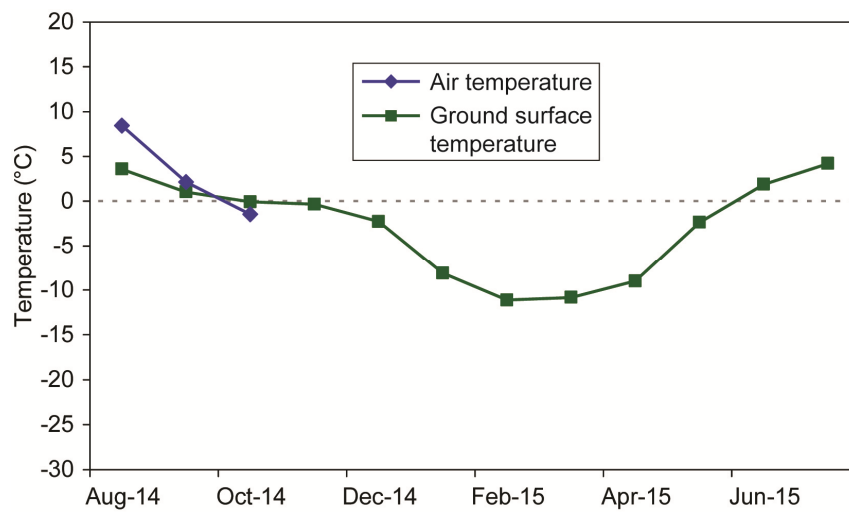
Landform: Glaciofluvial ridge

Vegetation cover: Low shrub tundra

Thaw depth: 0.44 m (probed)

Site visit: July 30, 2015

Month / Year	Temperature (°C)	
	Air	Surface
Aug / 2014	8.43	3.58
Sept / 2014	2.13	1.02
Oct / 2014	-1.46	-0.07
Nov / 2014	n/a	-0.34
Dec / 2014	n/a	-2.28
Jan / 2015	n/a	-8.12
Feb / 2015	n/a	-11.12
Mar / 2015	n/a	-10.84
Apr / 2015	n/a	-9.01
May / 2015	n/a	-2.37
Jun / 2015	n/a	1.87
Jul / 2015	n/a	4.19



Yaya Lake low — 90TT04

Inuvialuit Settlement Region

Latitude: 69.14 N

Longitude: 134.70 W

Elevation: 10 m a.s.l.

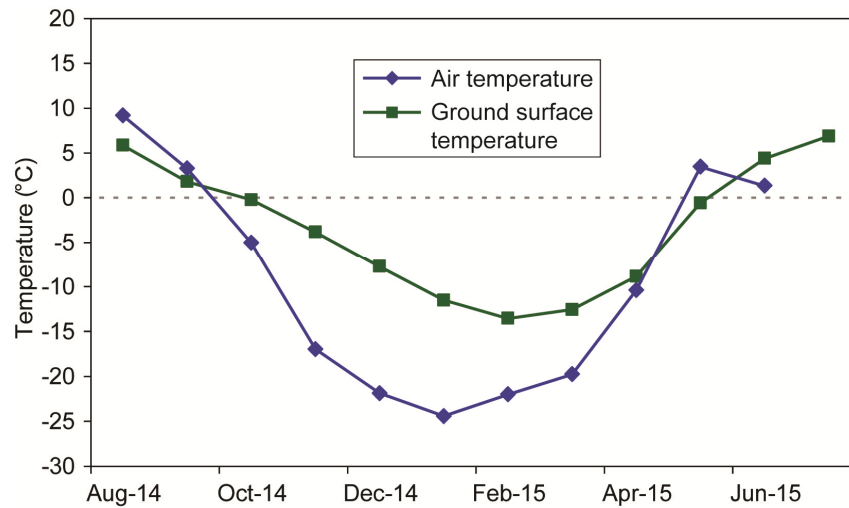
Landform: Ice contact complex

Vegetation cover: shrub tundra

Thaw Depth: n/a

Site visit: July 30, 2015

Month / Year	Temperature (°C)	
	Air	Surface
Aug / 2014	9.19	5.86
Sept / 2014	3.26	1.79
Oct / 2014	-5.04	-0.23
Nov / 2014	-16.96	-3.84
Dec / 2014	-21.87	-7.75
Jan / 2015	-24.43	-11.51
Feb / 2015	-22.01	-13.54
Mar / 2015	-19.77	-12.55
Apr / 2015	-10.40	-8.84
May / 2015	3.47	-0.57
Jun / 2015	1.33	4.38
Jul / 2015	n/a	6.88



East Channel — T6 Upland

Inuvialuit Settlement Region

Latitude: 69.12 N

Longitude: 134.19 W

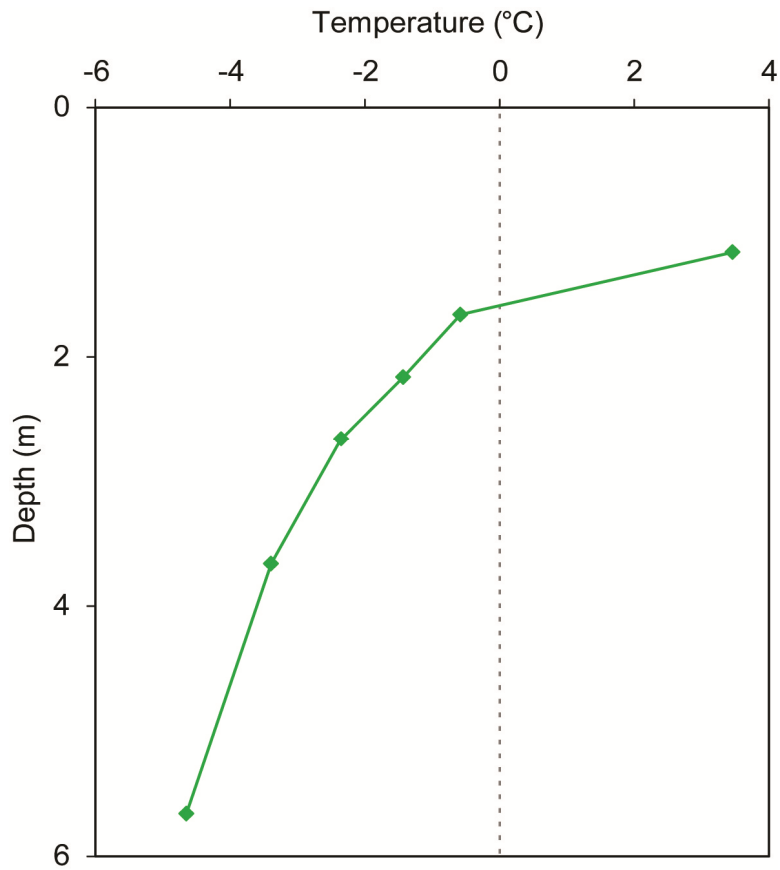
Elevation: n/a

Landform: Moraine uplands

Vegetation cover: Dwarf birch tundra with willow and alder shrubs

Thaw Depth: 1.59 m

Site visit: July 31, 2015



Depth (m)	Temp (°C)
1.16	3.46
1.66	-0.58
2.16	-1.43
2.66	-2.35
3.66	-3.39
5.66	-4.65

Parson's Lake — T5 Upland

Inuvialuit Settlement Region

Latitude: 68.96 N

Longitude: 133.84 W

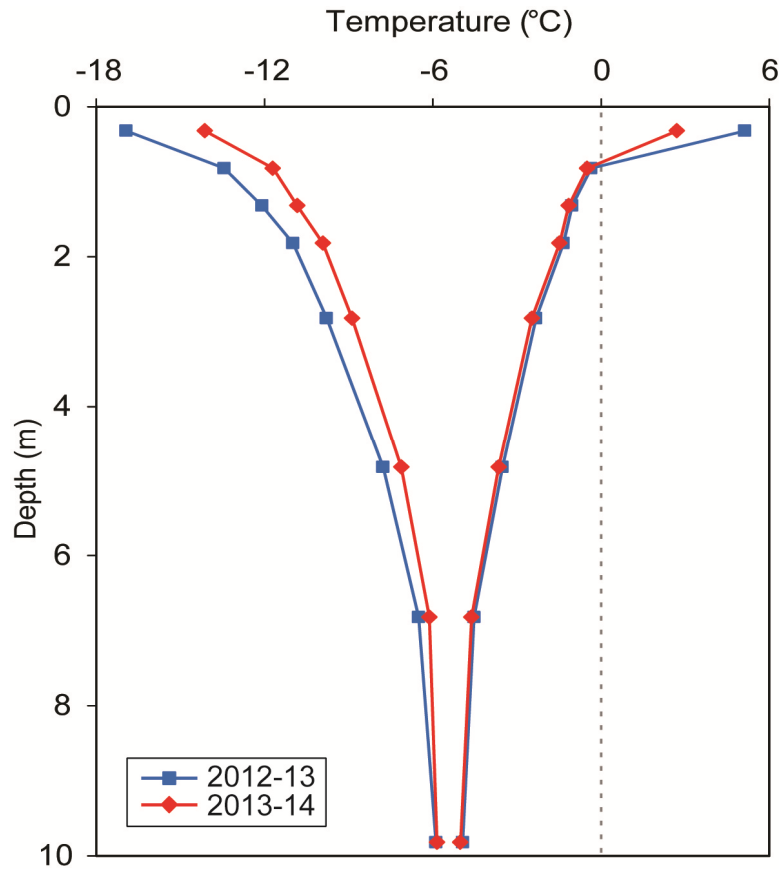
Elevation: n/a

Landform: Moraine uplands

Vegetation cover: Dwarf birch tundra with willow and alder shrubs

Thaw Depth: 0.79 m for 2013, 0.74 m for 2014

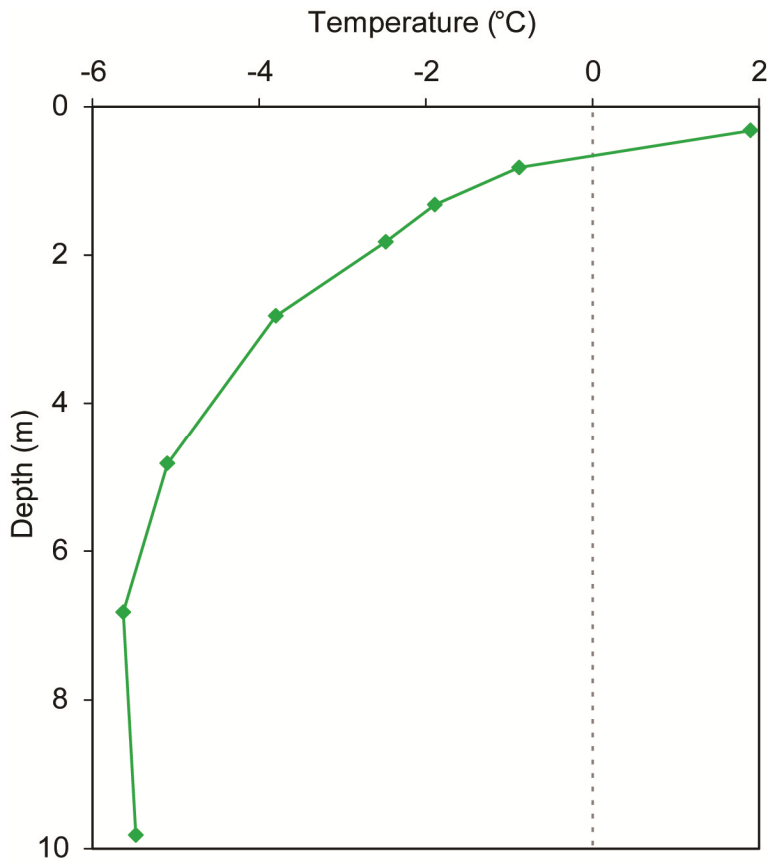
Site visit: July 31, 2015



Sep 2012 – Aug 2013		
Depth (m)	Max (°C)	Min (°C)
0.32	5.12	-16.93
0.82	-0.35	-13.44
1.32	-1.03	-12.09
1.82	-1.35	-10.99
2.82	-2.32	-9.79
4.82	-3.52	-7.77
6.82	-4.52	-6.51
9.82	-4.94	-5.89

Sep 2013 – Aug 2014		
Depth (m)	Max (°C)	Min (°C)
0.32	2.71	-14.13
0.82	-0.49	-11.70
1.32	-1.15	-10.83
1.82	-1.48	-9.92
2.82	-2.46	-8.88
4.82	-3.65	-7.13
6.82	-4.62	-6.12
9.82	-5.02	-5.85

Parson's Lake — T5 Upland (manual reading July 2015)



Depth (m)	Temp (°C)
0.32	1.9
0.82	-0.88
1.32	-1.89
1.82	-2.48
2.82	-3.8
4.82	-5.1
6.82	-5.63
9.82	-5.48

Parson's Lake — T5 Slump

Inuvialuit Settlement Region

Latitude: 68.96 N

Longitude: 133.84 W

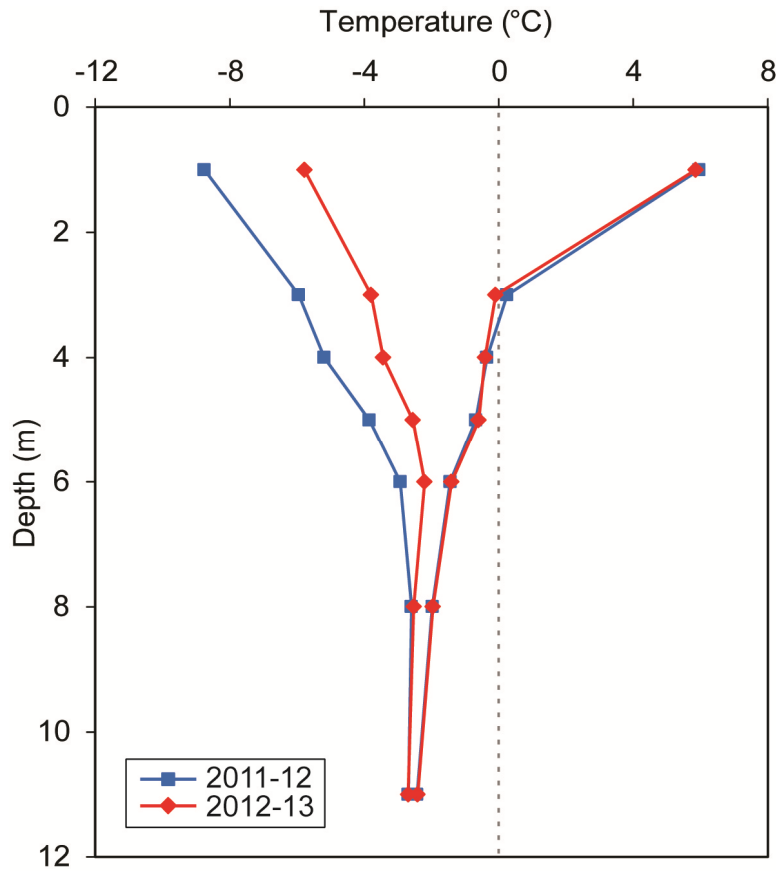
Elevation: n/a

Landform: Thaw slump

Vegetation cover: Willow and alder shrubs

Thaw Depth: 3.08 m for 2012, 2.97 m for 2013

Site visit: July 31, 2015



Sep 2011 – Aug 2012		
Depth (m)	Max (°C)	Min (°C)
1	5.96	-8.76
3	0.24	-5.95
4	-0.35	-5.19
5	-0.69	-3.85
6	-1.45	-2.93
8	-1.98	-2.60
11	-2.43	-2.69

Sep 2012 – Aug 2013		
Depth (m)	Max (°C)	Min (°C)
1	5.86	-5.78
3	-0.10	-3.80
4	-0.41	-3.44
5	-0.60	-2.56
6	-1.41	-2.21
8	-1.96	-2.53
11	-2.41	-2.69

Reindeer Station plateau — 91TT12

Inuvialuit Settlement Region

Latitude: 68.69 N

Longitude: 134.11 W

Elevation: 152 m a.s.l.

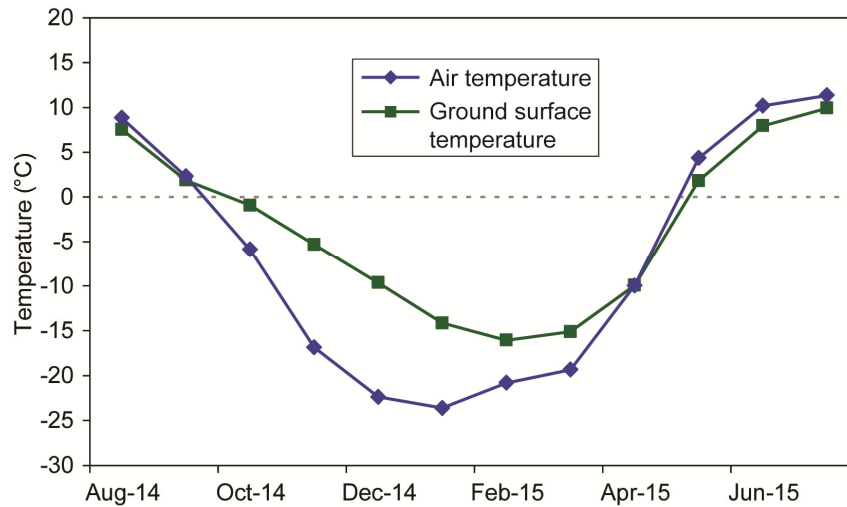
Landform: Plateau surface, till plain

Vegetation cover: Shrub tundra

Thaw Depth: 0.66 m (Probed)

Site visit: July 31, 2015

Month / Year	Temperature (°C)	
	Air	Surface
Aug / 2014	8.83	7.54
Sept / 2014	2.30	1.87
Oct / 2014	-5.89	-0.93
Nov / 2014	-16.85	-5.34
Dec / 2014	-22.38	-9.63
Jan / 2015	-23.61	-14.15
Feb / 2015	-20.82	-16.06
Mar / 2015	-19.34	-15.12
Apr / 2015	-9.98	-9.95
May / 2015	4.35	1.82
Jun / 2015	10.18	7.94
Jul / 2015	11.34	9.90



Reindeer Depot (Williams Island) — 91TT13

Inuvialuit Settlement Region

Latitude: 68.68 N

Longitude: 134.15 W

Elevation: 5 m a.s.l.

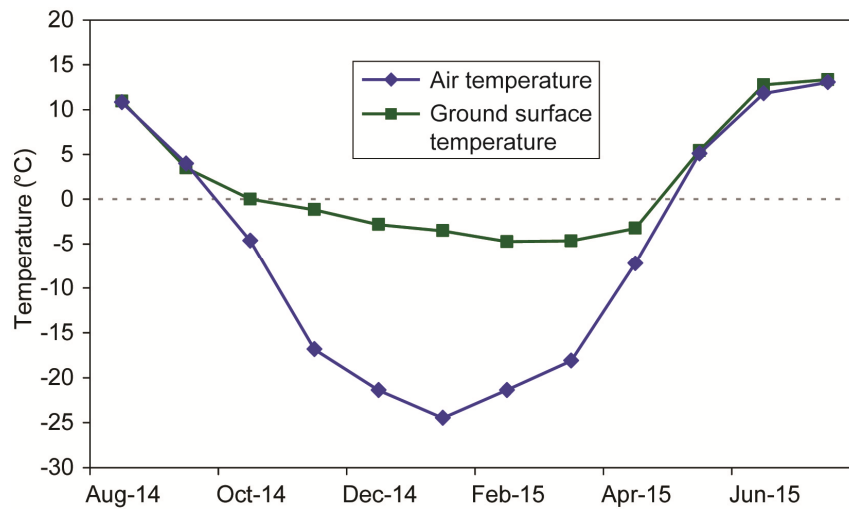
Landform: Surface of bar in Mackenzie Delta

Vegetation cover: Riparian willow and alder shrub

Thaw Depth: >1.35 m (Probed)

Site visit: August 1, 2015

Month / Year	Temperature (°C)	
	Air	Surface
Aug / 2014	10.81	10.94
Sept / 2014	3.99	3.48
Oct / 2014	-4.66	0.01
Nov / 2014	-16.84	-1.18
Dec / 2014	-21.39	-2.83
Jan / 2015	-24.49	-3.53
Feb / 2015	-21.37	-4.76
Mar / 2015	-18.10	-4.67
Apr / 2015	-7.22	-3.26
May / 2015	5.10	5.41
Jun / 2015	11.80	12.75
Jul / 2015	13.03	13.32



Jimmy Valley — JV-01 Bottom

Inuvialuit Settlement Region

Latitude: 68.63 N

Longitude: 133.63 W

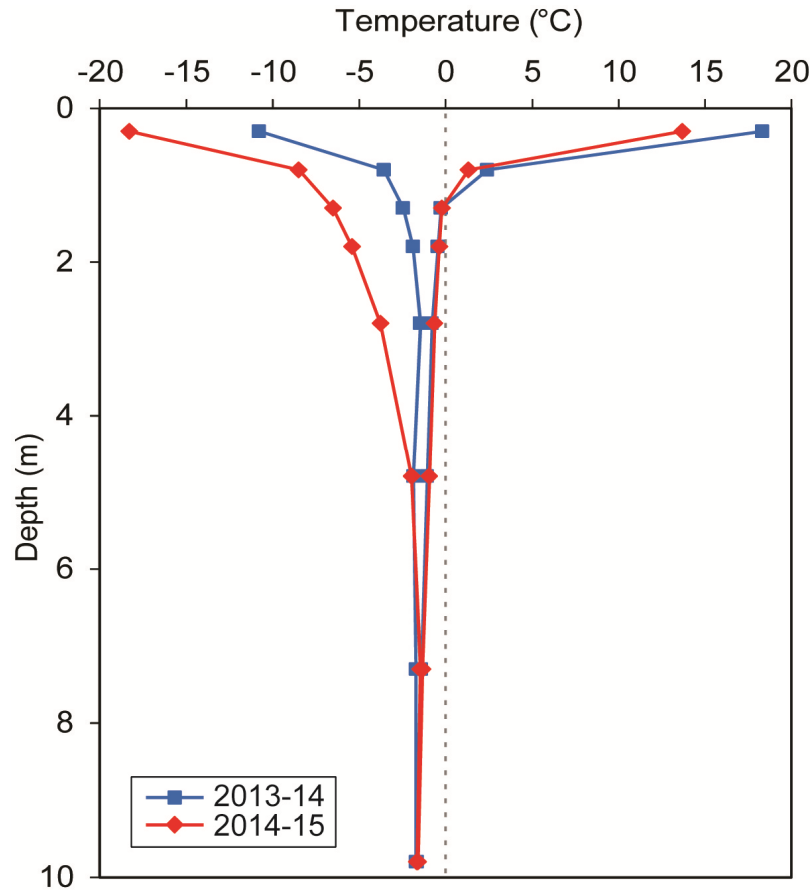
Elevation: n/a

Landform: Moraine uplands

Vegetation cover: Dwarf birch tundra with willow and alder shrubs

Thaw Depth: 0.88 m for 2014, 0.85 m for 2015

Site visit: July 31, 2015



Aug 2013 – Jul 2014		
Depth (m)	Max (°C)	Min (°C)
0.3	18.32	-10.77
0.8	2.41	-3.57
1.3	-0.27	-2.46
1.8	-0.44	-1.88
2.8	-0.79	-1.46
4.8	-1.08	-1.86
7.3	-1.42	-1.71
9.8	-1.66	-1.71

Aug 2014 – Jul 2015		
Depth (m)	Max (°C)	Min (°C)
0.3	13.68	-18.29
0.8	1.32	-8.48
1.3	-0.22	-6.51
1.8	-0.37	-5.41
2.8	-0.64	-3.76
4.8	-0.94	-1.97
7.3	-1.34	-1.46
9.8	-1.60	-1.66

Navy Channel — 03TC1

Inuvialuit Settlement Region

Latitude: 68.42 N

Longitude: 133.79 W

Elevation: 5 m a.s.l.

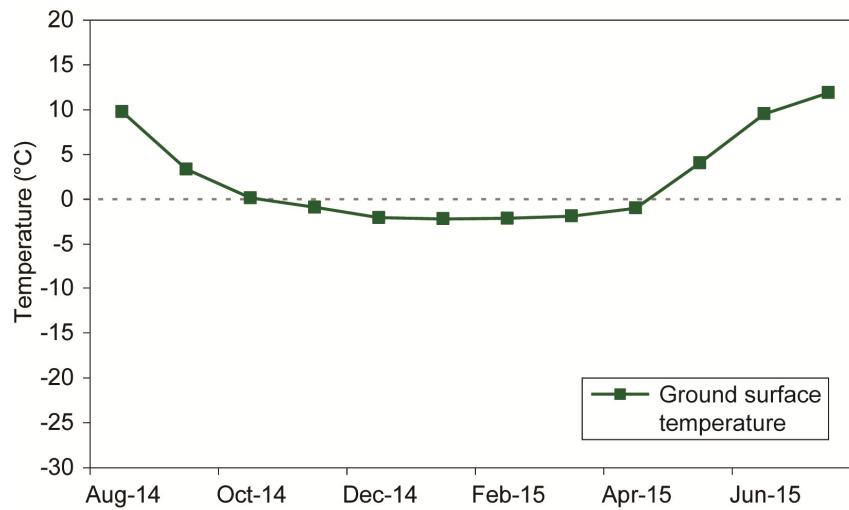
Landform: Surface of Holocene Mackenzie delta adjacent to eastern edge rising 10s of meters to till plain

Vegetation cover: Riparian high willow shrub, open, incomplete ground cover of forbs and sedge (forest tundra)

Thaw Depth: >1.32 m (Probed)

Site visit: August 1, 2015

Month / Year	Temperature (°C)	
	Air	Surface
Aug / 2014	n/a	9.78
Sept / 2014	n/a	3.36
Oct / 2014	n/a	0.15
Nov / 2014	n/a	-0.90
Dec / 2014	n/a	-2.06
Jan / 2015	n/a	-2.18
Feb / 2015	n/a	-2.13
Mar / 2015	n/a	-1.87
Apr / 2015	n/a	-0.98
May / 2015	n/a	4.06
Jun / 2015	n/a	9.54
Jul / 2015	n/a	11.88



Norris Creek — NC-01

Gwich'in Settlement Region

Latitude: 68.41 N

Longitude: 133.29 W

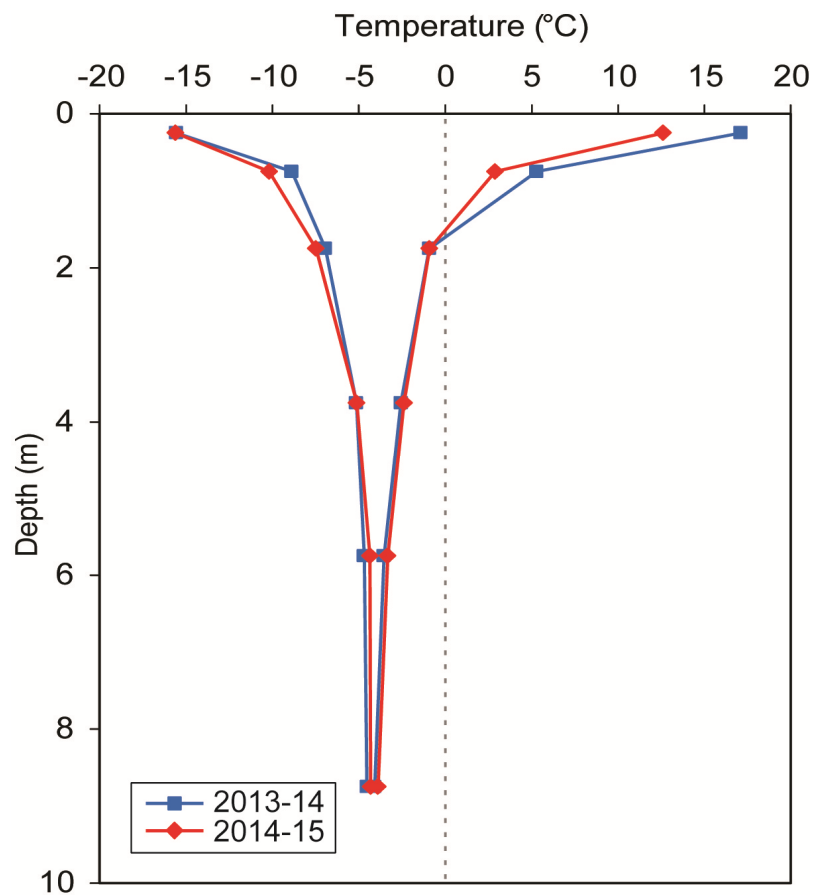
Elevation: 15 m a.s.l.

Landform: Thick organic material over moraine plain

Vegetation cover: Shrub Tundra

Thaw Depth: 0.97 m for 2014, 0.90 m for 2015

Site visit: July 29, 2015



Aug 2013 – Jul 2014		
Depth (m)	Max (°C)	Min (°C)
0.25	17.10	-15.56
0.75	5.28	-8.88
1.75	-0.93	-6.93
3.75	-2.55	-5.13
5.75	-3.53	-4.68
8.75	-4.07	-4.52

Aug 2014 – Jul 2015		
Depth (m)	Max (°C)	Min (°C)
0.25	12.61	-15.60
0.75	2.88	-10.18
1.75	-0.92	-7.47
3.75	-2.38	-5.12
5.75	-3.32	-4.34
8.75	-3.88	-4.30

Navy Road — 01TC1

Gwich'in Settlement Region

Latitude: 68.40 N

Longitude: 133.76 W

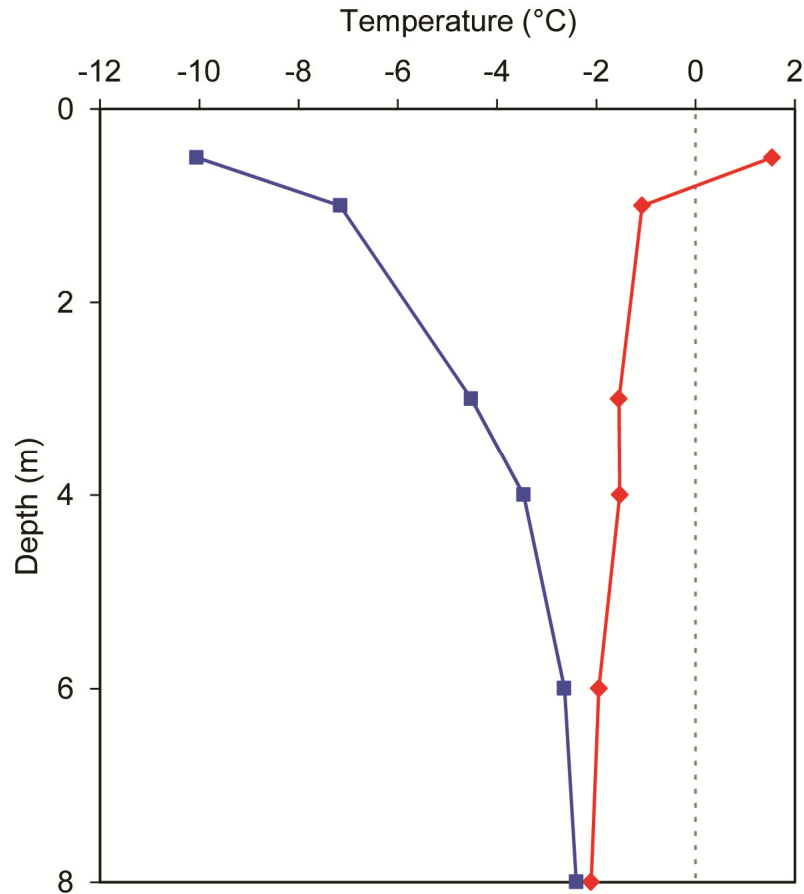
Elevation: 60 m a.s.l.

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

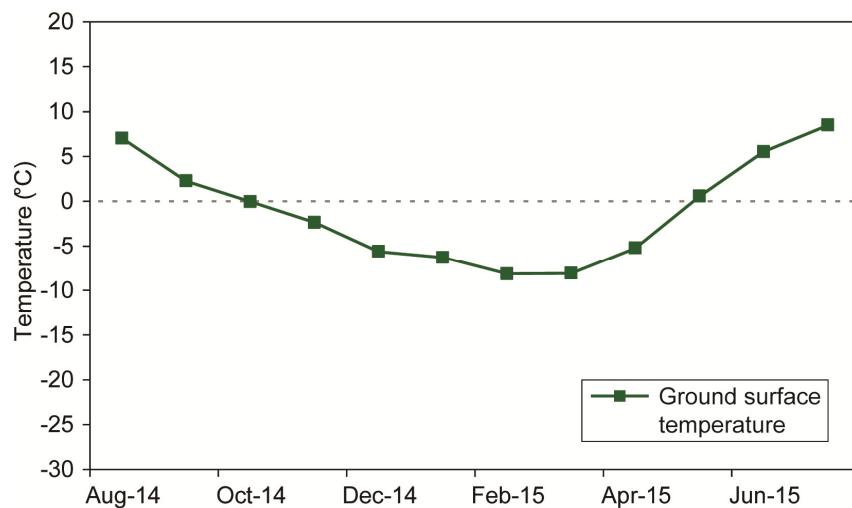
Thaw Depth: 0.79 m

Site visit: July 28, 2015



Aug 2014 – Jul 2015		
Depth (m)	Max (°C)	Min (°C)
0.5	1.54	-10.05
1	-1.08	-7.16
3	-1.55	-4.52
4	-1.53	-3.46
6	-1.95	-2.64
8	-2.11	-2.40

Month / Year	Temperature (°C)	
	Air	Surface
Aug / 2014	n/a	7.03
Sept / 2014	n/a	2.26
Oct / 2014	n/a	-0.04
Nov / 2014	n/a	-2.36
Dec / 2014	n/a	-5.63
Jan / 2015	n/a	-6.30
Feb / 2015	n/a	-8.15
Mar / 2015	n/a	-8.10
Apr / 2015	n/a	-5.24
May / 2015	n/a	0.57
Jun / 2015	n/a	5.53
Jul / 2015	n/a	8.49



Inuvik Airport (trees) — 01TC2

Gwich'in Settlement Region

Latitude: 68.32 N

Longitude: 133.44 W

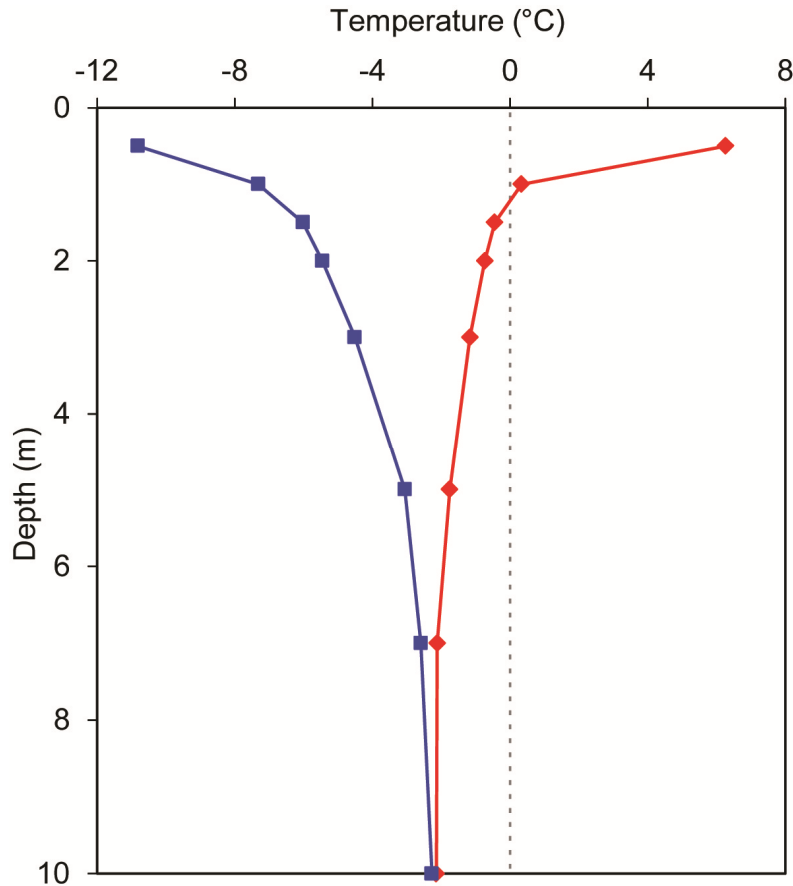
Elevation: 84 m a.s.l.

Landform: Fluted till plain glacial (>10Ka)

Vegetation cover: Taiga open black spruce, health ground cover

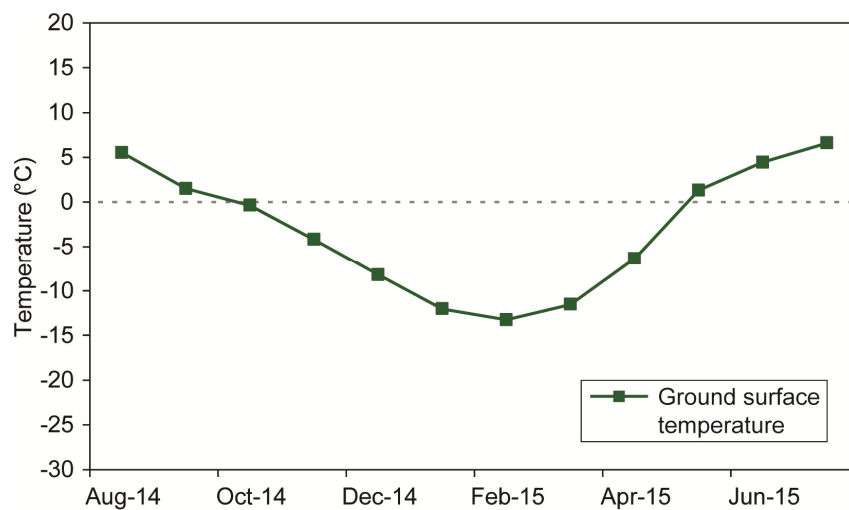
Thaw Depth: 1.21 m

Site visit: July 28, 2015



Aug 2014 – Jul 2015		
Depth (m)	Max (°C)	Min (°C)
0.5	6.26	-10.82
1	0.33	-7.32
1.5	-0.45	-6.02
2	-0.73	-5.46
3	-1.17	-4.52
5	-1.76	-3.06
7	-2.12	-2.59
10	-2.15	-2.27

Month / Year	Temperature (°C)	
	Air	Surface
Aug / 2014	n/a	5.53
Sept / 2014	n/a	1.51
Oct / 2014	n/a	-0.37
Nov / 2014	n/a	-4.20
Dec / 2014	n/a	-8.19
Jan / 2015	n/a	-12.05
Feb / 2015	n/a	-13.26
Mar / 2015	n/a	-11.54
Apr / 2015	n/a	-6.35
May / 2015	n/a	1.31
Jun / 2015	n/a	4.44
Jul / 2015	n/a	6.59



Inuvik Airport (bog) — 12TC1

Gwich'in Settlement Region

Latitude: 68.32 N

Longitude: 133.43 W

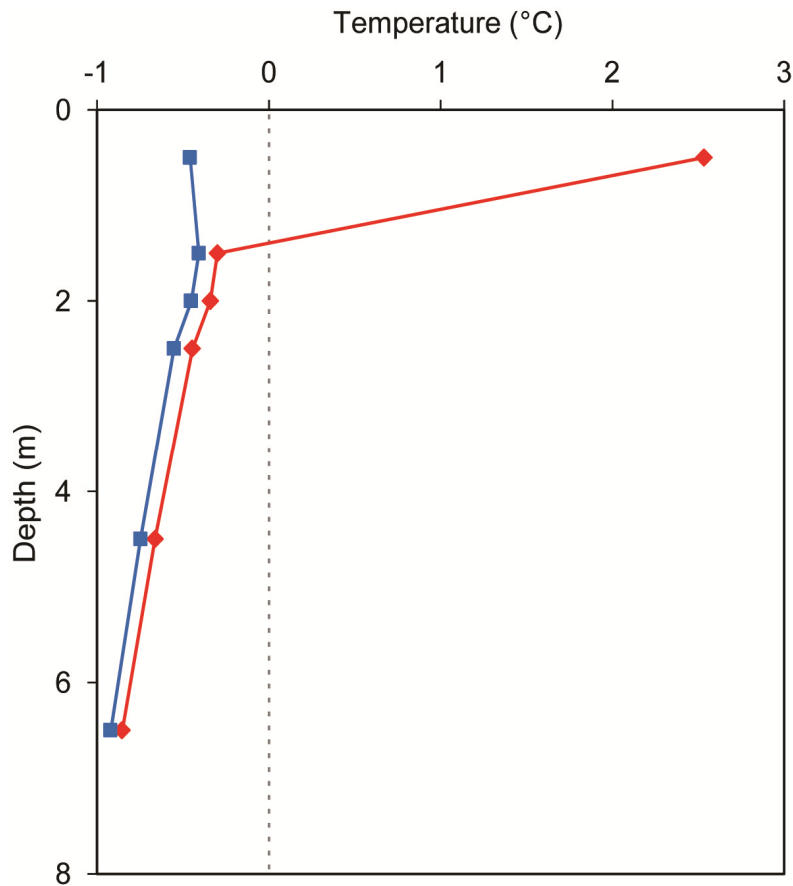
Elevation: 68 m a.s.l.

Landform: Bog between ridges on fluted till plain, glacial (>10Ka)

Vegetation cover: Taiga open bog, scattered shrub, heath ground cover (forest tundra)

Thaw Depth: 1.39 m

Site visit: July 28, 2015



Aug 2014 – Jul 2015		
Depth (m)	Max (°C)	Min (°C)
0.5	2.53	-0.46
1.5	-0.30	-0.41
2	-0.34	-0.45
2.5	-0.45	-0.55
4.5	-0.66	-0.75
6.5	-0.85	-0.92

Inuvik Airport (bog) — 01TC3

Gwich'in Settlement Region

Latitude: 68.32 N

Longitude: 133.43 W

Elevation: 68 m a.s.l.

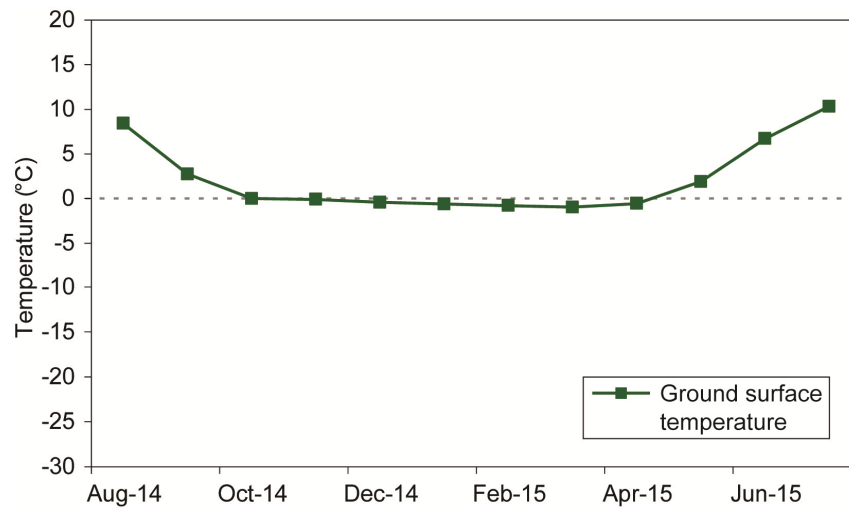
Landform: Bog between ridges on fluted till plain, glacial (>10Ka)

Vegetation cover: Taiga open bog, scattered shrub, heath ground cover (forest tundra)

Thaw Depth: 0.64 m (Probed)

Site visit: July 28, 2015

Month / Year	Temperature (°C)	
	Air	Surface
Aug / 2014	n/a	8.41
Sept / 2014	n/a	2.75
Oct / 2014	n/a	0.00
Nov / 2014	n/a	-0.09
Dec / 2014	n/a	-0.42
Jan / 2015	n/a	-0.63
Feb / 2015	n/a	-0.80
Mar / 2015	n/a	-0.96
Apr / 2015	n/a	-0.56
May / 2015	n/a	1.89
Jun / 2015	n/a	6.71
Jul / 2015	n/a	10.31



Campbell Lake — CaL-01

Gwich'in Settlement Region

Latitude: 68.24 N

Longitude: 133.10 W

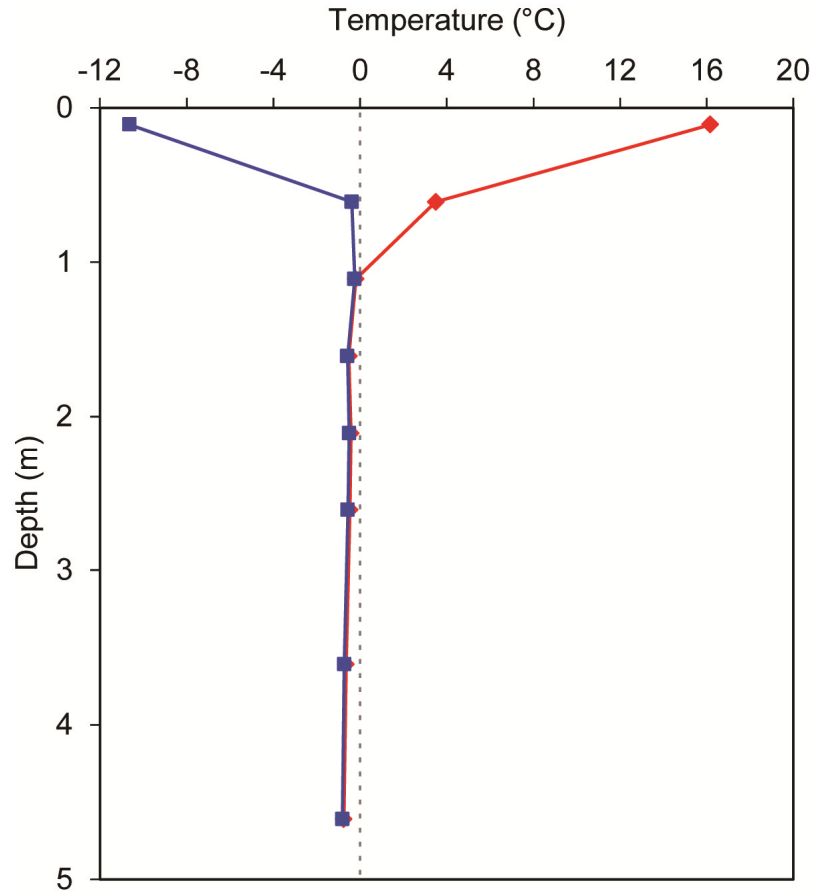
Elevation: 115 m a.s.l.

Landform: Moraine plain

Vegetation cover: Peatland

Thaw Depth: 0.75 m

Site visit: July 29, 2015



Aug 2014 – Jul 2015		
Depth (m)	Max (°C)	Min (°C)
0.11	16.16	-10.63
0.61	3.50	-0.38
1.11	-0.20	-0.25
1.61	-0.51	-0.58
2.11	-0.42	-0.50
2.61	-0.47	-0.56
3.61	-0.64	-0.72
4.61	-0.75	-0.81

Campbell Lake — CaL-02

Gwich'in Settlement Region

Latitude: 68.24 N

Longitude: 133.09 W

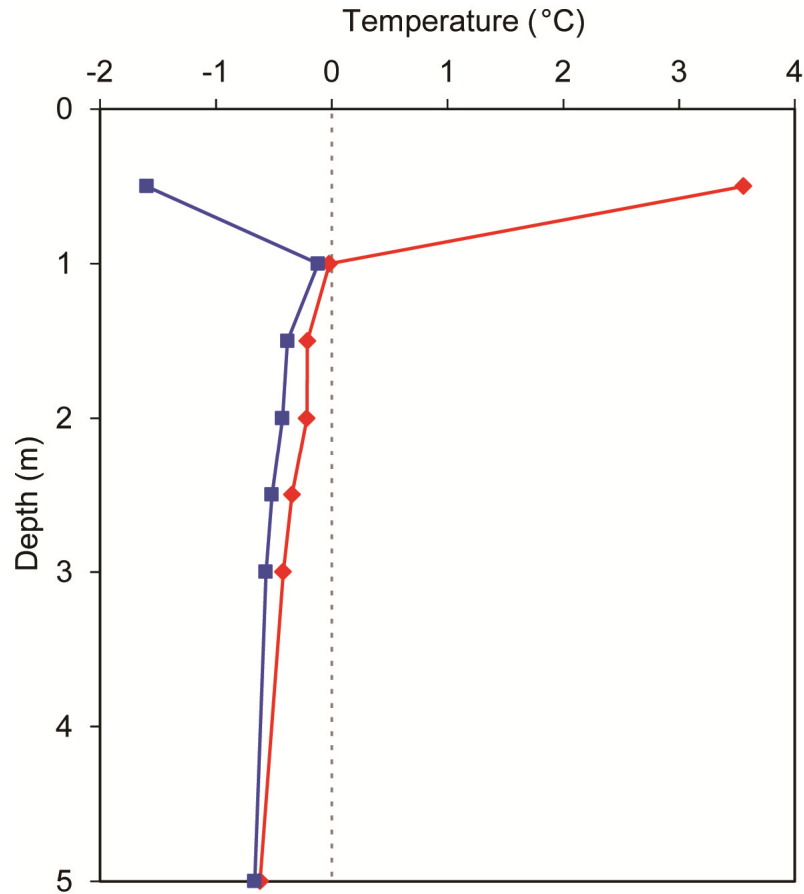
Elevation: 118 m a.s.l.

Landform: Moraine plain

Vegetation cover: Cutline through Black spruce forest

Thaw Depth: 1.00 m

Site visit: July 29, 2015



Aug 2014 – Jul 2015		
Depth (m)	Max (°C)	Min (°C)
0.5	3.56	-1.60
1	-0.02	-0.12
1.5	-0.21	-0.38
2	-0.22	-0.43
2.5	-0.34	-0.52
3	-0.42	-0.57
5	-0.62	-0.66

Campbell Lake — CaL-03

Gwich'in Settlement Region

Latitude: 68.24 N

Longitude: 133.10 W

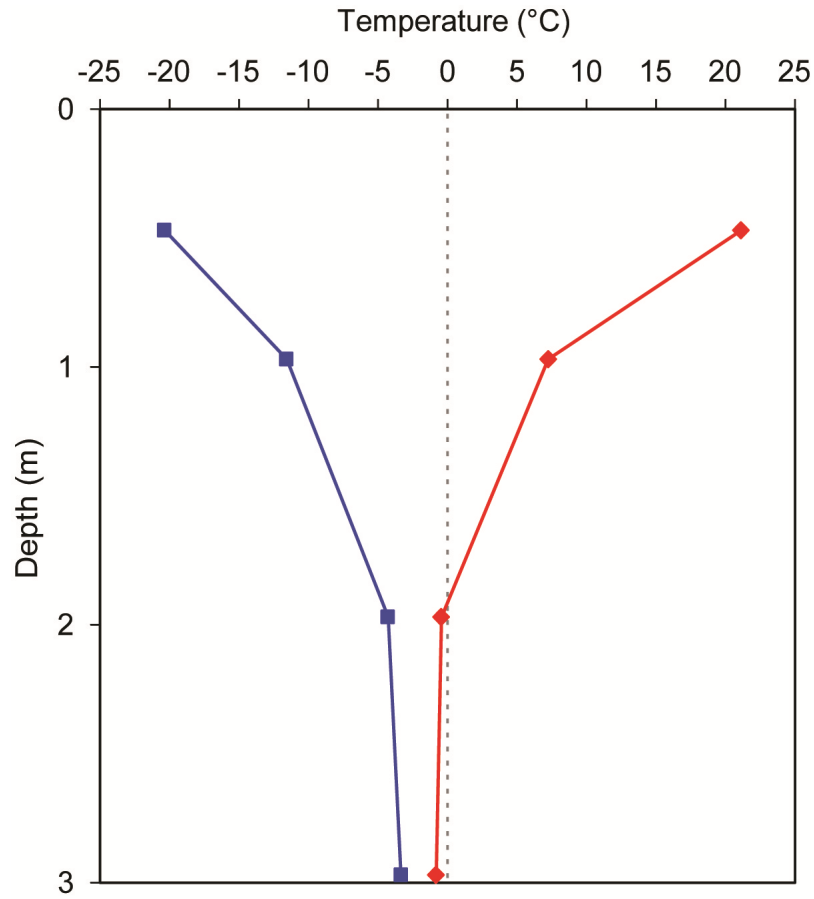
Elevation: 118 m a.s.l.

Landform: Moraine plain

Vegetation cover: Black spruce forest

Thaw Depth: 1.23 m

Site visit: July 29, 2015



Aug 2014 – Jul 2015		
Depth (m)	Max (°C)	Min (°C)
0.47	21.13	-20.37
0.97	7.25	-11.58
1.97	-0.44	-4.28
2.97	-0.83	-3.35

North Caribou Lake — NCL-01

Gwich'in Settlement Region

Latitude: 68.15 N

Longitude: 132.93 W

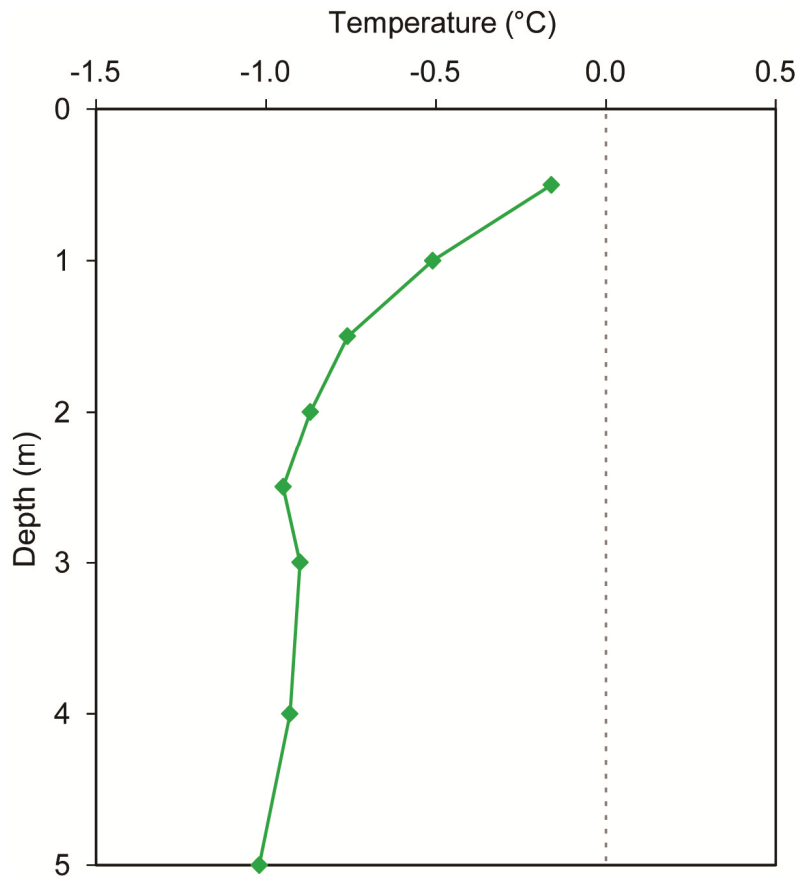
Elevation: 209 m a.s.l.

Landform: Moraine plain

Vegetation cover: Peatland

Thaw Depth: 0.27 m

Site visit: July 29, 2015



Depth (m)	Temp (°C)
0.5	-0.16
1	-0.51
1.5	-0.76
2	-0.87
2.5	-0.95
3	-0.9
4	-0.93
5	-1.02

North Caribou Lake — NCL-02

Gwich'in Settlement Region

Latitude: 68.15 N

Longitude: 132.93 W

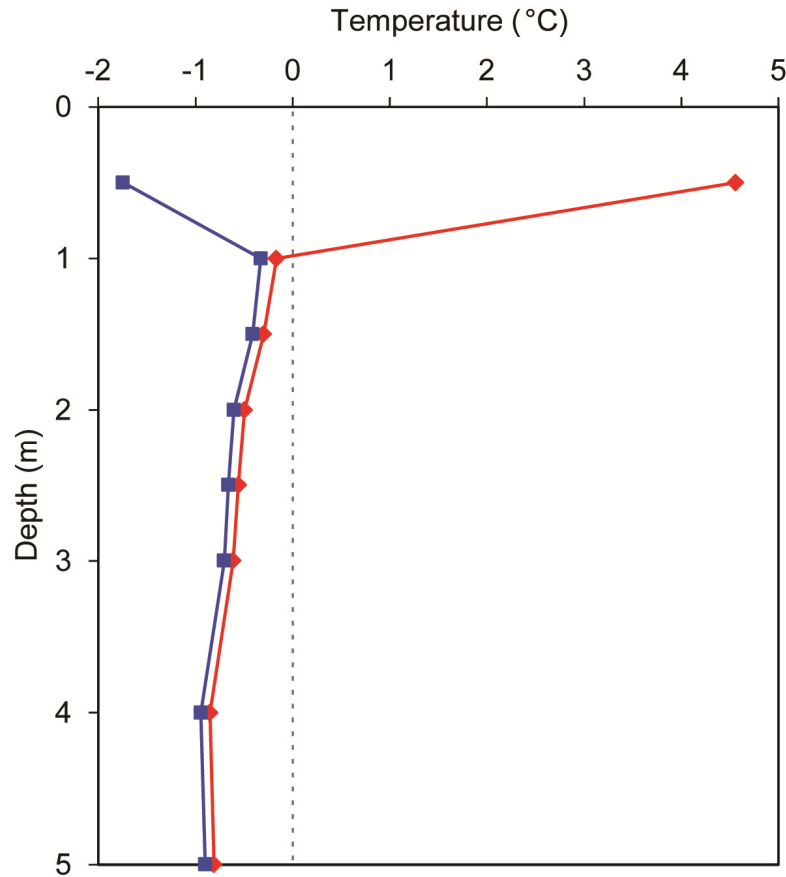
Elevation: 217 m a.s.l.

Landform: Moraine plain

Vegetation cover: Stunted black spruce forest

Thaw Depth: 0.98 m

Site visit: July 29, 2015



Aug 2014 – July 2015		
Depth (m)	Max (°C)	Min (°C)
0.5	4.56	-1.74
1	-0.17	-0.33
1.5	-0.30	-0.41
2	-0.50	-0.60
2.5	-0.56	-0.66
3	-0.61	-0.70
4	-0.85	-0.94
5	-0.81	-0.90

Hill Lake — HL-01

Gwich'in Settlement Region

Latitude: 67.99 N

Longitude: 132.49 W

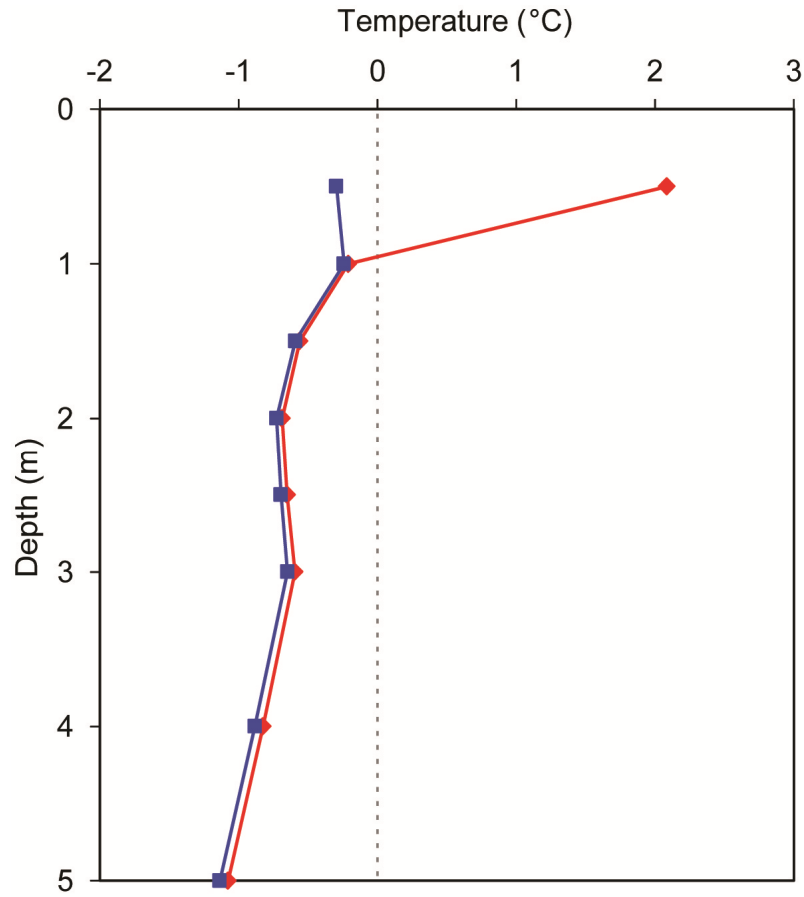
Elevation: 229 m a.s.l.

Landform: Moraine plain

Vegetation cover: Tundra

Thaw Depth : 0.95 m

Site visit: July 29, 2015



Aug 2014 – July 2015		
Depth (m)	Max (°C)	Min (°C)
0.5	2.08	-0.30
1	-0.21	-0.24
1.5	-0.56	-0.59
2	-0.69	-0.73
2.5	-0.65	-0.70
3	-0.60	-0.65
4	-0.83	-0.88
5	-1.08	-1.14

Hill Lake — HL-02

Gwich'in Settlement Region

Latitude: 67.99 N

Longitude: 132.49 W

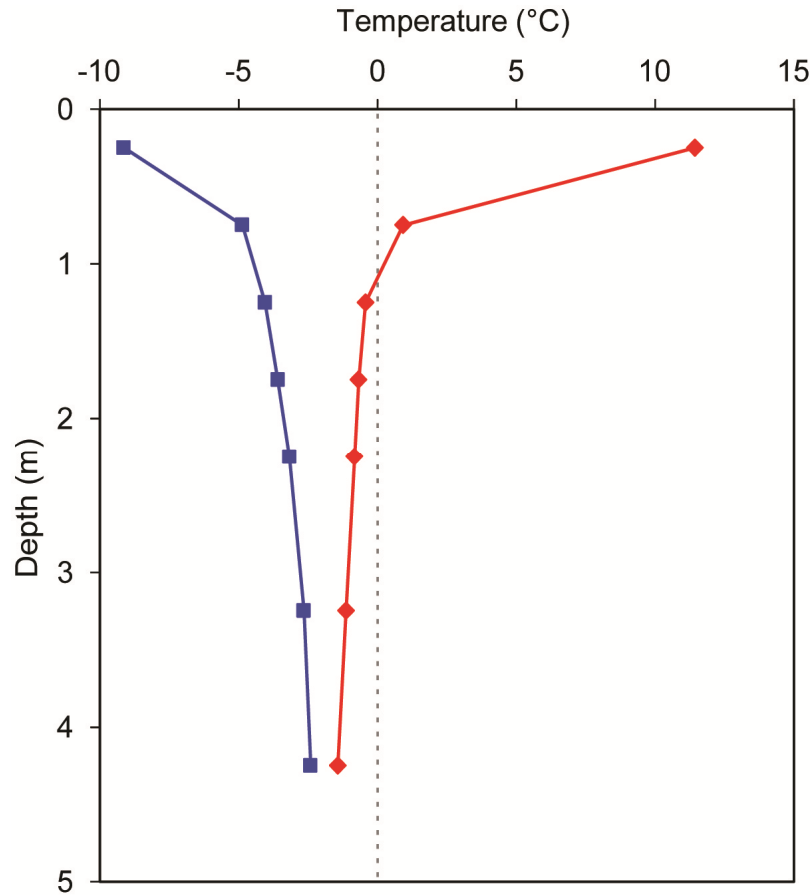
Elevation: 234 m a.s.l.

Landform: Moraine plain

Vegetation cover: Shrub Tundra

Thaw Depth: 0.79 m

Site visit: July 29, 2015



Aug 2014 – July 2015		
Depth (m)	Max (°C)	Min (°C)
0.25	11.44	-9.14
0.75	0.92	-4.87
1.25	-0.43	-4.06
1.75	-0.68	-3.59
2.25	-0.83	-3.18
3.25	-1.14	-2.66
4.25	-1.43	-2.41

Wood Bridge Lake — WBL-01

Gwich'in Settlement Region

Latitude: 67.90 N

Longitude: 132.18 W

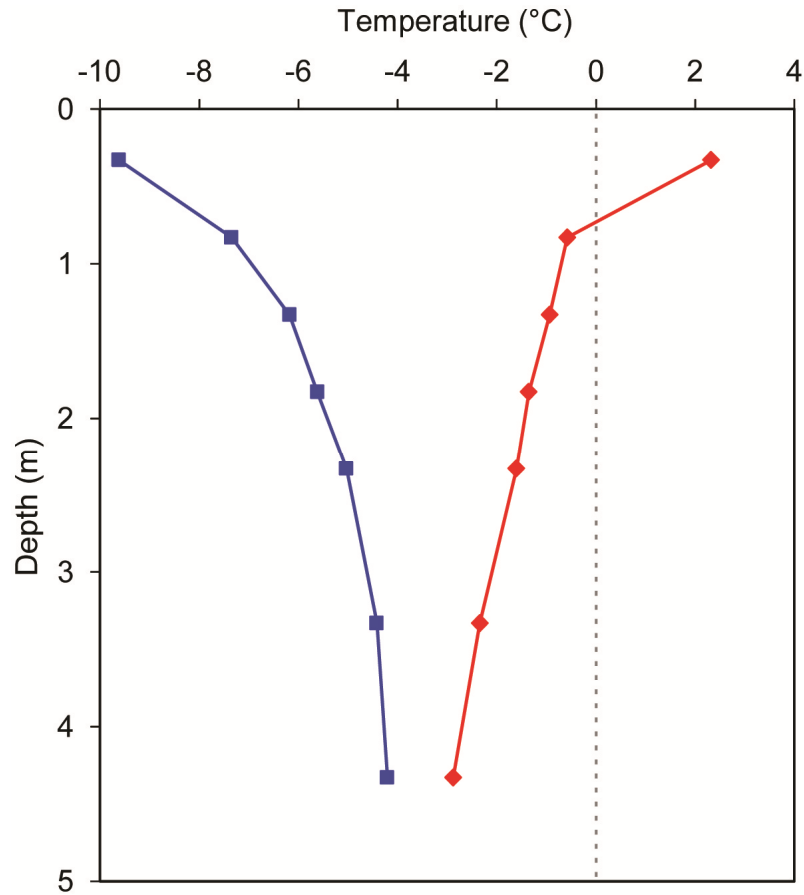
Elevation: 204 m a.s.l.

Landform: Alluvial plain

Vegetation: Black spruce forest

Thaw Depth: 0.73 m

Site visit: July 29, 2015



Aug 2014 – July 2015		
Depth (m)	Max (°C)	Min (°C)
0.33	2.32	-9.62
0.83	-0.58	-7.35
1.33	-0.93	-6.18
1.83	-1.36	-5.62
2.33	-1.61	-5.03
3.33	-2.34	-4.42
4.33	-2.88	-4.21

Rengleng River mouth — 91TT14

Gwich'in Settlement Region

Latitude: 67.80 N

Longitude: 134.13 W

Elevation: 8 m a.s.l.

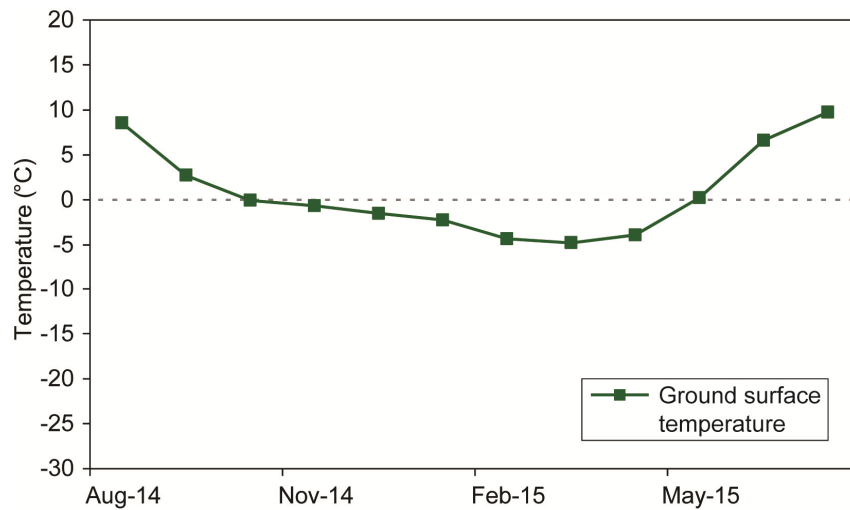
Landform: Alluvial plain

Vegetation cover: Mixed spruce and hardwood forest

Thaw Depth : 103.7 m (probed)

Site visit: August 2, 2015

Month / Year	Temperature (°C)	
	Air	Surface
Aug / 2014	n/a	8.54
Sept / 2014	n/a	2.72
Oct / 2014	n/a	-0.05
Nov / 2014	n/a	-0.66
Dec / 2014	n/a	-1.51
Jan / 2015	n/a	-2.23
Feb / 2015	n/a	-4.34
Mar / 2015	n/a	-4.77
Apr / 2015	n/a	-3.91
May / 2015	n/a	0.23
Jun / 2015	n/a	6.61
Jul / 2015	n/a	9.75



Jackfish Creek — JF-02

Sahtu Settlement Region

Latitude: 66.29 N

Longitude: 128.47 W

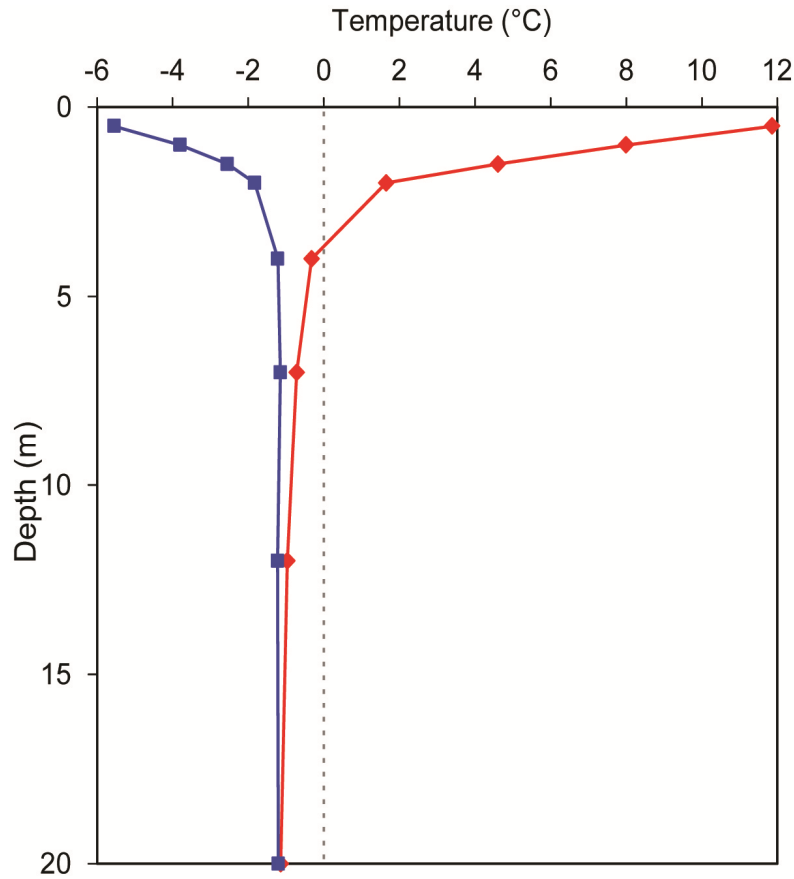
Elevation: 90 m a.s.l.

Landform: Eolian dune on moraine plain, well drained, elevated area

Vegetation cover: Black spruce forest and moss cover

Thaw Depth: 2.28 m

Site visit: October 01, 2015



Sep 2014 – Aug 2015		
Depth (m)	Max (°C)	Min (°C)
0.5	11.86	-5.55
1	8.00	-3.80
1.5	4.61	-2.55
2	1.65	-1.83
4	-0.32	-1.22
7	-0.71	-1.15
12	-0.96	-1.22
20	-1.14	-1.20

Fort Good Hope South — FGHS-01

Sahtu Settlement Region

Latitude: 66.21 N

Longitude: 128.50 W

Elevation: 134 m a.s.l.

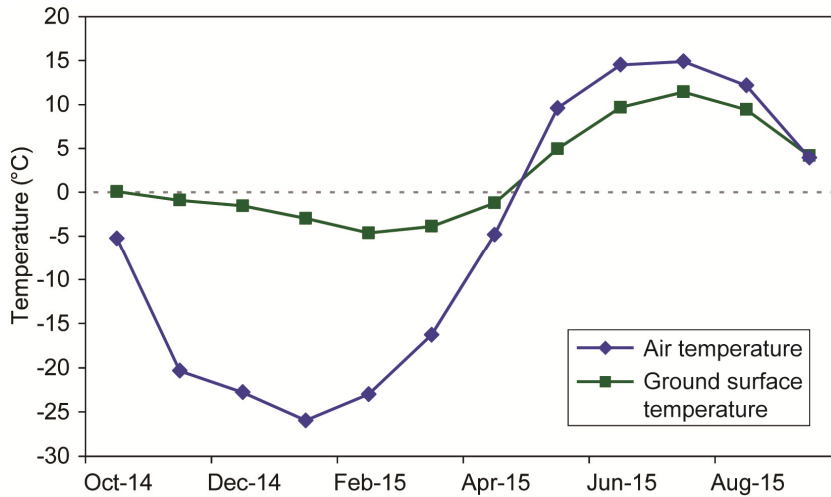
Landform: Hummocky peatland

Vegetation cover: Dense shrub and open black spruce

Thaw Depth: n/a

Site visit: October 01, 2015

Month / Year	Temperature (°C)	
	Air	Surface
Oct / 2014	-5.25	0.07
Nov / 2014	-20.34	-0.91
Dec / 2014	-22.79	-1.55
Jan / 2014	-25.97	-2.97
Feb / 2015	-23.00	-4.63
Mar / 2015	-16.28	-3.88
Apr / 2015	-4.82	-1.22
May / 2015	9.58	4.95
Jun / 2015	14.50	9.66
Jul / 2015	14.90	11.42
Aug / 2015	12.16	9.40
Sep / 2015	3.93	4.15



Fort Good Hope South — FGHS-02

Sahtu Settlement Region

Latitude: 66.21 N

Longitude: 128.50 W

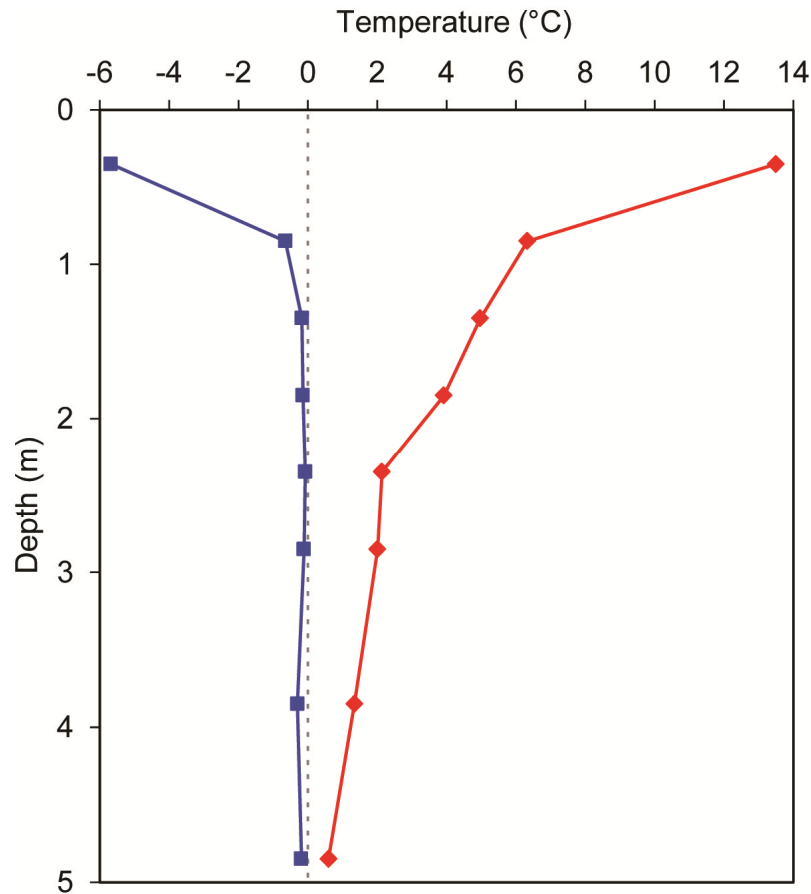
Elevation: 134 m a.s.l.

Landform: Hummocky peatland

Vegetation cover: Peat plateau, lichen, open black spruce

Thaw Depth: 5.65 m (thaw depth was extrapolated from bottom two temperature measurements)

Site visit: October 01, 2015



Sep 2014 – Aug 2015		
Depth (m)	Max (°C)	Min (°C)
0.35	13.50	-5.69
0.85	6.33	-0.65
1.35	4.97	-0.17
1.85	3.92	-0.15
2.35	2.14	-0.08
2.85	2.01	-0.11
3.85	1.34	-0.30
4.85	0.59	-0.19

Snafu Creek — SC-01

Sahtu Settlement Region

Latitude: 66.00 N

Longitude: 128.35 W

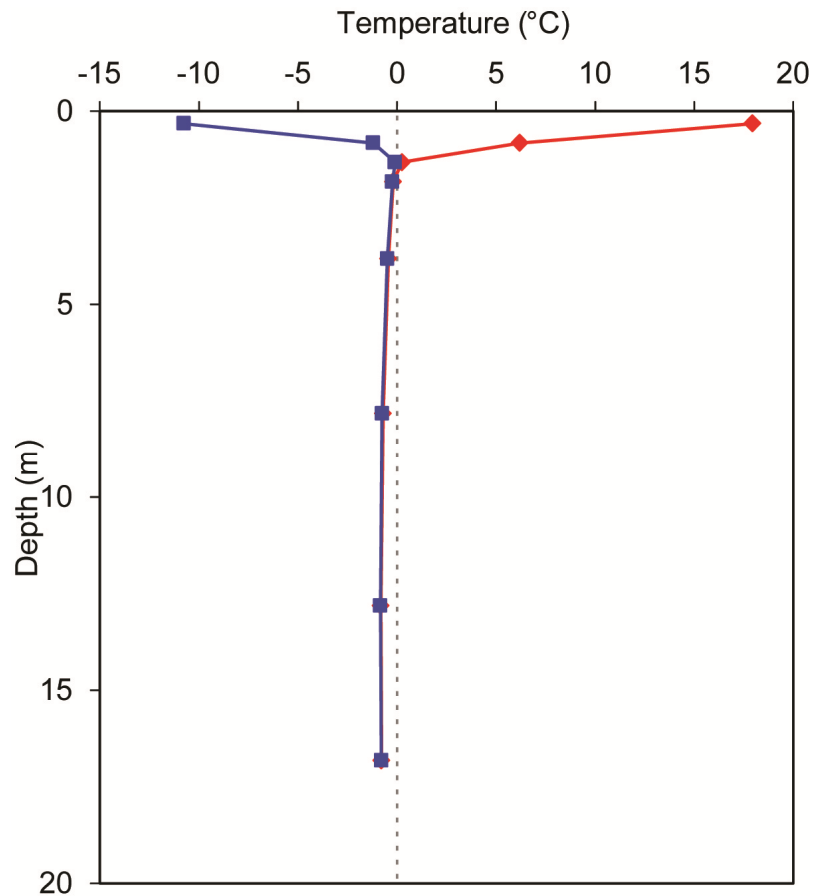
Elevation: 100 m a.s.l.

Landform: Moraine plain

Vegetation cover: Peat bog, open black spruce forest, and lichen cover

Thaw Depth: 1.34 m

Site visit: October 1, 2015



Sep 2014 – Aug 2015		
Depth (m)	Max (°C)	Min (°C)
0.32	17.94	-10.76
0.82	6.19	-1.20
1.32	0.25	-0.10
1.82	-0.19	-0.24
3.82	-0.44	-0.49
7.82	-0.71	-0.75
12.82	-0.82	-0.84
16.82	-0.78	-0.79

Chick Lake — CL-01
Sahtu Settlement Region

Latitude: 65.90 N

Longitude: 128.24 W

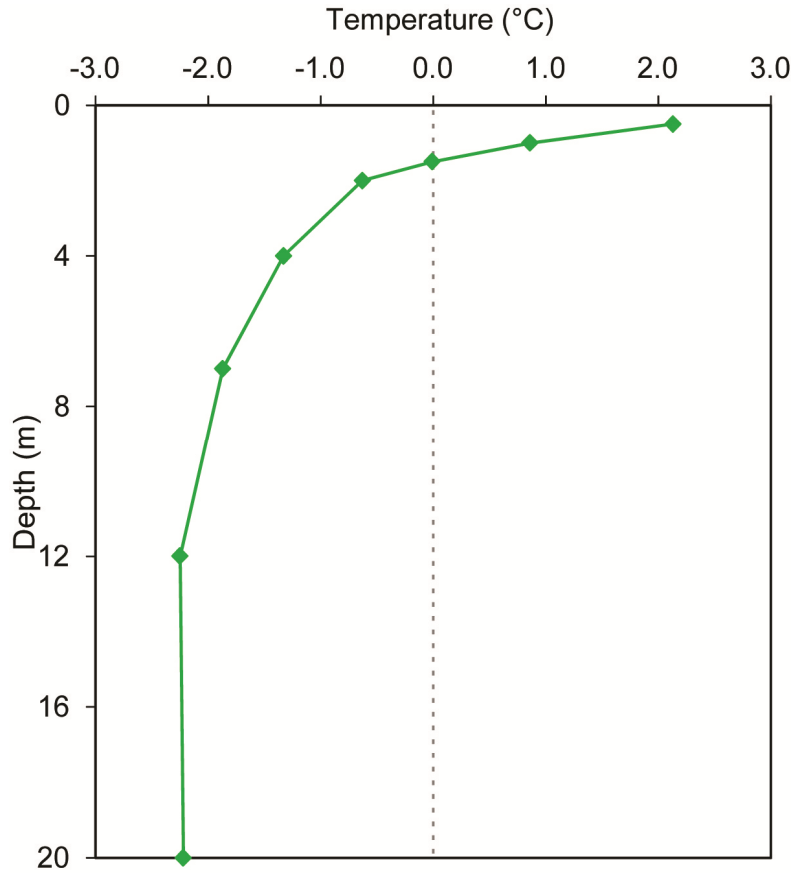
Elevation: 122 m a.s.l.

Landform: Moraine plain

Vegetation cover: Peat and organic soil with open black spruce forest and shrubs

Thaw Depth: 1.34 m

Site visit: October 01, 2015



Depth (m)	Temp (°C)
0.5	2.13
1	0.86
1.5	-0.01
2	-0.63
4	-1.33
7	-1.87
12	-2.25
20	-2.22

Gibson Lake — GL-01

Sahtu Settlement Region

Latitude: 65.75 N

Longitude: 127.89 W

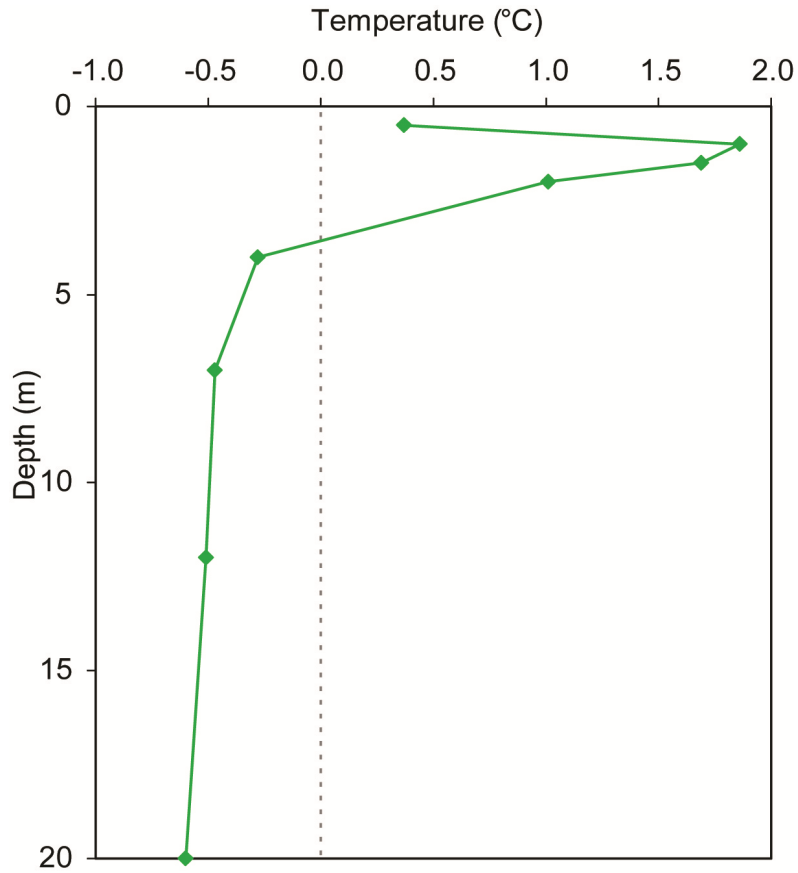
Elevation: 228 m a.s.l.

Landform: Hummocky moraine plain

Vegetation cover: Recovering burnt area with peat and shrubs

Thaw Depth: 2.74 m

Site visit: October 01, 2015



Depth (m)	Temp (°C)
0.5	0.37
1	1.86
1.5	1.69
2	1.01
4	-0.28
7	-0.47
12	-0.51
20	-0.6

Hanna River — HR-01

Sahtu Settlement Region

Latitude: 65.67 N

Longitude: 127.83 W

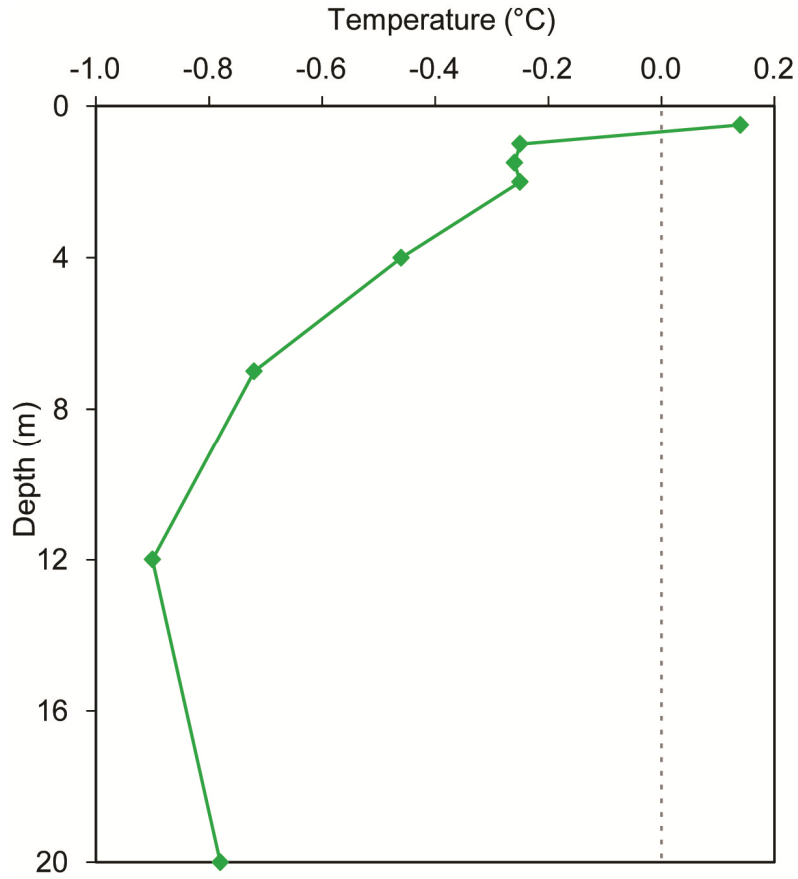
Elevation: 104 m a.s.l.

Landform: Lacustrine plain

Vegetation cover: Boggy burnt area

Thaw Depth: 0.79 m

Site visit: October 1, 2015



Depth (m)	Temp (°C)
0.5	-0.16
1	-0.51
1.5	-0.76
2	-0.87
2.5	-0.95
3	-0.9
4	-0.93
5	-1.02

Elliot Creek — EC-01

Sahtu Settlement Region

Latitude: 65.52 N

Longitude: 127.62 W

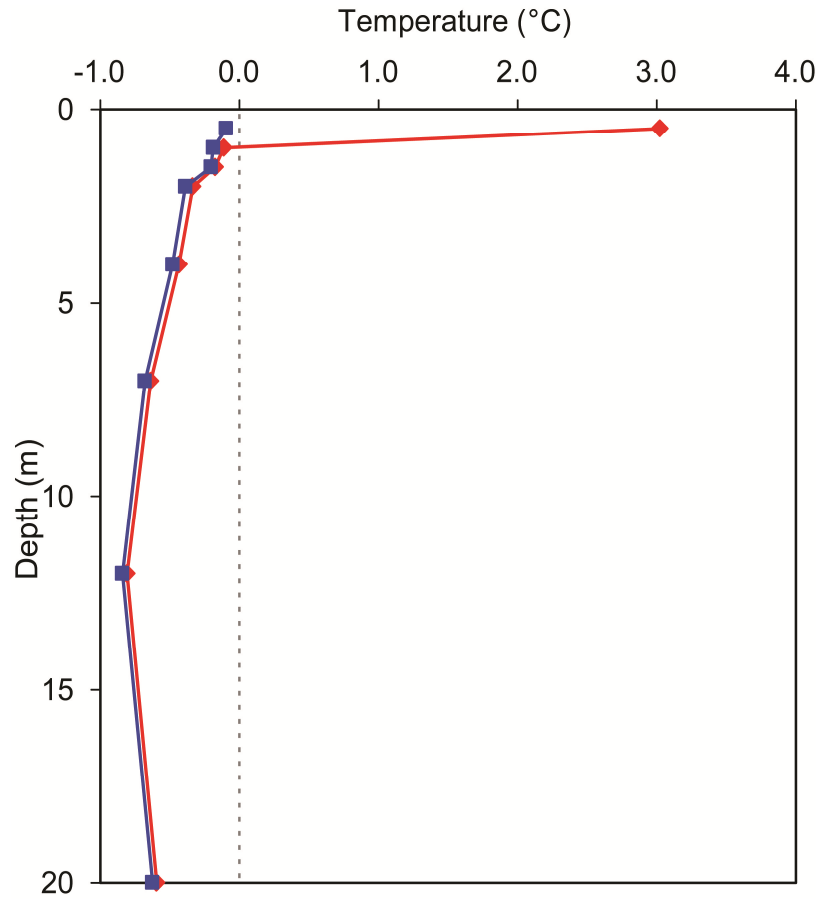
Elevation: 54 m a.s.l.

Landform: Lacustrine undulating plain, well-drained elevated area

Vegetation cover: Peat cover on edge of open, mature black spruce forest

Thaw Depth: 1.01 m

Site visit: October 1, 2015



Sep 2014 – Aug 2015		
Depth (m)	Max (°C)	Min (°C)
0.5	3.25	-0.06
1	0.06	-0.15
1.5	-0.17	-0.19
2	-0.34	-0.38
4	-0.43	-0.46
7	-0.65	-0.66
12	-0.80	-0.83
20	-0.61	-0.62

Elliot Creek — EC-02

Sahtu Settlement Region

Latitude: 65.52 N

Longitude: 127.62 W

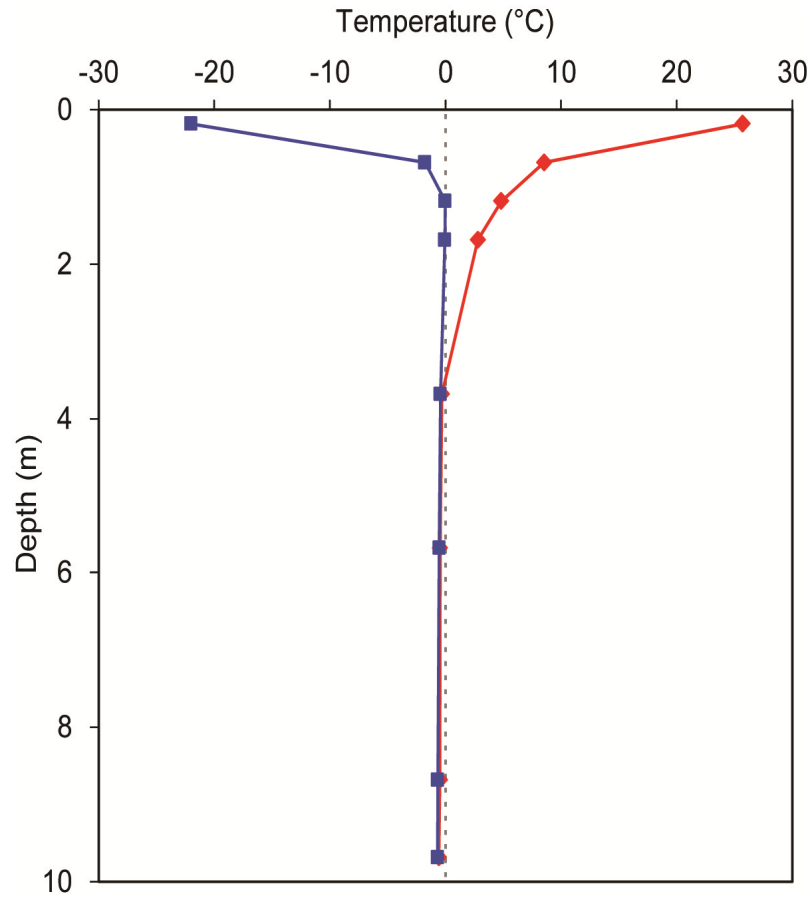
Elevation: 54 m a.s.l.

Landform: Lacustrine plain overlain by alluvial sediments

Vegetation cover: Peat cover on edge of dense, mature black spruce forest

Thaw Depth: 2.38 m

Site visit: October 1, 2015



Sep 2014 – Aug 2015		
Depth (m)	Max (°C)	Min (°C)
0.18	25.73	-21.99
0.68	8.55	-1.77
1.18	4.83	-0.03
1.68	2.81	-0.06
3.68	-0.30	-0.44
5.68	-0.47	-0.54
8.68	-0.48	-0.67
9.68	-0.57	-0.69

Oscar Creek — OC-01

Sahtu Settlement Region

Latitude: 65.44 N

Longitude: 127.44 W

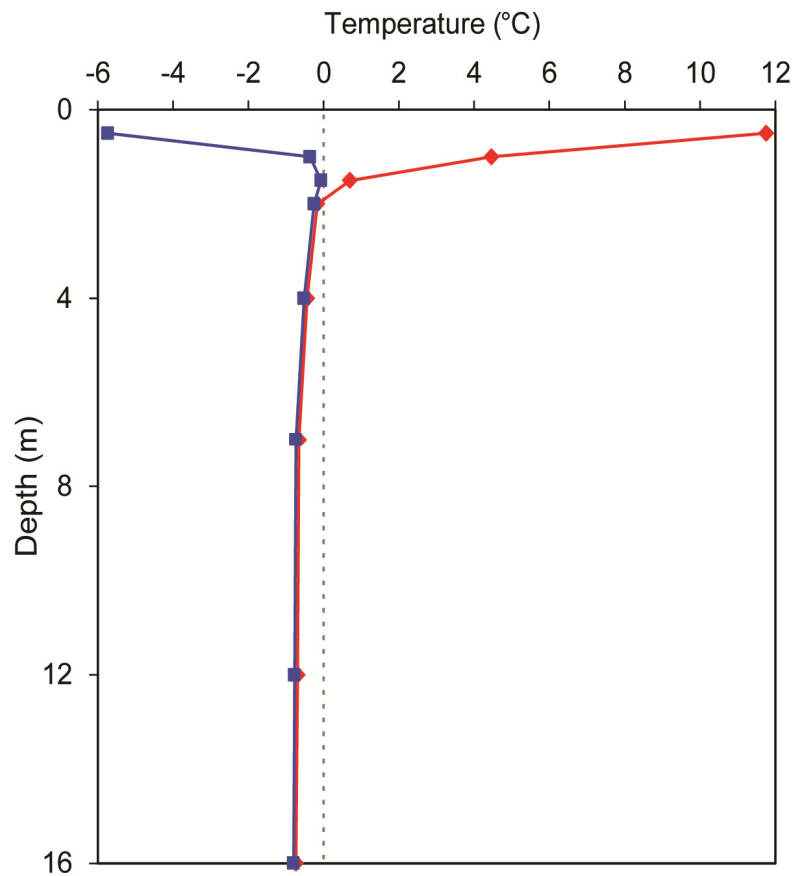
Elevation: 64 m a.s.l.

Landform: Undulating glaciolacustrine terrain overlain by alluvial sediments

Vegetation cover: Peat cover with dense-forested birch and black spruce

Thaw Depth: 1.59 m

Site visit: October 1, 2015



Sep 2014 – Aug 2015		
Depth (m)	Max (°C)	Min (°C)
0.5	11.76	-5.73
1	4.47	-0.36
1.5	0.70	-0.07
2	-0.17	-0.25
4	-0.44	-0.52
7	-0.65	-0.73
12	-0.69	-0.77
16	-0.73	-0.80

Kee Scarp HT

Sahtu Settlement Region

Latitude: 65.30 N

Longitude: 126.72 W

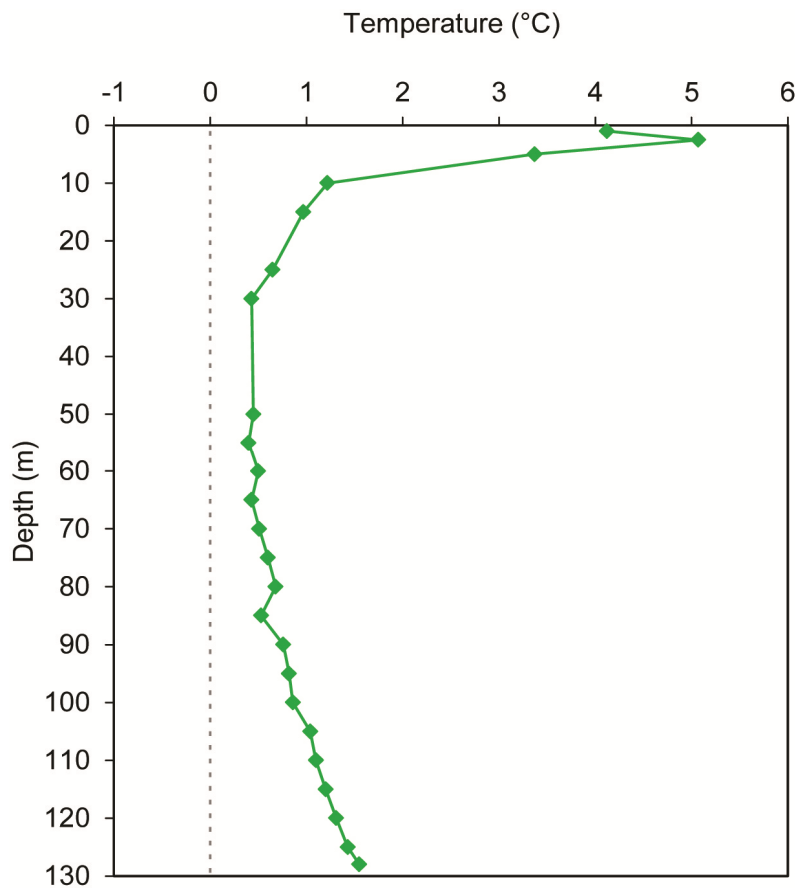
Elevation: 270 m a.s.l.

Landform: Top of narrow ridge. Borehole is in shale (which is underlain by limestone)
with 20 cm moss and organic cover at surface

Vegetation cover: Boreal forest, mixture aspen birch pine and spruce with ground
cover of grasses and small shrub

Thaw Depth: n/a

Site visit: October 2, 2015



Depth (m)	Temp (°C)
1	4.12
2.5	5.07
5	3.37
10	1.22
15	0.97
25	0.65
30	0.43
50	0.45
55	0.4
60	0.5
65	0.43
70	0.51
75	0.6
80	0.68
85	0.53
90	0.76
95	0.82
100	0.86
105	1.04
110	1.1
115	1.2
120	1.31
125	1.43
128	1.55

84-1-T4

Sahtu Settlement Region

Latitude: 65.29 N

Longitude: 126.89 W

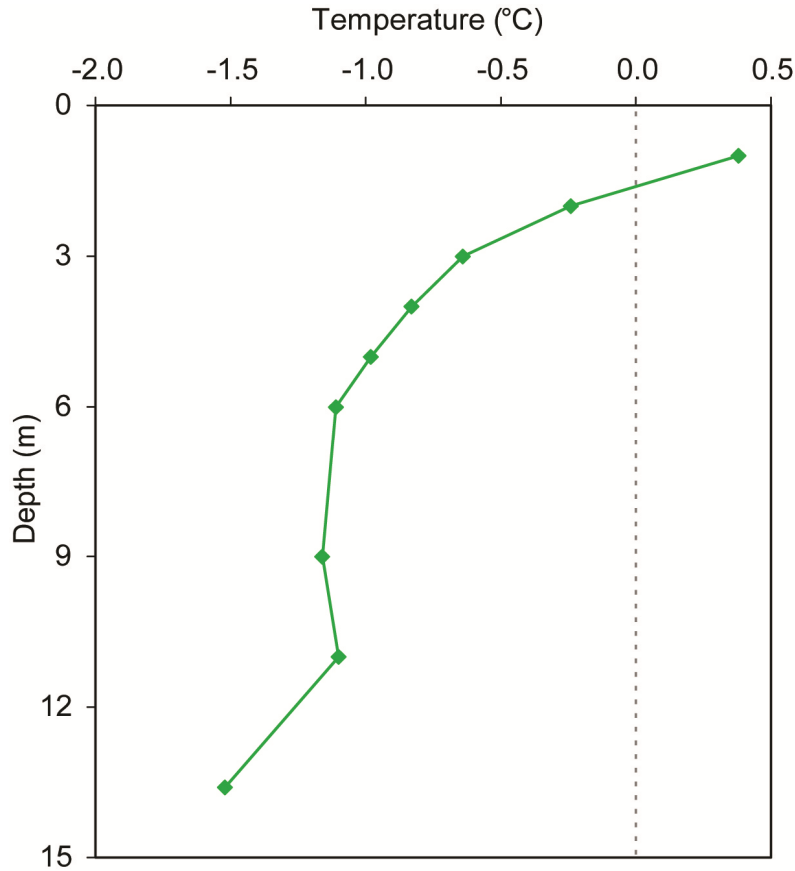
Elevation: 61 m a.s.l.

Landform: Ground moraine

Vegetation cover: Moss, lichen, ericaceous shrubs with black spruce and tamarack

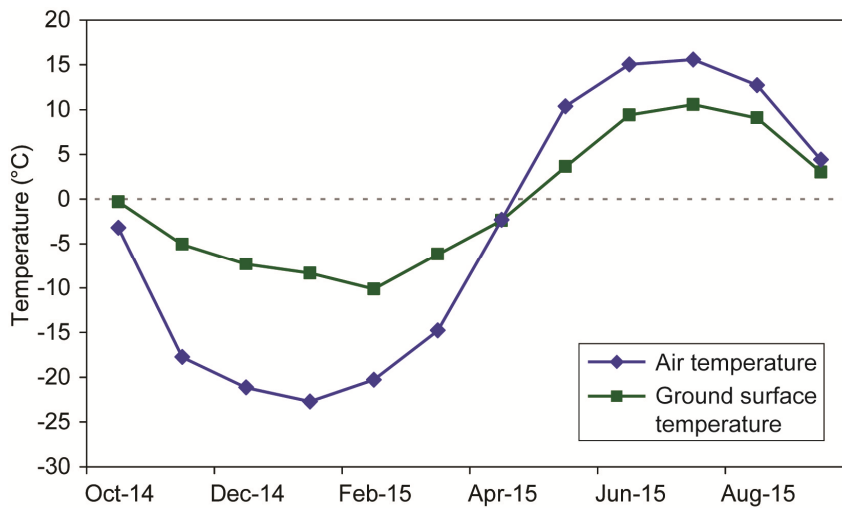
Thaw Depth: 1.61 m

Site visit: September 30, 2015



Depth (m)	Temp (°C)
1	0.38
2	-0.24
3	-0.64
4	-0.83
5	-0.98
6	-1.11
9	-1.16
11	-1.1
13.6	-1.52

Month / Year	Temperature (°C)	
	Air	Surface
Oct / 2014	-3.22	-0.31
Nov / 2014	-17.76	-5.08
Dec / 2014	-21.16	-7.33
Jan / 2015	-22.73	-8.34
Feb / 2015	-20.29	-10.12
Mar / 2015	-14.78	-6.19
Apr / 2015	-2.31	-2.39
May / 2015	10.36	3.62
Jun / 2015	15.03	9.39
Jul / 2015	15.58	10.55
Aug / 2015	12.71	9.06
Sept / 2015	4.39	3.01



Norman Wells Arena

Sahtu Settlement Region

Latitude: 65.28 N

Longitude: 126.83 W

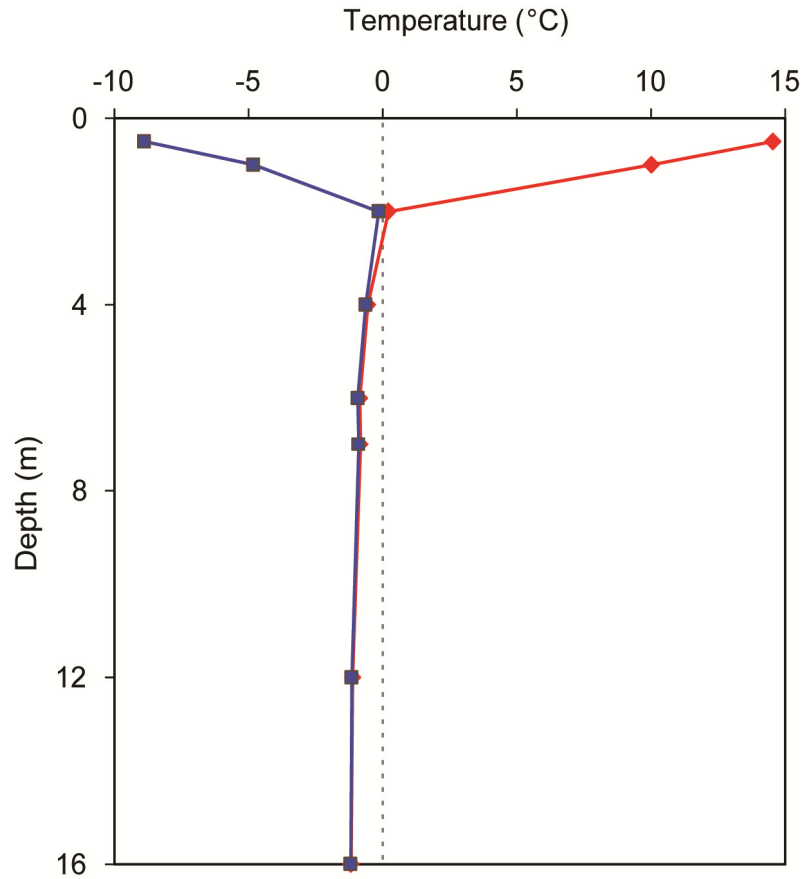
Elevation: 80 m a.s.l.

Landform: Ground moraine

Vegetation cover: Disturbed area adjacent to parking lot

Thaw Depth: 2.02 m

Site visit: September 30, 2015



Sep 2014 - Aug 2015		
Depth (m)	Max (°C)	Min (°C)
0.5	14.54	-8.89
1	10.02	-4.82
2	0.21	-0.15
4	-0.56	-0.64
6	-0.86	-0.93
7	-0.83	-0.90
12	-1.12	-1.16
16	-1.18	-1.19

Norman Wells Water treatment plant

Sahtu Settlement Region

Latitude: 65.28 N

Longitude: 126.84 W

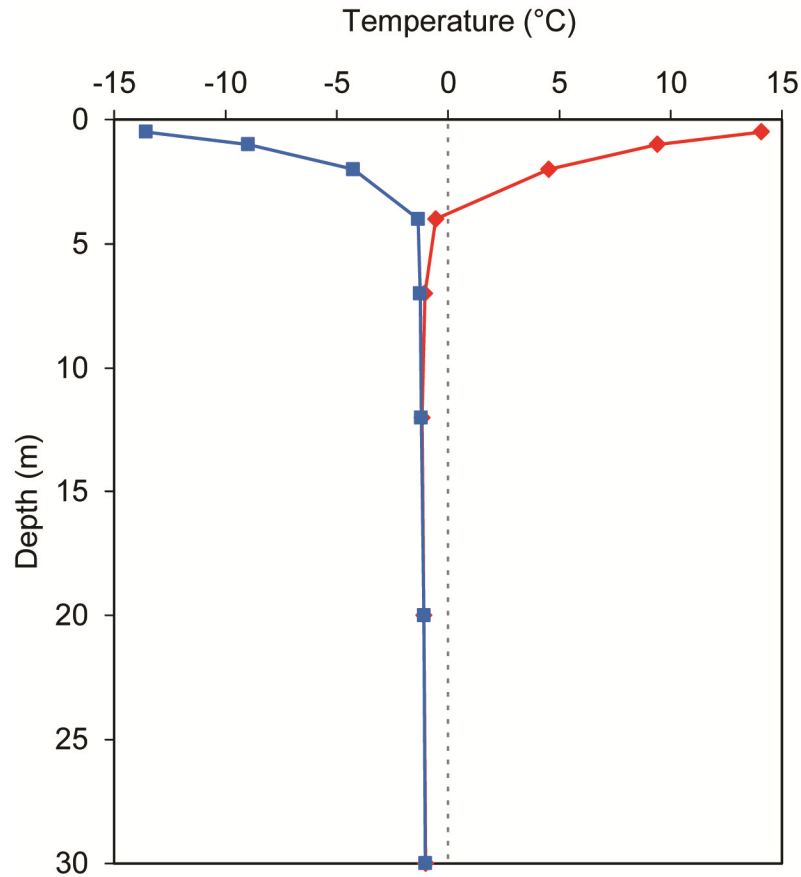
Elevation: 80 m a.s.l.

Landform: Ground moraine

Vegetation cover: Disturbed area adjacent to parking lot

Thaw Depth: 2.93 m

Site visit: September 30, 2015



Sep 2014 – Aug 2015		
Depth (m)	Max (°C)	Min (°C)
0.5	14.08	-13.57
1	9.41	-8.97
2	4.54	-4.26
4	-0.55	-1.34
7	-1.05	-1.26
12	-1.17	-1.21
20	-1.08	-1.08
30	-1.01	-1.02

Van Everdingen 30m

Sahtu Settlement Region

Latitude: 65.27 N

Longitude: 126.75 W

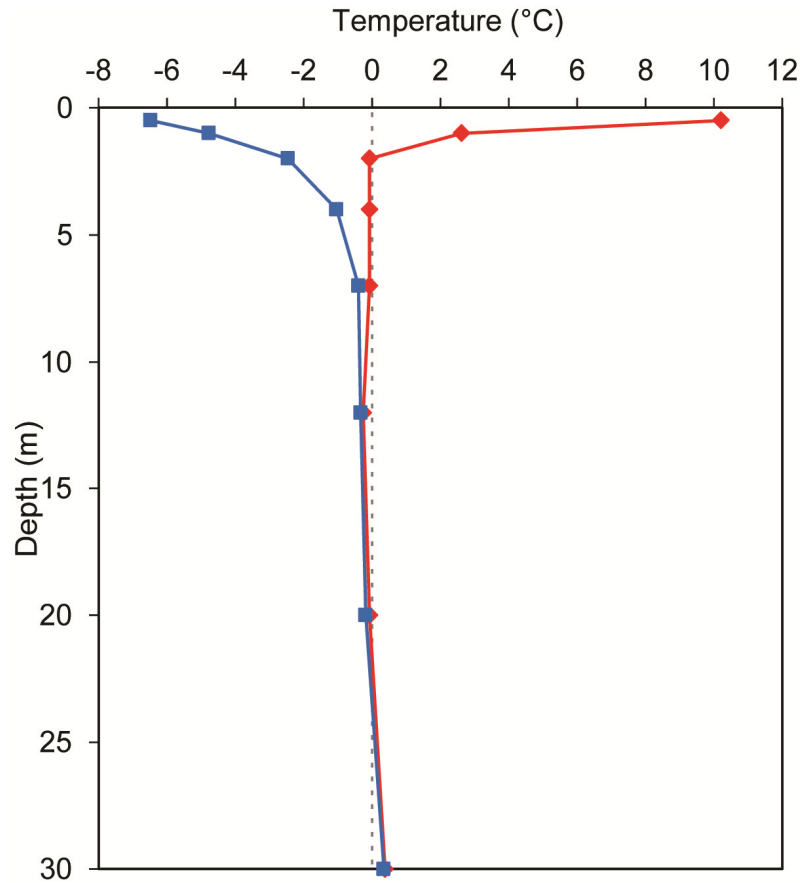
Elevation: n/a

Landform: Lacustrine plain

Vegetation cover: Open forest, moss, shrub, spruce/tamarack

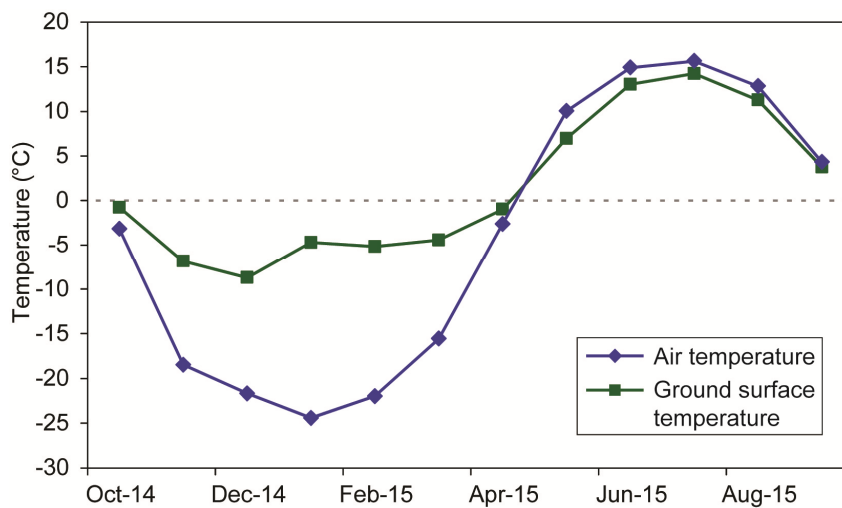
Thaw Depth: 1.17 m

Site visit: September 30, 2015



Sep 2014 – Aug 2015		
Depth (m)	Max (°C)	Min (°C)
0.5	10.21	-6.48
1.0	2.62	-4.77
2.0	-0.08	-2.47
4.0	-0.08	-1.05
7.0	-0.08	-0.40
12.0	-0.26	-0.34
20.0	-0.08	-0.19
30.0	0.38	0.34

Month / Year	Temperature (°C)	
	Air	Surface
Oct / 2014	-3.18	-0.78
Nov / 2014	-18.48	-6.86
Dec / 2014	-21.68	-8.72
Jan / 2015	-24.42	-4.71
Feb / 2015	-22.00	-5.17
Mar / 2015	-15.56	-4.44
Apr / 2015	-2.62	-0.98
May / 2015	10.04	6.96
Jun / 2015	14.91	13.03
Jul / 2015	15.63	14.22
Aug / 2015	12.81	11.26
Sept / 2015	4.32	3.74



84-2A-T4 Canyon Creek North A

Sahtu Settlement Region

Latitude: 65.23 N

Longitude: 126.5 W

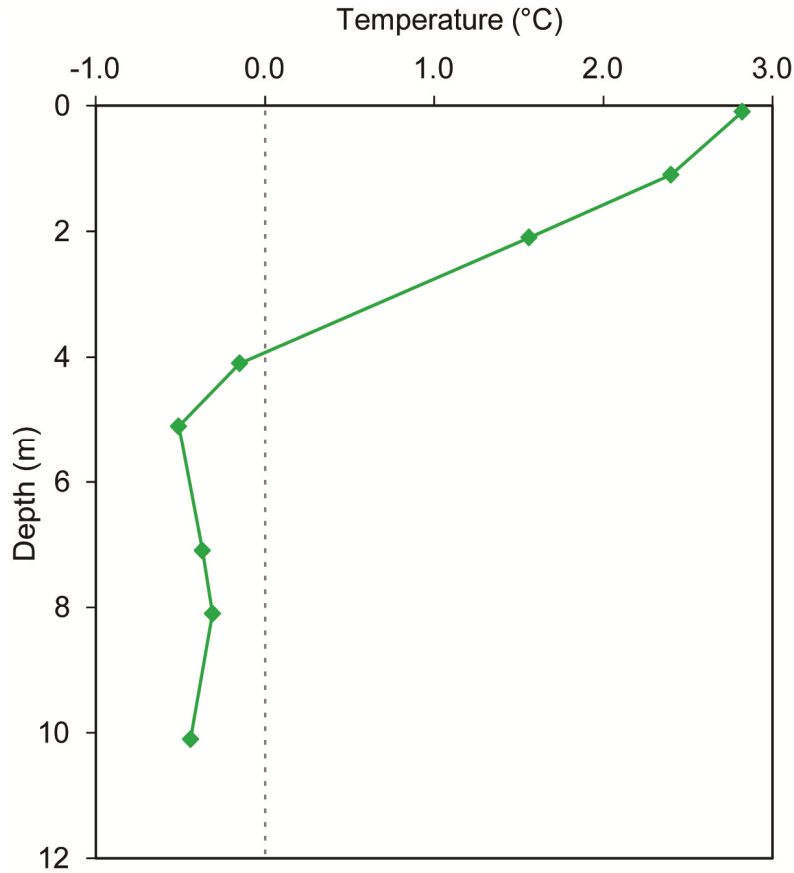
Elevation: 110 m a.s.l.

Landform: Ground moraine

Vegetation cover: Lichen, moss, ericaceous shrubs with black spruce and tamarack

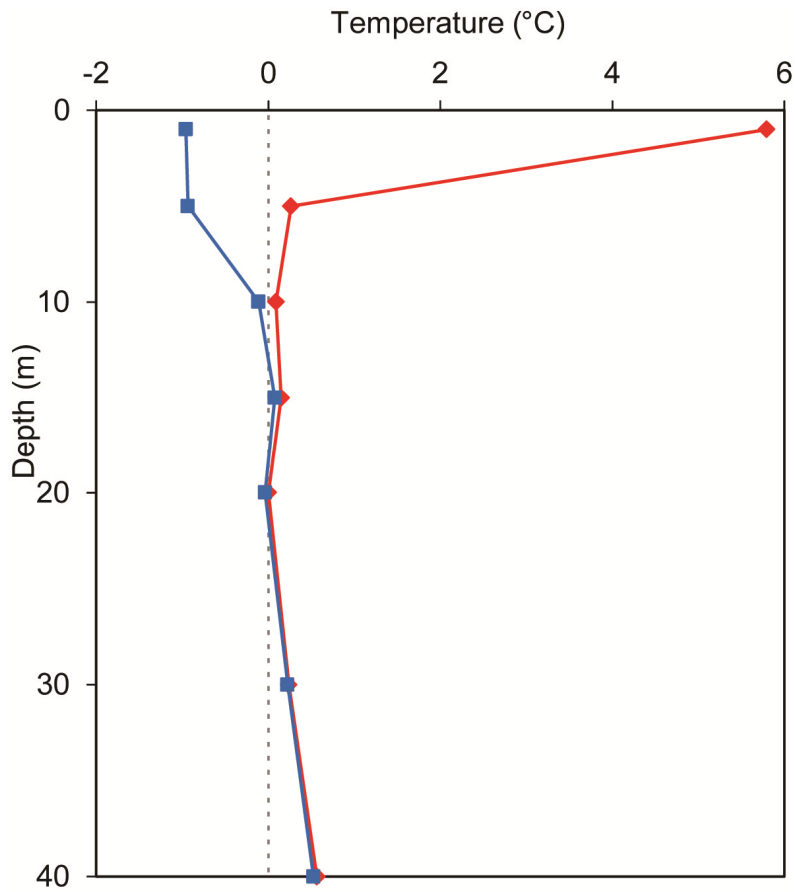
Thaw Depth: 3.96 m

Site visit: October 1, 2015



Depth (m)	Temp (°C)
0.1	2.82
1.1	2.4
2.1	1.56
4.1	-0.15
5.1	-0.51
7.1	-0.37
8.1	-0.31
10.1	-0.44

84-2A-HT Canyon Creek North A



Sep 2014 – Aug 2015		
Depth (m)	Max (°C)	Min (°C)
1	5.79	-0.96
5	0.26	-0.93
10	0.09	-0.11
15	0.15	0.08
20	0.00	-0.04
30	0.24	0.23
40	0.56	0.53

84-2A-HT Canyon Creek North A

Sahtu Settlement Region

Latitude: 65.23 N

Longitude: 126.5 W

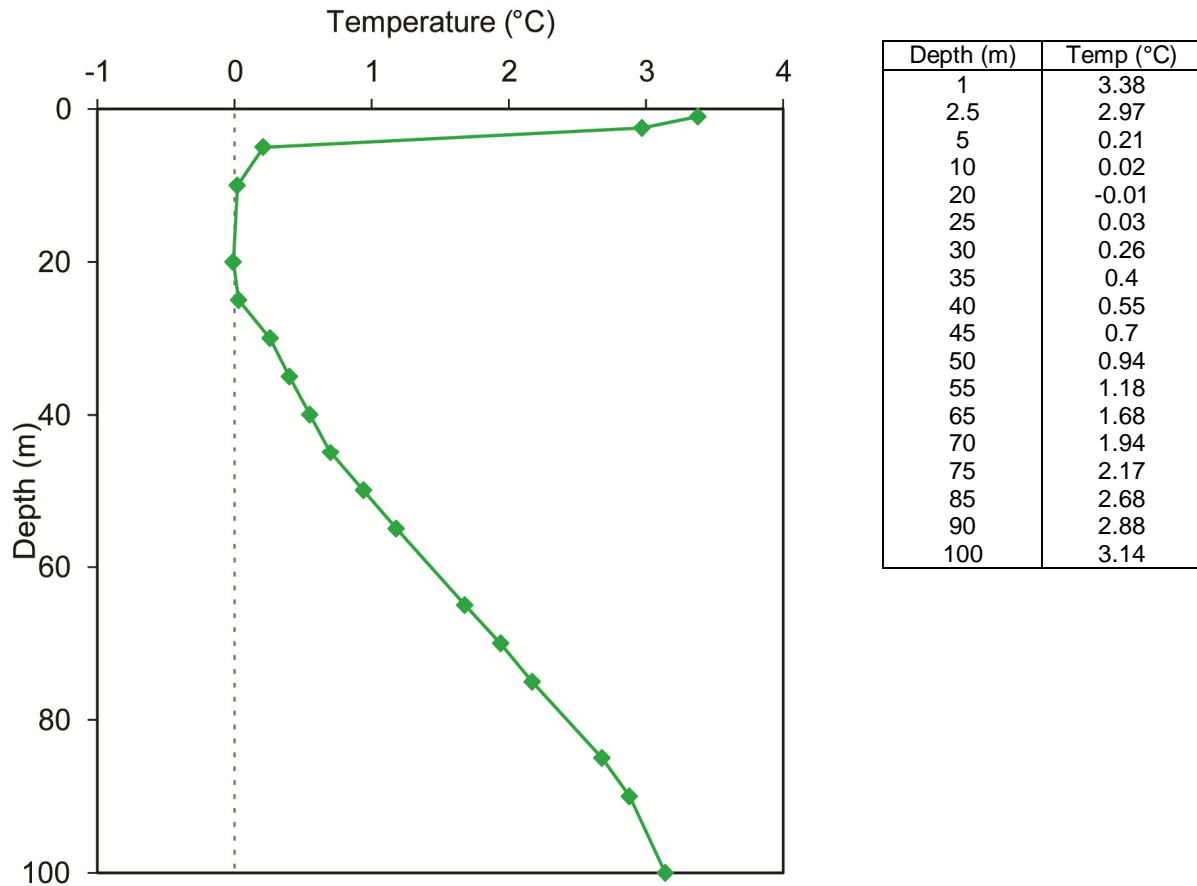
Elevation: 110 m a.s.l.

Landform: Ground moraine

Vegetation cover: Lichen, moss, ericaceous shrubs with black spruce and tamarack

Thaw Depth: 10.53 m for 2015

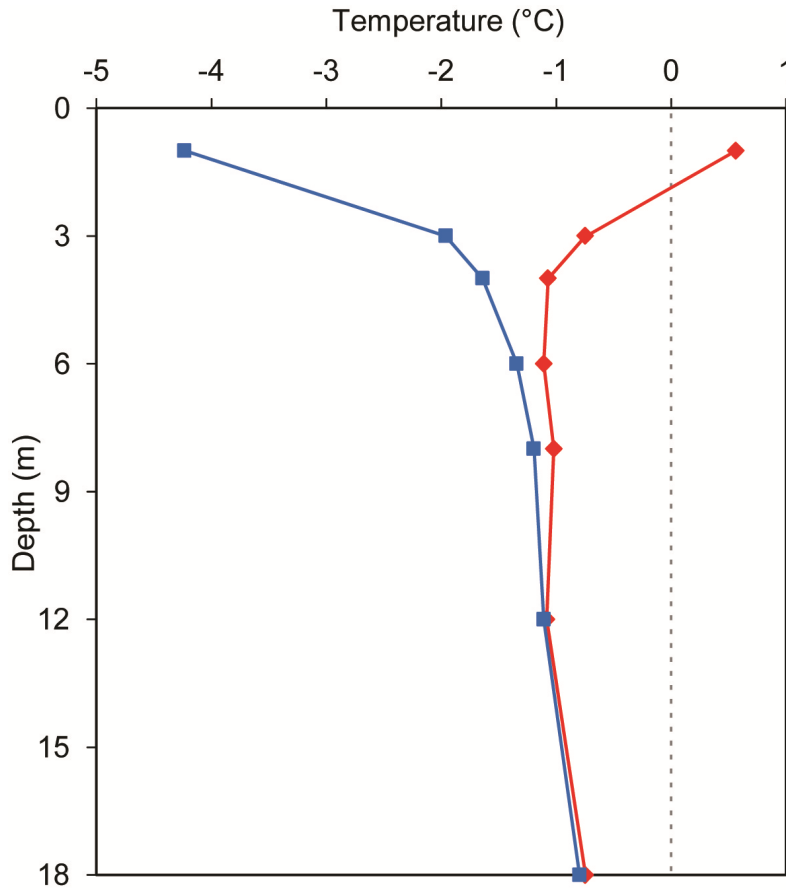
Site visit: October 1, 2015



84-2B-T4

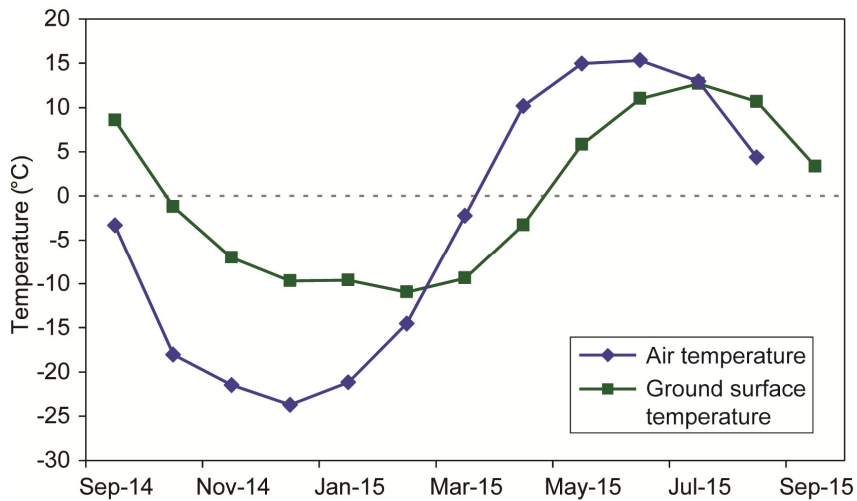
Sahtu Settlement Region

Latitude: 65.23N Longitude: 126.52 W
 Elevation: 110 m a.s.l.
 Landform: Ground moraine
 Vegetation cover: Moss with white spruce
 Thaw Depth: 1.86 m
 Site visit: October 1, 2015



Sep 2014 – Aug 2015		
Depth (m)	Max (°C)	Min (°C)
1	0.56	-4.23
3	-0.75	-1.96
4	-1.07	-1.64
6	-1.11	-1.34
8	-1.02	-1.19
12	-1.08	-1.11
18	-0.75	-0.80

Month / Year	Temperature (°C)	
	Air	Surface
Sept / 2014	3.94	8.56
Oct / 2014	-3.35	-1.22
Nov / 2014	-18.06	-7.01
Dec / 2014	-21.49	-9.69
Jan / 2015	-23.73	-9.60
Feb / 2015	-21.18	-10.96
Mar / 2015	-14.53	-9.37
Apr / 2015	-2.25	-3.29
May / 2015	10.17	5.82
Jun / 2015	14.96	10.99
Jul / 2015	15.32	12.69
Aug / 2015	12.94	10.67
Sept / 2015	4.34	3.36



Vermillion Creek — VC-01

Sahtu Settlement Region

Latitude: 65.10 N

Longitude: 126.14 W

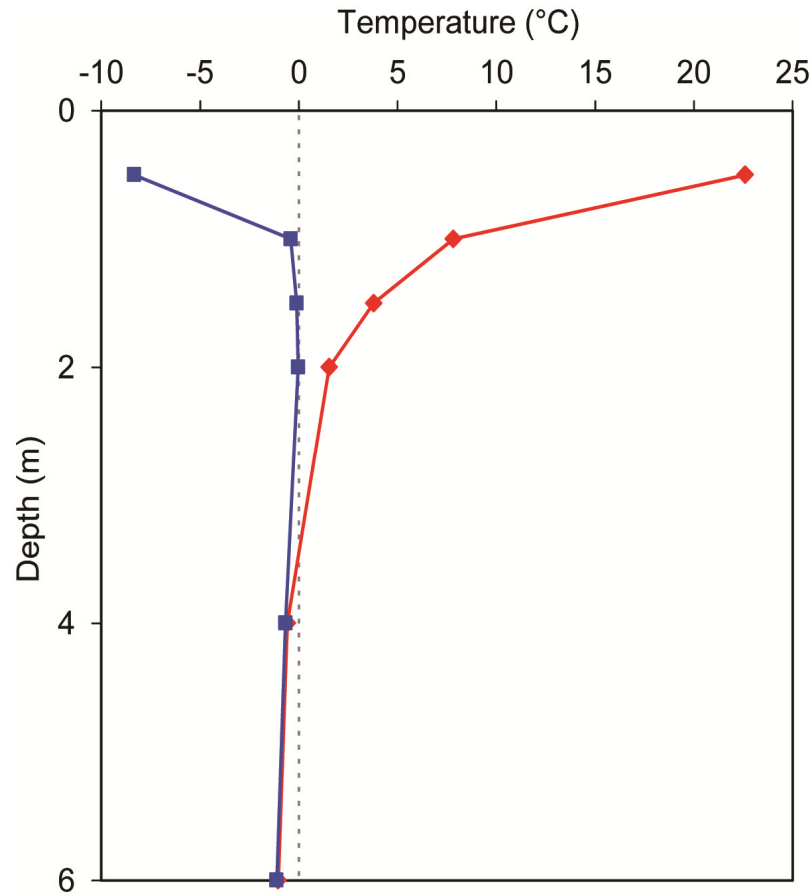
Elevation: 92 m a.s.l.

Landform: Moraine plain (site at approach to water crossing)

Vegetation cover: NW side of creek, on top of ridge in black spruce forest

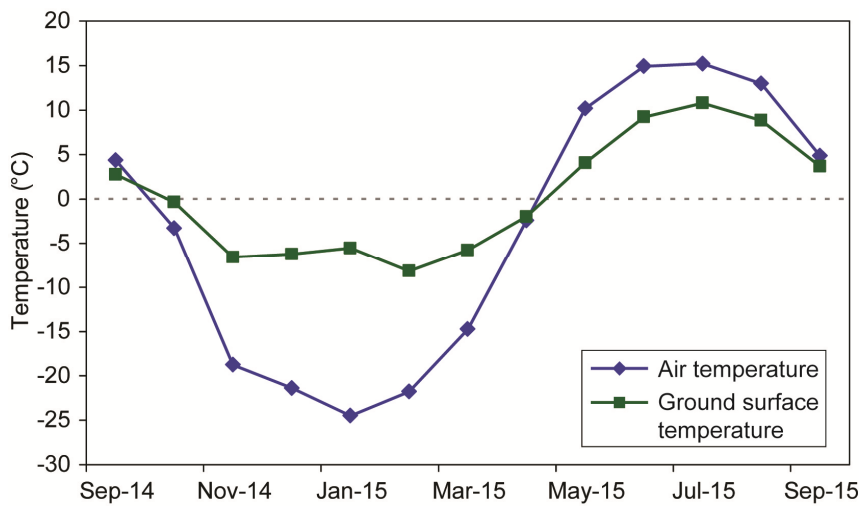
Thaw Depth: 2.46 m

Site visit: October 01, 2015



Sep 2014 – Aug 2015		
Depth (m)	Max (°C)	Min (°C)
0.5	18.03	-12.47
1	7.96	-0.73
1.5	4.10	-0.15
2	1.97	-0.04
4	-0.55	-0.61
6	-0.95	-1.08

Month / Year	Temperature (°C)	
	Air	Surface
Sept / 2014	4.39	2.78
Oct / 2014	-3.28	-0.35
Nov / 2014	-18.75	-6.57
Dec / 2014	-21.37	-6.22
Jan / 2015	-24.49	-5.53
Feb / 2015	-21.78	-8.16
Mar / 2015	-14.74	-5.76
Apr / 2015	-2.41	-1.98
May / 2015	10.18	4.08
Jun / 2015	14.92	9.22
Jul / 2015	15.22	10.80
Aug / 2015	12.98	8.84
Sept / 2015	4.88	3.69



Vermillion Creek — VC-02

Sahtu Settlement Region

Latitude: 65.10 N

Longitude: 126.13 W

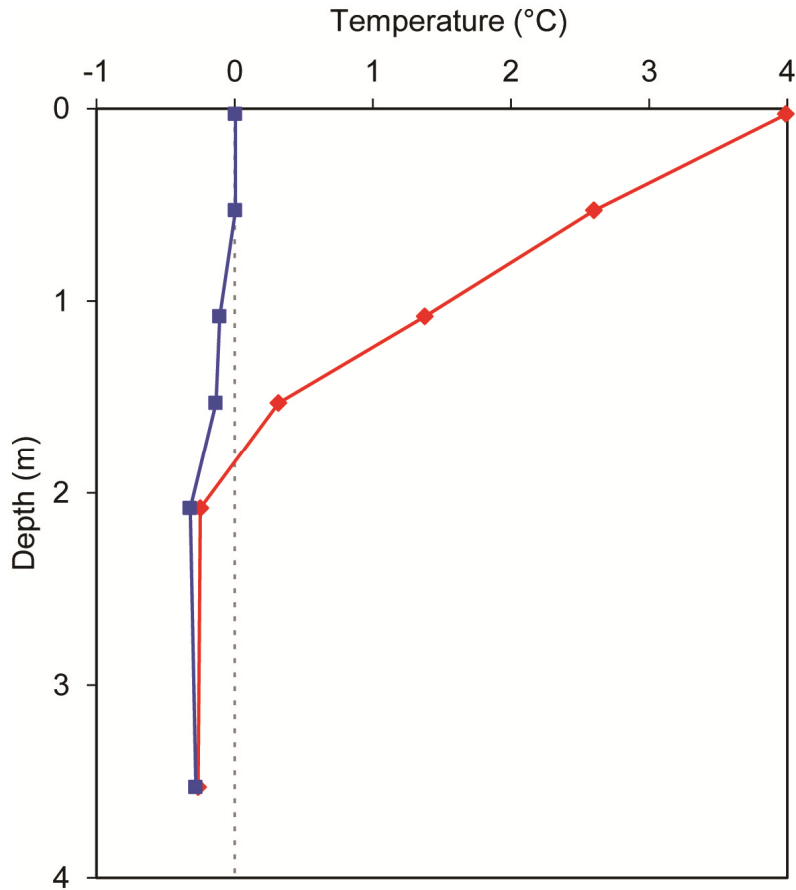
Elevation: 92 m a.s.l.

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: 1.66 m

Site visit: October 1, 2015



Sep 2014 – Aug 2015		
Depth (m)	Max (°C)	Min (°C)
0.03	3.99	0.00
0.53	2.60	0.00
1.08	1.38	-0.11
1.53	0.32	-0.14
2.08	-0.25	-0.32
3.53	-0.26	-0.28

Police Island — PI-01

Sahtu Settlement Region

Latitude: 64.83 N

Longitude: 125.02 W

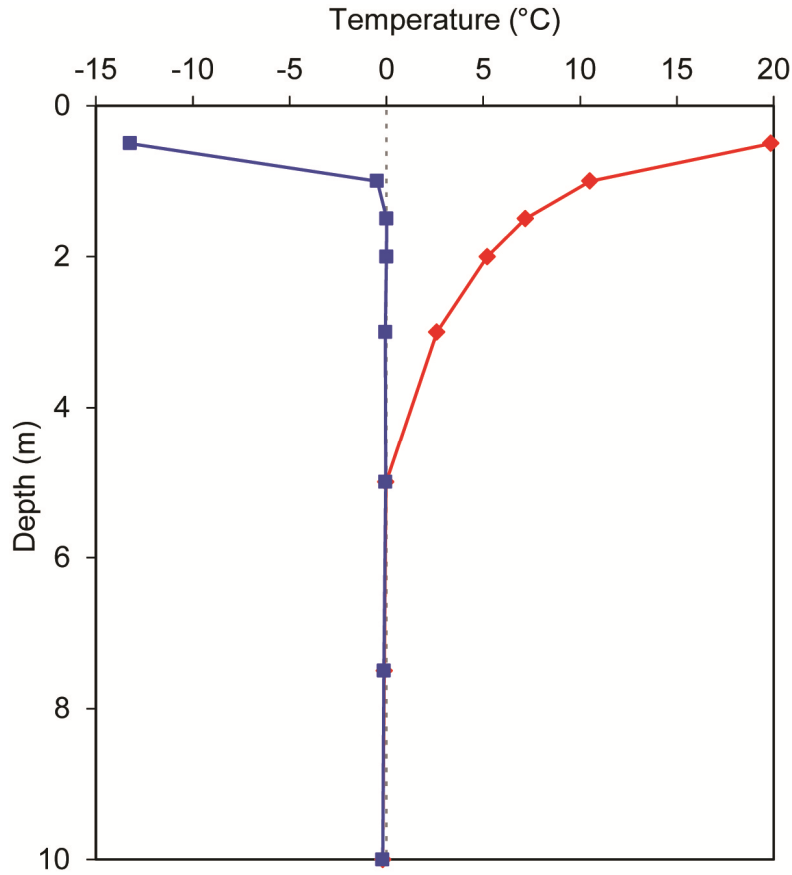
Elevation: 113 m a.s.l.

Landform: Lacustrine plain

Vegetation cover: Recovering burn (burnt black spruce forest)

Thaw Depth: 4.0 m

Site visit: October 2, 2015



Sep 2014 – Aug 2015		
Depth (m)	Max (°C)	Min (°C)
0.5	19.86	-13.24
1	10.51	-0.48
1.5	7.17	0.01
2	5.20	0.00
3	2.61	-0.06
5	-0.03	-0.04
7.5	-0.11	-0.13
10	-0.18	-0.20

Police Island — PI-02

Sahtu Settlement Region

Latitude: 64.83 N

Longitude: 125.01 W

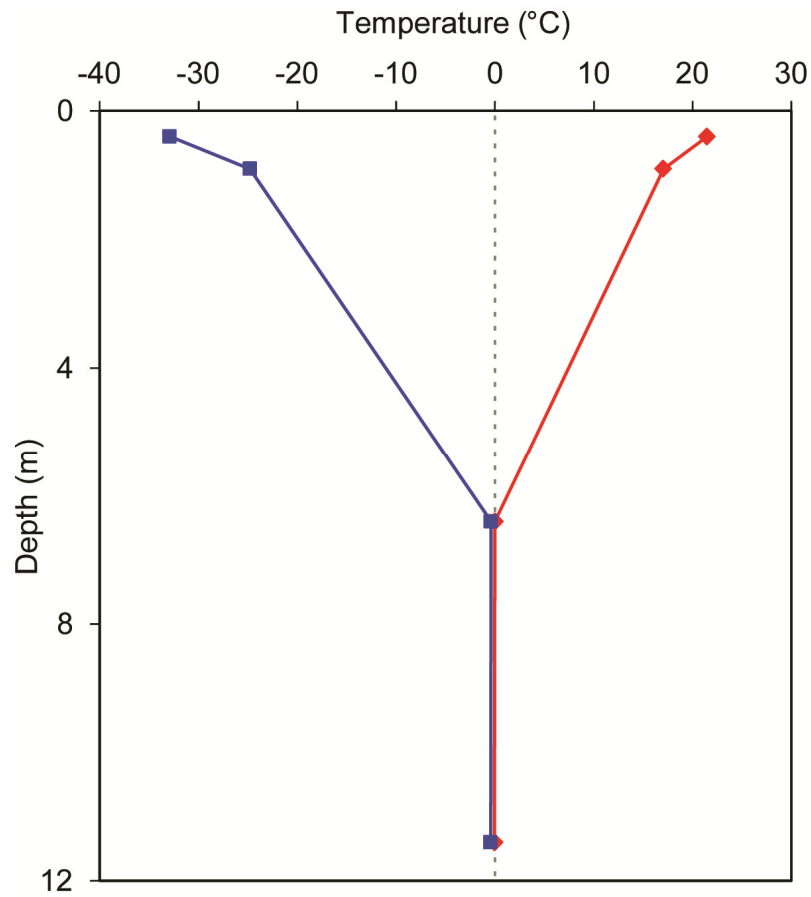
Elevation: 113 m a.s.l.

Landform: Lacustrine plain

Vegetation cover: Unburnt, black spruce forest with moss and lichen ground cover

Thaw Depth: 2.82 m

Site visit: October 2, 2015



Sep 2014 – Aug 2015		
Depth (m)	Max (°C)	Min (°C)
0.4	21.47	-32.90
0.9	17.04	-24.80
6.4	-0.01	-0.40
11.4	-0.05	-0.44

Old Fort Point — OFP-01

Sahtu Settlement Region

Latitude: 64.65 N

Longitude: 124.84 W

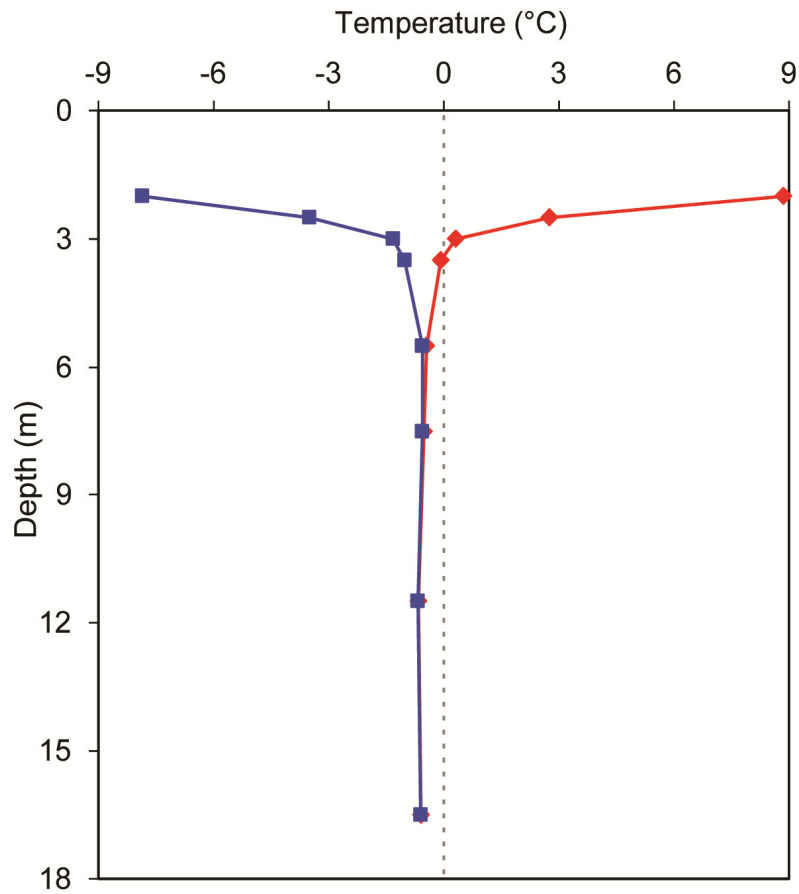
Elevation: 112 m a.s.l.

Landform: Lacustrine plain

Vegetation cover: Open mixed spruce, pine deciduous forest adjacent to open, low-lying fen

Thaw Depth: 3.06 m

Site visit: October 2, 2015



Sep 2014 – Aug 2015		
Depth (m)	Max (°C)	Min (°C)
2	8.86	-7.86
2.5	2.76	-3.50
3	0.31	-1.32
3.5	-0.08	-1.02
5.5	-0.45	-0.56
7.5	-0.51	-0.56
11.5	-0.66	-0.67
16.5	-0.59	-0.60

Little Smith Creek — LS-01

Sahtu Settlement Region

Latitude: 64.43 N

Longitude: 124.74 W

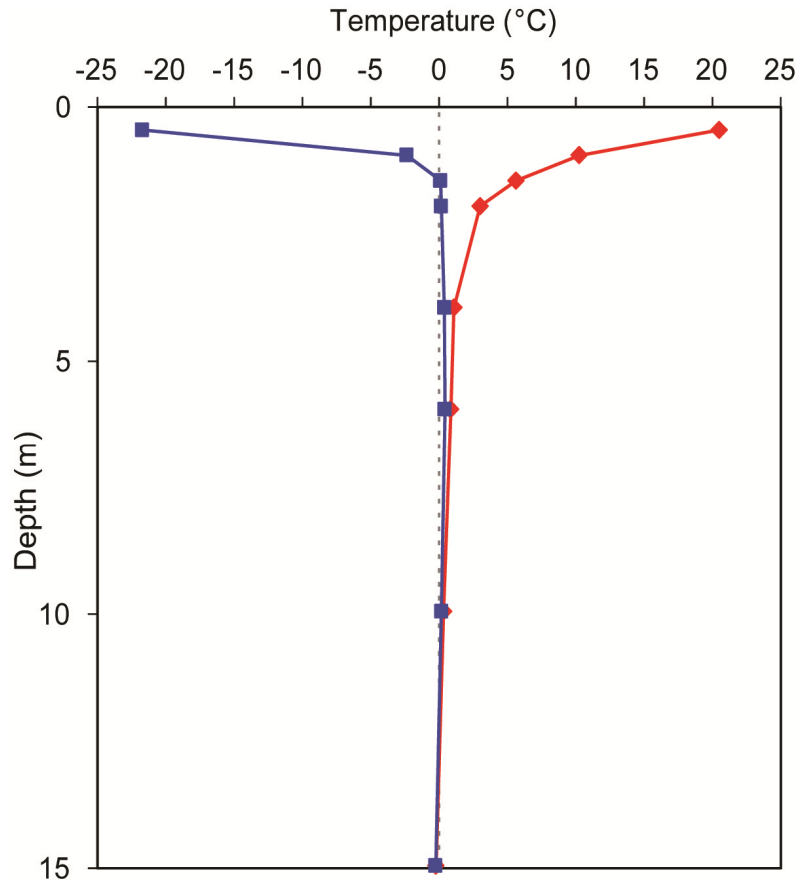
Elevation: 80 m a.s.l.

Landform: Alluvial flood plain

Vegetation cover: Open mature black spruce forest

Thaw Depth: 12.35 m

Site visit: October 2, 2015



Sep 2014 – Aug 2015		
Depth (m)	Max (°C)	Min (°C)
0.45	20.50	-21.72
0.95	10.26	-2.36
1.45	5.63	0.09
1.95	3.00	0.15
3.95	1.08	0.37
5.95	0.86	0.42
9.95	0.32	0.17
14.95	-0.23	-0.25

Little Smith Creek— LS-02

Sahtu Settlement Region

Latitude: 64.43 N

Longitude: 124.73 W

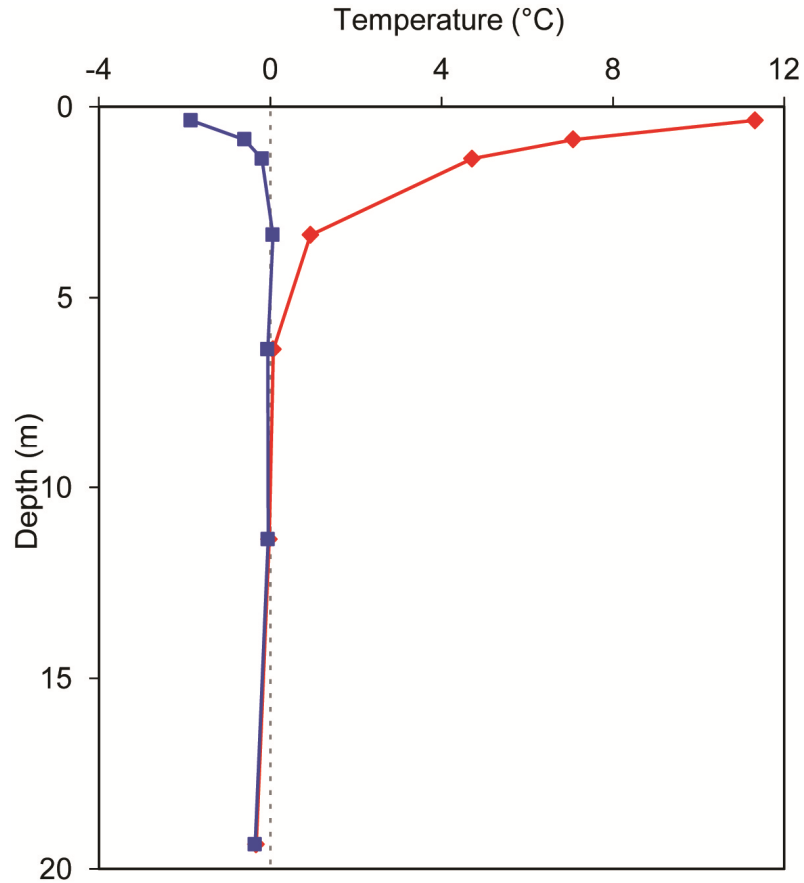
Elevation: 112 m a.s.l.

Landform: Glaciofluvial outwash plain

Vegetation cover: Tamarack birch poplar, and pine forest transition to spruce

Thaw Depth: 6.60 m

Site visit: October 2, 2015



Sep 2014 – Aug 2015		
Depth (m)	Max (°C)	Min (°C)
0.36	11.32	-1.85
0.86	7.07	-0.60
1.36	4.71	-0.19
3.36	0.94	0.06
6.36	0.07	-0.06
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

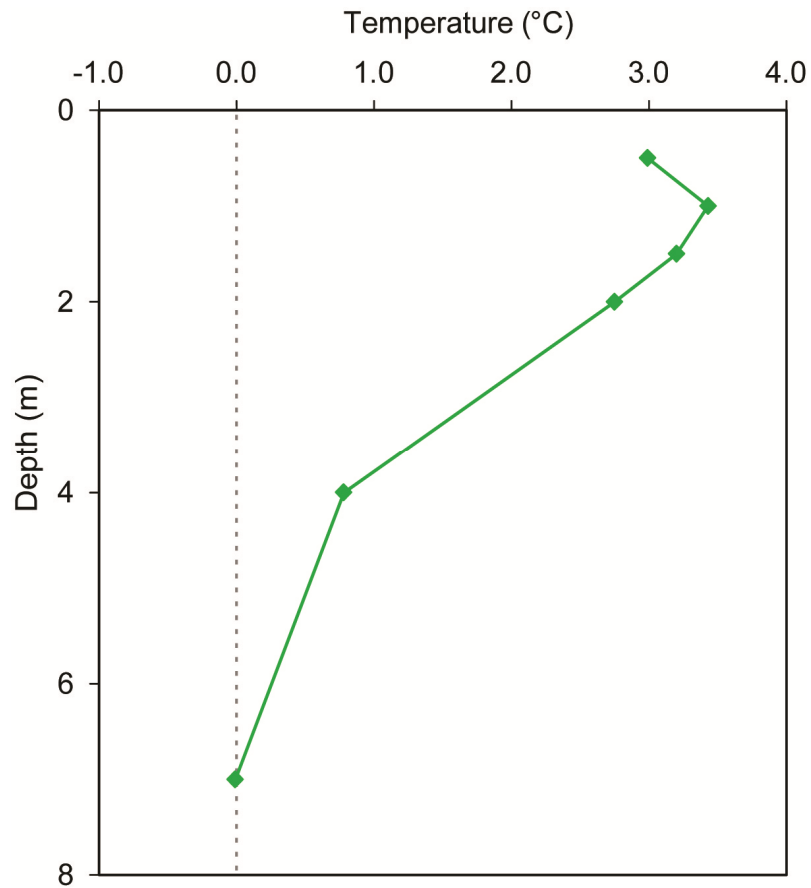
Elevation: 140 m a.s.l.

Landform: Glaciofluvial veneer over lacustrine

Vegetation cover: Burnt black spruce forest

Thaw Depth: 4.79 m

Site visit: October 2, 2015



Depth (m)	Temp (°C)
0.5	2.99
1	3.43
1.5	3.2
2	2.75
4	0.78
7	-0.01

KP182 — Bottom

Sahtu Settlement Region

Latitude: 64.28 N

Longitude: 124.47 W

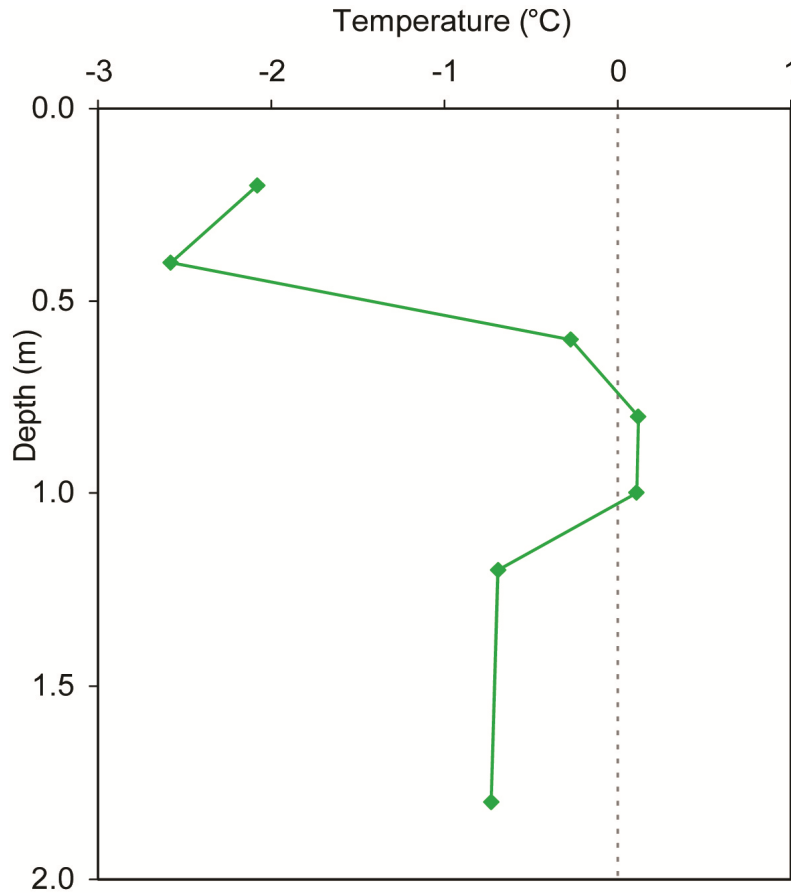
Elevation: 133 m a.s.l.

Landform: Lacustrine plain

Vegetation cover: Forested (recovering burn, burned 1994)- Aspen, willow, birch, tamarack

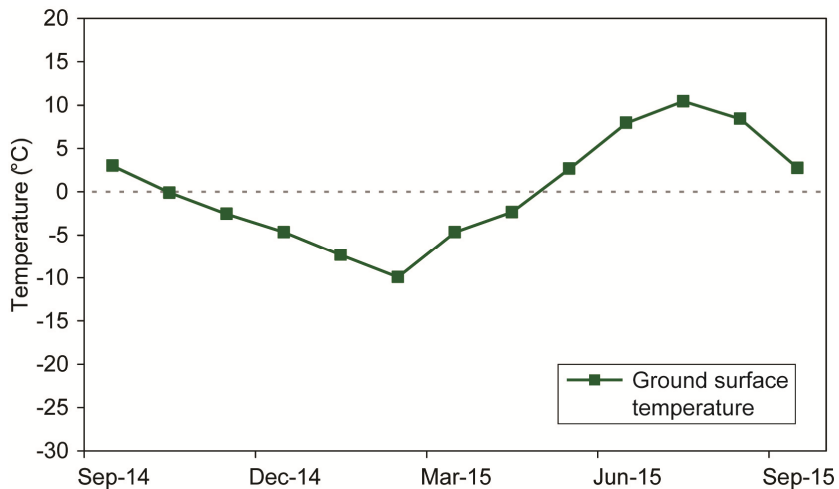
Thaw Depth: 1.03 m

Site visit: October 3, 2015



Depth (m)	Temp (°C)
0.2	-2.08
0.4	-2.58
0.6	-0.27
0.8	0.12
1.0	0.11
1.2	-0.69
1.8	-0.73

Month / Year	Temperature (°C)	
	Air	Surface
Sept / 2014	n/a	2.99
Oct / 2014	n/a	-0.11
Nov / 2014	n/a	-2.58
Dec / 2014	n/a	-4.67
Jan / 2015	n/a	-7.36
Feb / 2015	n/a	-9.94
Mar / 2015	n/a	-4.68
Apr / 2015	n/a	-2.35
May / 2015	n/a	2.64
Jun / 2015	n/a	7.94
Jul / 2015	n/a	10.43
Aug / 2015	n/a	8.41
Sept / 2015	n/a	2.74



KP182 — Mid Slope HT192

Sahtu Settlement Region

Latitude: 64.28 N

Longitude: 124.47 W

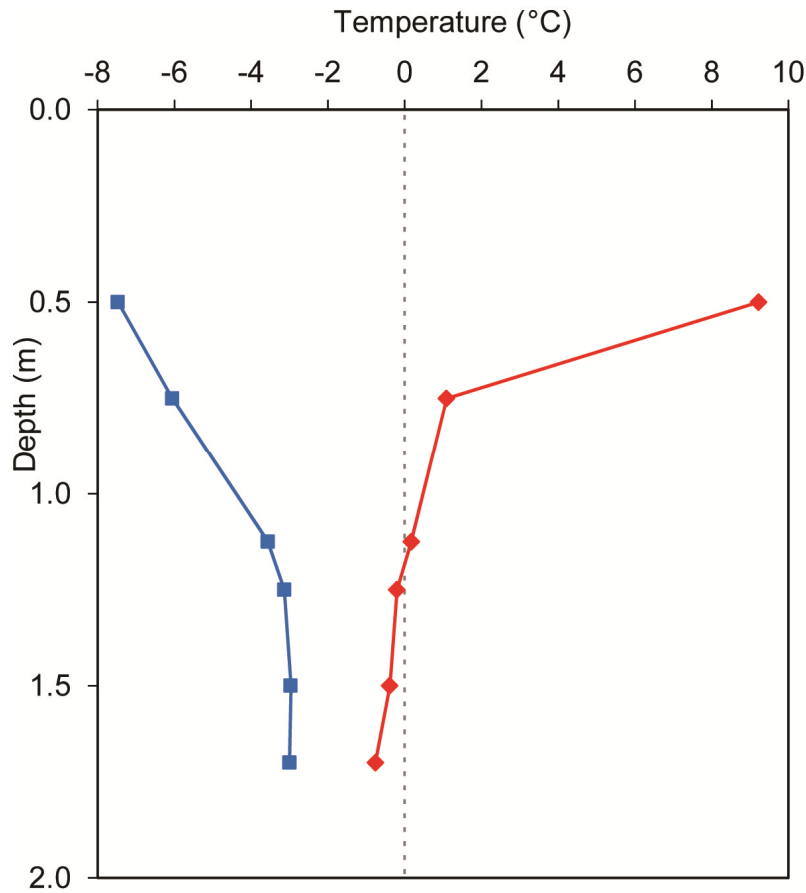
Elevation: 138 m a.s.l.

Landform: Lacustrine plain

Vegetation cover: Forested (recovering burn, burned 1994) - Aspen, willow, birch, tamarack

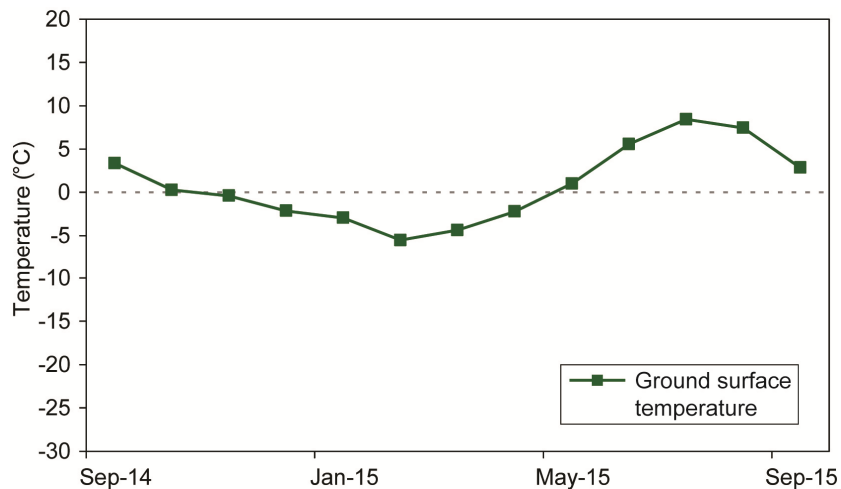
Thaw Depth: 1.19 m

Site visit: October 3, 2015



Sep 2014 – Aug 2015		
Depth (m)	Max (°C)	Min (°C)
0.5	9.22	-7.47
0.75	1.09	-6.05
1.125	0.17	-3.56
1.25	-0.20	-3.14
1.5	-0.39	-2.97
1.7	-0.76	-3.00

Month / Year	Temperature (°C)	
	Air	Surface
Sept / 2014	n/a	3.36
Oct / 2014	n/a	0.27
Nov / 2014	n/a	-0.41
Dec / 2014	n/a	-2.14
Jan / 2015	n/a	-2.95
Feb / 2015	n/a	-5.53
Mar / 2015	n/a	-4.37
Apr / 2015	n/a	-2.22
May / 2015	n/a	1.00
Jun / 2015	n/a	5.56
Jul / 2015	n/a	8.42
Aug / 2015	n/a	7.45
Sept / 2015	n/a	2.84



KP182 — Crest of Slope

Sahtu Settlement Region

Latitude: 64.28 N

Longitude: 124.47 W

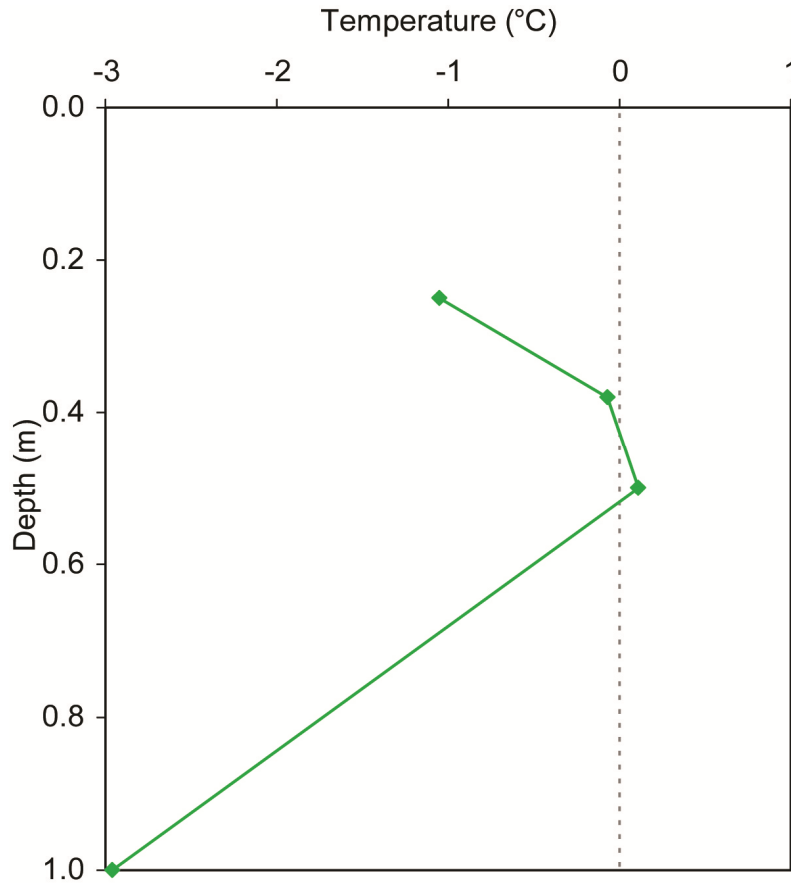
Elevation: 139 m a.s.l.

Landform: Lacustrine plain

Vegetation cover: Forested (recovering burn, burned 1994)— Aspen, willow, birch, tamarack

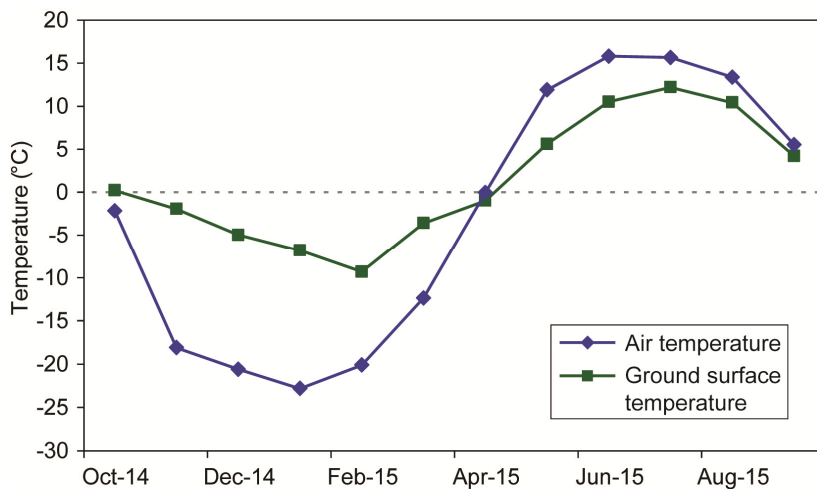
Thaw Depth: 0.39 m

Site visit: October 3, 2015



Depth (m)	Temp (°C)
0.25	-1.05
0.38	-0.07
0.5	0.11
1	-2.96

Month / Year	Temperature (°C)	
	Air	Surface
Oct / 2014	-2.17	0.21
Nov / 2014	-18.11	-1.96
Dec / 2014	-20.61	-4.98
Jan / 2015	-22.82	-6.82
Feb / 2015	-20.13	-9.31
Mar / 2015	-12.37	-3.62
Apr / 2015	-0.07	-0.98
May / 2015	11.89	5.60
Jun / 2015	15.82	10.52
Jul / 2015	15.64	12.18
Aug / 2015	13.38	10.41
Sept / 2015	5.52	4.22



KP182 — Top of Slope

Sahtu Settlement Region

Latitude: 64.28 N

Longitude: 124.47 W

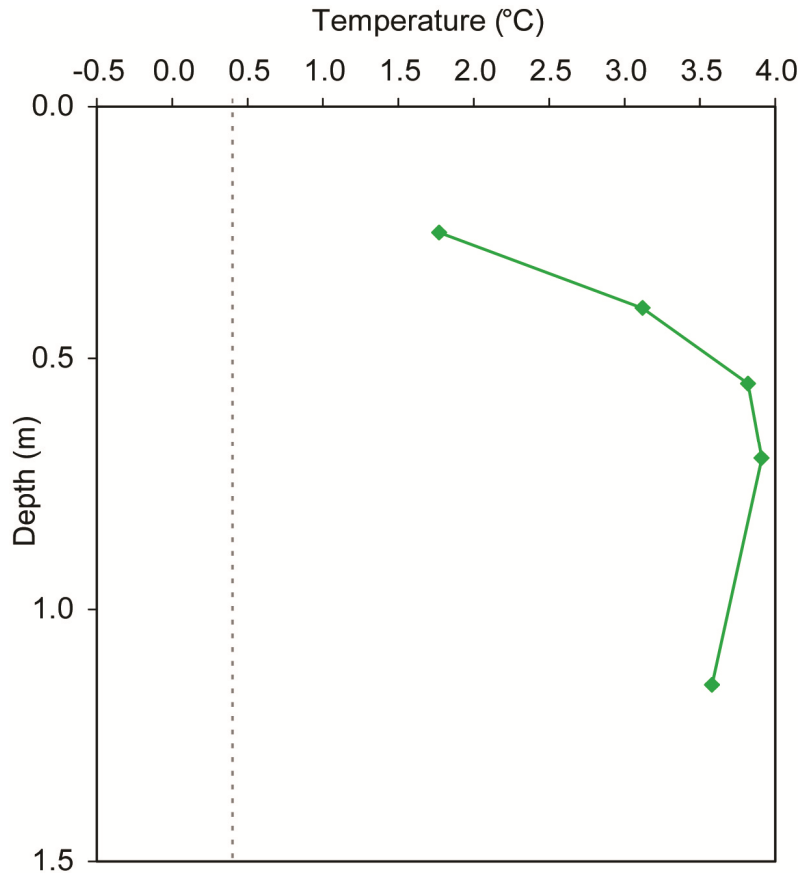
Elevation: 144 m a.s.l.

Landform: Lacustrine plain

Vegetation cover: Forested (recovering burn, burned 1994)- Aspen, willow, birch, tamarack

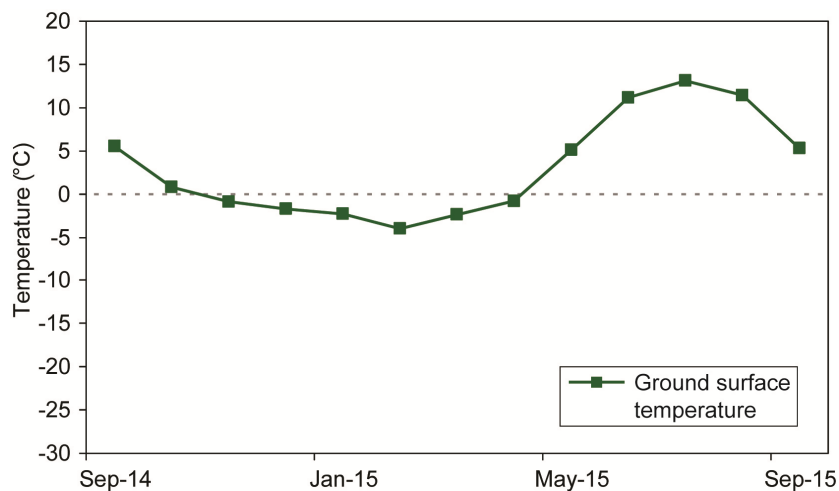
Thaw Depth: n/a

Site visit: October 3, 2015



Depth (m)	Temp (°C)
0.25	1.77
0.4	3.12
0.55	3.82
0.7	3.91
1.15	3.58

Month / Year	Temperature (°C)	
	Air	Surface
Sept / 2014	n/a	5.55
Oct / 2014	n/a	0.84
Nov / 2014	n/a	-0.85
Dec / 2014	n/a	-1.68
Jan / 2015	n/a	-2.25
Feb / 2015	n/a	-3.97
Mar / 2015	n/a	-2.34
Apr / 2015	n/a	-0.77
May / 2015	n/a	5.11
Jun / 2015	n/a	11.18
Jul / 2015	n/a	13.12
Aug / 2015	n/a	11.45
Sept / 2015	n/a	5.31



Steep Creek Top — Steep-02

Sahtu Settlement Region

Latitude: 64.18 N

Longitude: 124.38 W

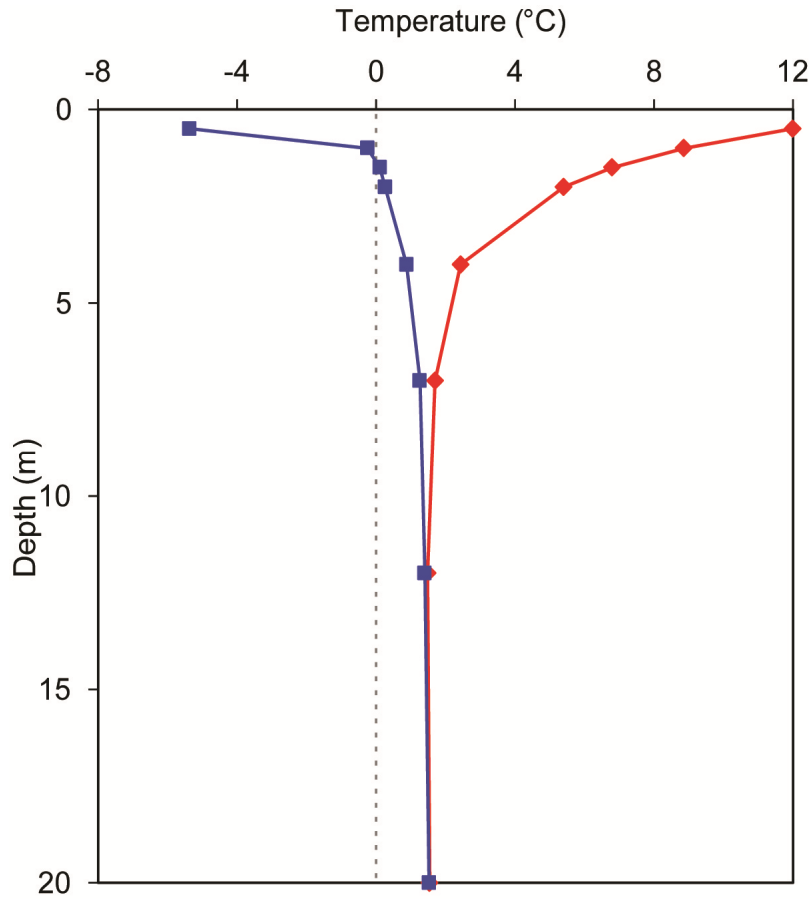
Elevation: 134 m a.s.l.

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: October 2, 2015



Sep 2014 – Aug 2015		
Depth (m)	Max (°C)	Min (°C)
0.5	11.99	-5.37
1	8.86	-0.25
1.5	6.79	0.11
2	5.40	0.26
4	2.43	0.88
7	1.69	1.26
12	1.48	1.40
20	1.54	1.52

85-7A-HA108

Deh cho Settlement Region

Latitude: 63.61 N

Longitude: 123.64 W

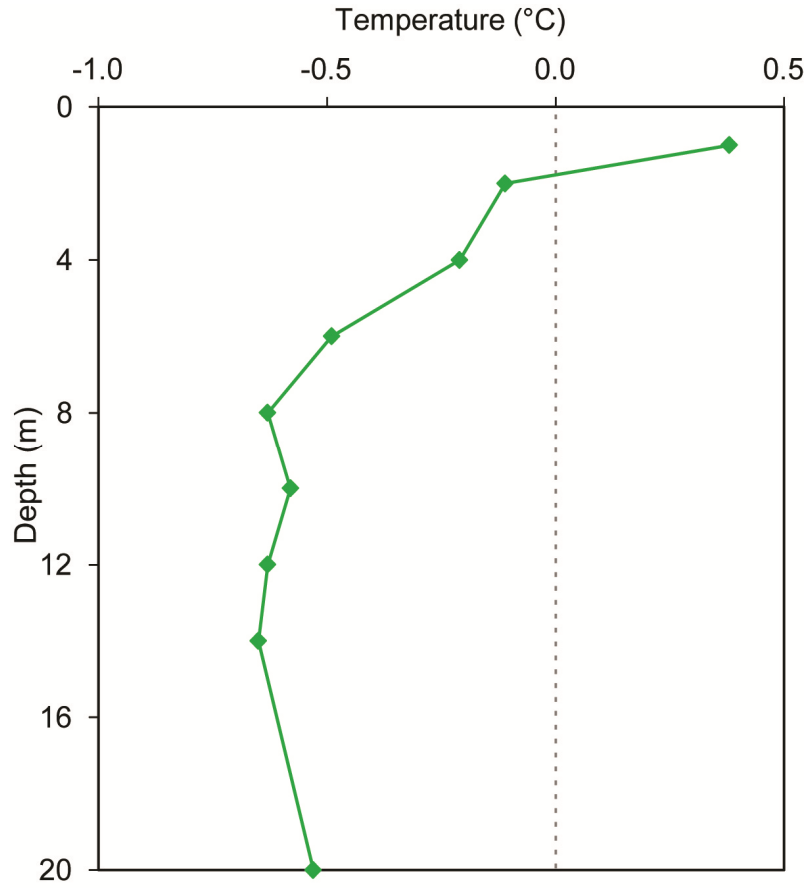
Elevation: 255 m a.s.l.

Landform: Ground moraine

Vegetation cover: Lichen, moss, ericaceous shrubs with black spruce and alder

Thaw Depth: 1.78 m

Site visit: October 2, 2015



Depth (m)	Temp (°C)
1	0.38
2	-0.11
4	-0.21
6	-0.49
8	-0.63
10	-0.58
12	-0.63
14	-0.65
20	-0.53

Ochre River cabin — 92TT10

Deh cho Settlement Region

Latitude: 63.47 N

Longitude: 123.69 W

Elevation: n/a

Landform: n/a

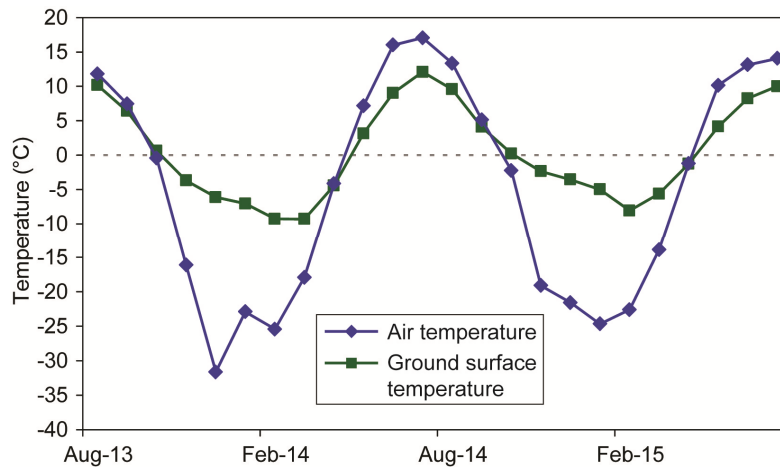
Vegetation cover: n/a

Thaw Depth: n/a

Site visit: August 9, 2015

Month / Year	Temperature (°C)	
	Air	Surface
Aug / 2013	11.82	10.18
Sept / 2013	7.46	6.40
Oct / 2013	-0.45	0.62
Nov / 2013	-16.12	-3.71
Dec / 2013	-31.65	-6.13
Jan / 2014	-22.91	-7.06
Feb / 2014	-25.42	-9.29
Mar / 2014	-17.91	-9.31
Apr / 2014	-4.17	-4.42
May / 2014	7.18	3.14
Jun / 2014	16.01	9.04
Jul / 2014	17.05	12.09

Month / Year	Temperature (°C)	
	Air	Surface
Aug / 2014	13.35	9.57
Sept / 2014	5.13	4.09
Oct / 2014	-2.24	0.23
Nov / 2014	-19.08	-2.35
Dec / 2014	-21.59	-3.56
Jan / 2015	-24.66	-5.00
Feb / 2015	-22.59	-8.07
Mar / 2015	-13.87	-5.63
Apr / 2015	-1.21	-1.27
May / 2015	10.15	4.14
Jun / 2015	13.14	8.23
Jul / 2015	14.07	10.00



KP313 T2

Deh cho Settlement Region

Latitude: 63.26 N

Longitude: 123.43 W

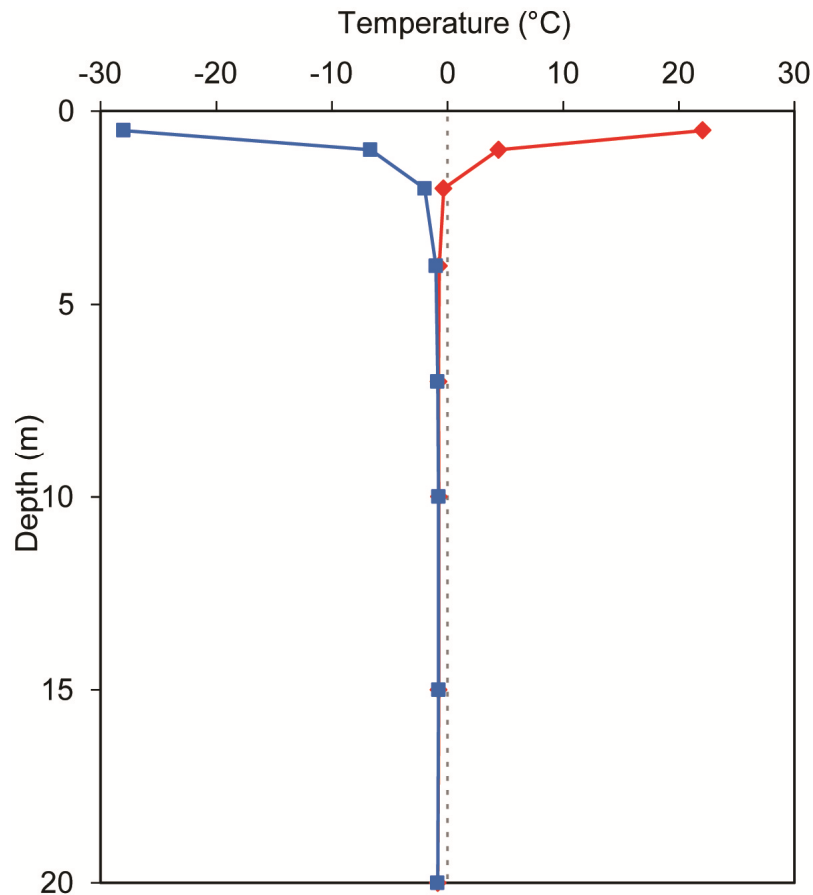
Elevation: 250 m a.s.l.

Landform: Lacustrine plain, bottom of slope

Vegetation cover: Moss cover and peat, forested, mix of birch and spruce

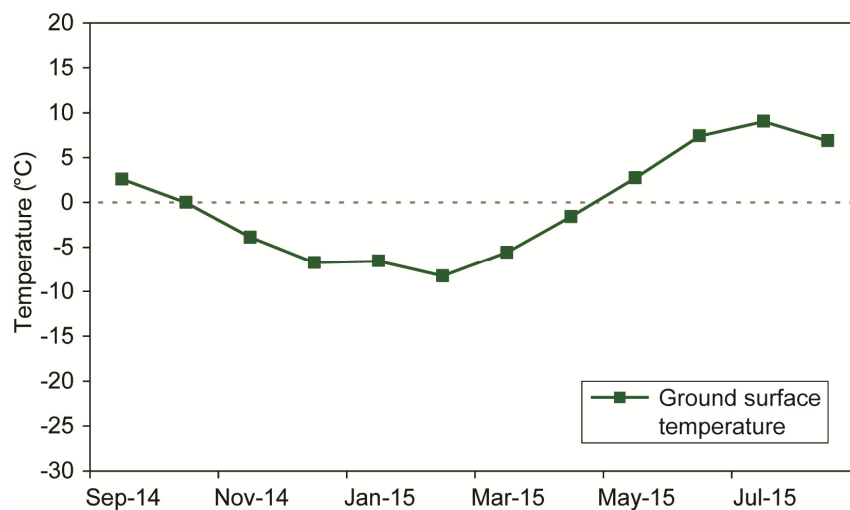
Thaw Depth: 1.13 m

Site visit: October 2, 2015



Sep 2014 – Aug 2015		
Depth (m)	Max (°C)	Min (°C)
0.5	22.06	-28.01
1	4.42	-6.67
2	-0.34	-1.97
4	-0.73	-1.01
7	-0.79	-0.86
10	-0.75	-0.79
15	-0.77	-0.79
20	-0.84	-0.86

Month / Year	Temperature (°C)	
	Air	Surface
Sept / 2014	n/a	2.59
Oct / 2014	n/a	-0.03
Nov / 2014	n/a	-3.90
Dec / 2014	n/a	-6.76
Jan / 2015	n/a	-6.59
Feb / 2015	n/a	-8.28
Mar / 2015	n/a	-5.60
Apr / 2015	n/a	-1.58
May / 2015	n/a	2.72
Jun / 2015	n/a	7.39
Jul / 2015	n/a	9.03
Aug / 2015	n/a	6.85
Sept / 2015	n/a	2.24



KP313 T4

Deh cho Settlement Region

Latitude: 63.26 N

Longitude: 123.43 W

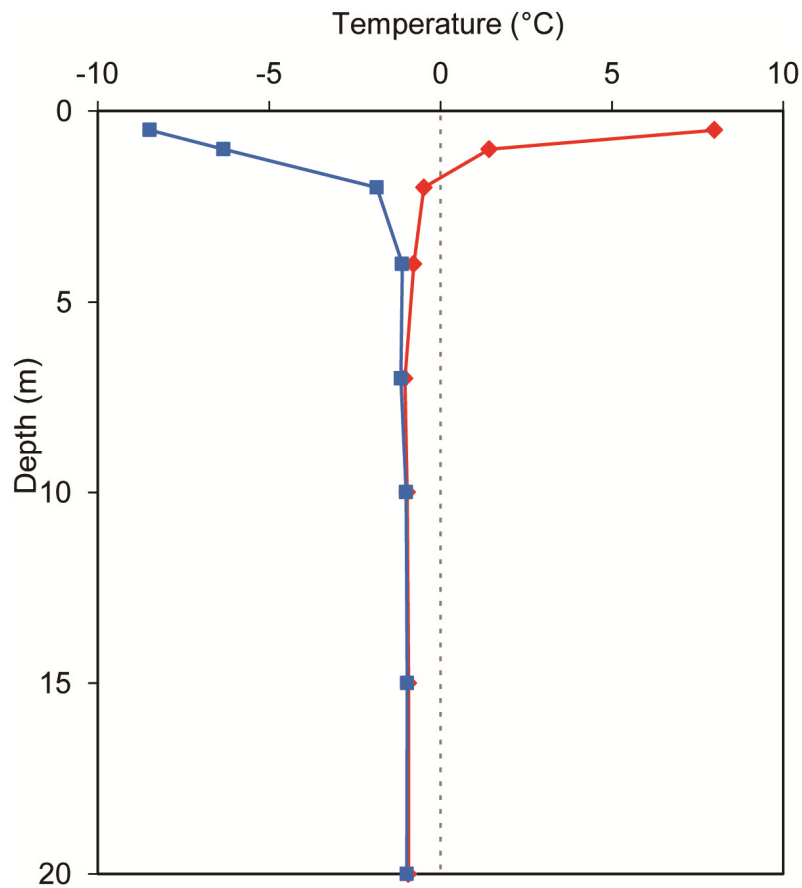
Elevation: 250 m a.s.l.

Landform: Lacustrine plain, mid slope, W side of ROW

Vegetation cover: Moss cover and peat, forested, mix of birch and spruce

Thaw Depth: 1.11 m

Site visit: October 2, 2015



Sep 2014 – Aug 2015		
Depth (m)	Max (°C)	Min (°C)
0.5	7.99	-8.48
1	1.42	-6.33
2	-0.49	-1.86
4	-0.79	-1.12
7	-1.05	-1.16
10	-0.97	-1.01
15	-0.93	-0.97
20	-0.93	-0.98

KP313 T5

Deh cho Settlement Region

Latitude: 63.26 N

Longitude: 123.43 W

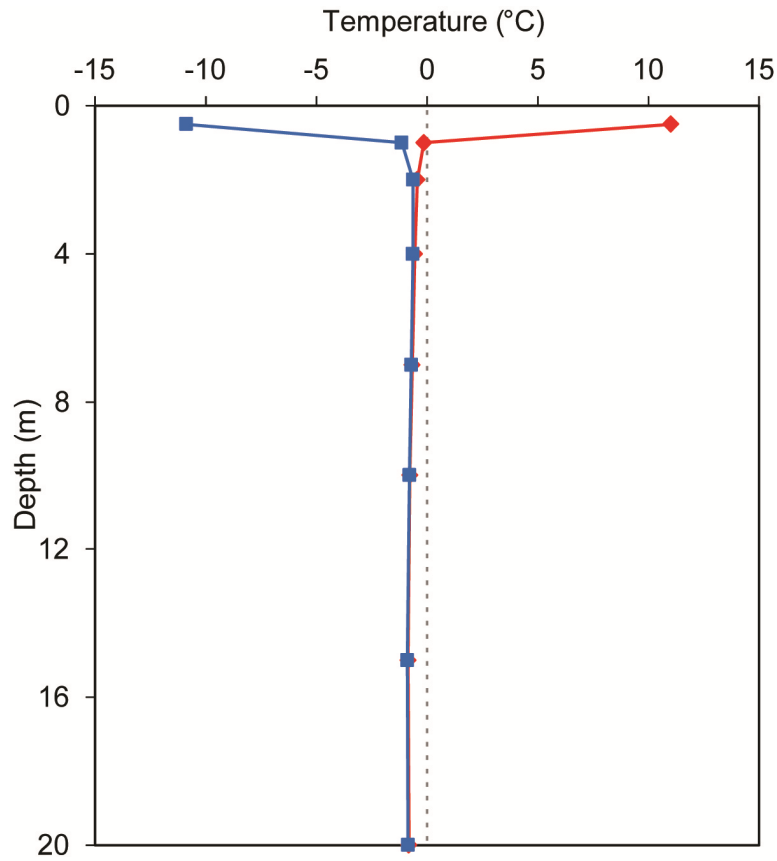
Elevation: 250 m a.s.l.

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: October 2, 2015



Sep 2014 – Aug 2015		
Depth (m)	Max (°C)	Min (°C)
0.5	11.01	-10.87
1.0	-0.15	-1.14
2.0	-0.45	-0.64
4.0	-0.56	-0.64
7.0	-0.67	-0.71
10.0	-0.78	-0.80
15.0	-0.86	-0.90
20.0	-0.82	-0.86

KP313 T6

Deh cho Settlement Region

Latitude: 63.26 N

Longitude: 123.43 W

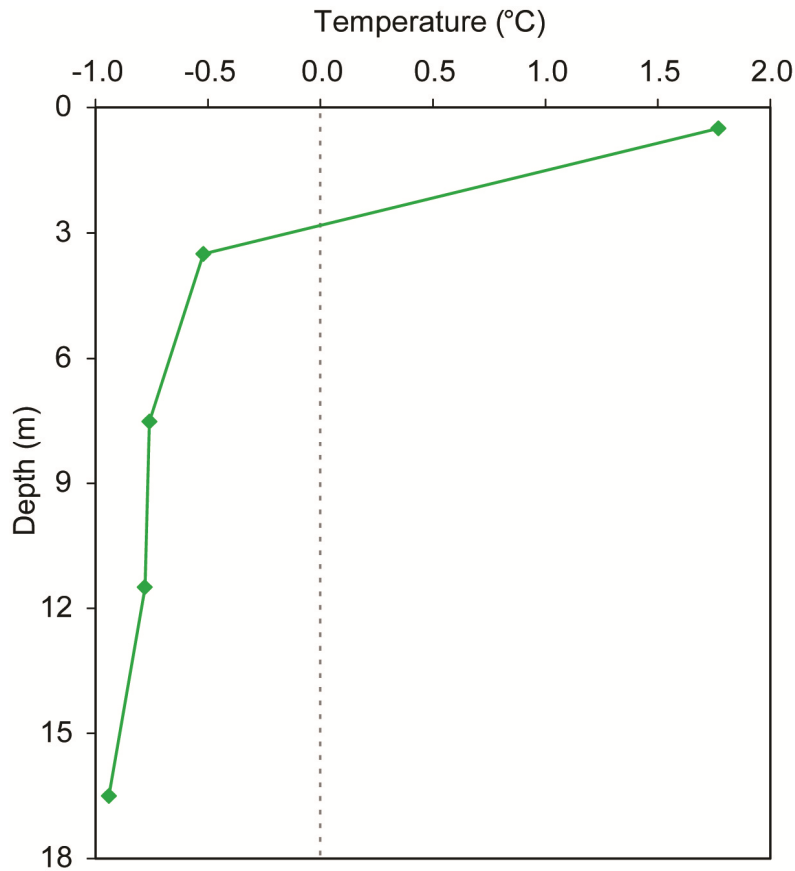
Elevation: 250 m a.s.l.

Landform: Lacustrine plain, top of slope

Vegetation cover: Thin moss and organic cover, forested, mix of birch and spruce

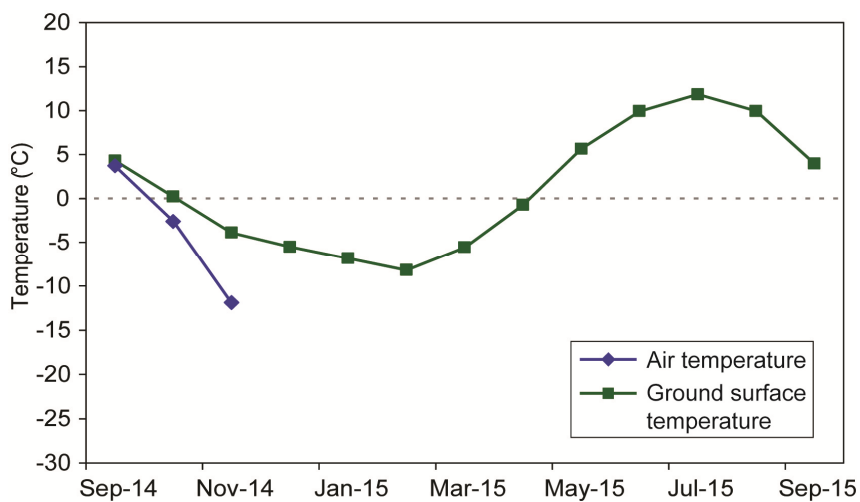
Thaw Depth: 2.82 m

Site visit: October 2, 2015



Depth (m)	Temp (°C)
0.5	1.77
3.5	-0.52
7.5	-0.76
11.5	-0.78
16.5	-0.94

Month / Year	Temperature (°C)	
	Air	Surface
Sept / 2014	3.71	4.32
Oct / 2014	-2.61	0.22
Nov / 2014	-11.90	-3.89
Dec / 2014	n/a	-5.52
Jan / 2015	n/a	-6.84
Feb / 2015	n/a	-8.19
Mar / 2015	n/a	-5.58
Apr / 2015	n/a	-0.73
May / 2015	n/a	5.65
Jun / 2015	n/a	9.93
Jul / 2015	n/a	11.85
Aug / 2015	n/a	9.94
Sept / 2015	n/a	3.99



River Between Two Mountains — RBTM-01

Deh cho Settlement Region

Latitude: 62.95 N

Longitude: 123.21 W

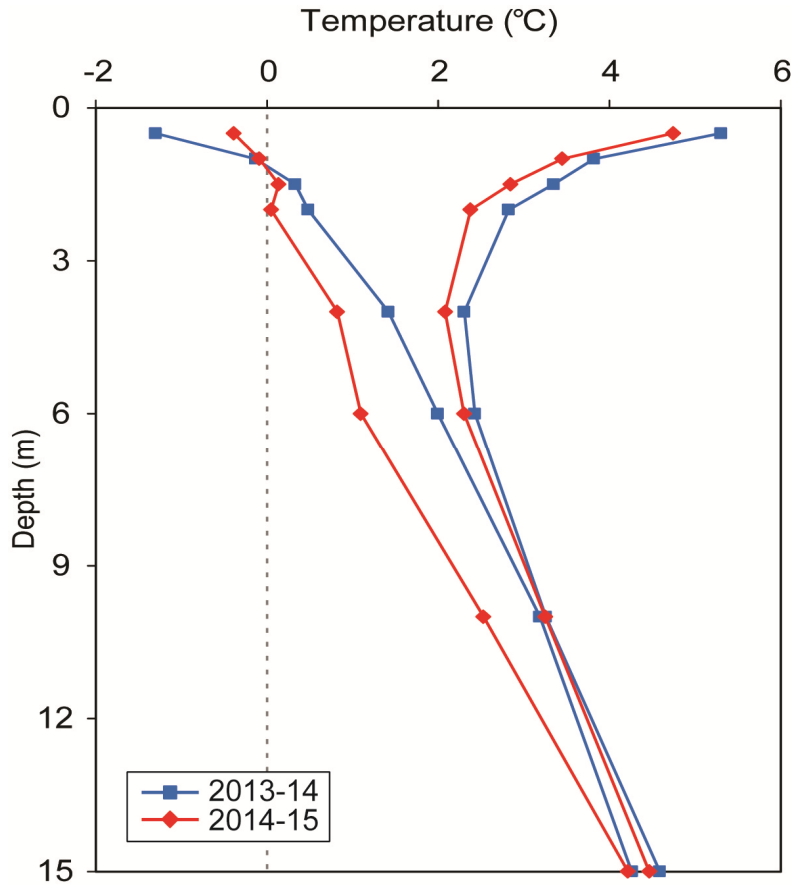
Elevation: 120 m a.s.l.

Landform: Transition lacustrine to alluvial to moraine terrain

Vegetation cover: Dense black spruce forest

Thaw Depth: n/a

Site visit: August 7, 2015



Aug 2013 – Jul 2014		
Depth (m)	Max (°C)	Min (°C)
0.5	5.30	-1.30
1	3.82	-0.13
1.5	3.35	0.33
2	2.82	0.48
4	2.30	1.42
6	2.43	1.99
10	3.26	3.19
15	4.59	4.26

Aug 2014 – Jul 2015		
Depth (m)	Max (°C)	Min (°C)
0.5	4.74	-0.39
1	3.45	-0.09
1.5	2.84	0.14
2	2.38	0.05
4	2.08	0.82
6	2.30	1.10
10	3.25	2.53
15	4.47	4.22

River Between Two Mountains — 92TT8

Deh cho Settlement Region

Latitude: 62.95 N

Longitude: 123.20 W

Elevation: 120 m a.s.l.

Landform: Transition lacustrine to alluvial to moraine terrain

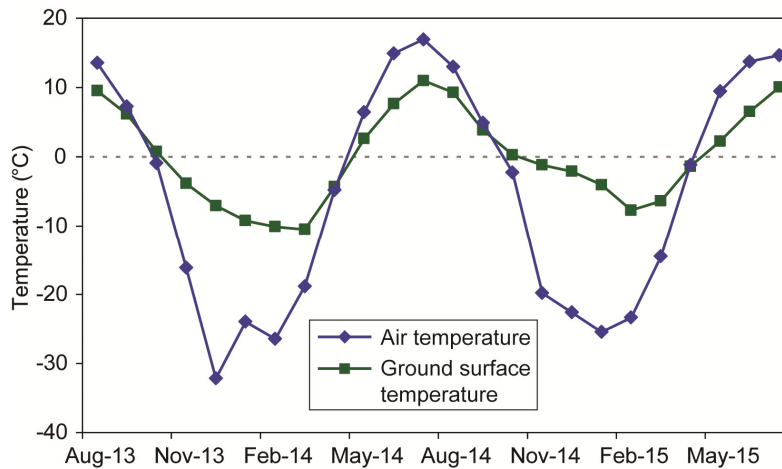
Vegetation cover: Dense black spruce forest

Thaw Depth: n/a

Site visit: August 7, 2015

Month / Year	Temperature (°C)	
	Air	Surface
Aug / 2013	13.56	9.54
Sept / 2013	7.28	6.18
Oct / 2013	-0.90	0.75
Nov / 2013	-16.13	-3.84
Dec / 2013	-32.18	-7.03
Jan / 2014	-23.96	-9.20
Feb / 2014	-26.44	-10.07
Mar / 2014	-18.83	-10.48
Apr / 2014	-4.78	-4.32
May / 2014	6.45	2.64
Jun / 2014	14.94	7.68
Jul / 2014	16.95	11.00

Month / Year	Temperature (°C)	
	Air	Surface
Aug / 2014	13.02	9.30
Sept / 2014	4.92	3.89
Oct / 2014	-2.24	0.31
Nov / 2014	-19.80	-1.16
Dec / 2014	-22.61	-2.07
Jan / 2015	-25.45	-4.02
Feb / 2015	-23.35	-7.69
Mar / 2015	-14.50	-6.35
Apr / 2015	-1.15	-1.35
May / 2015	9.45	2.27
Jun / 2015	13.74	6.55
Jul / 2015	14.66	10.08



River Between Two Mountains — RBTM-02

Deh cho Settlement Region

Latitude: 62.93 N

Longitude: 123.18 W

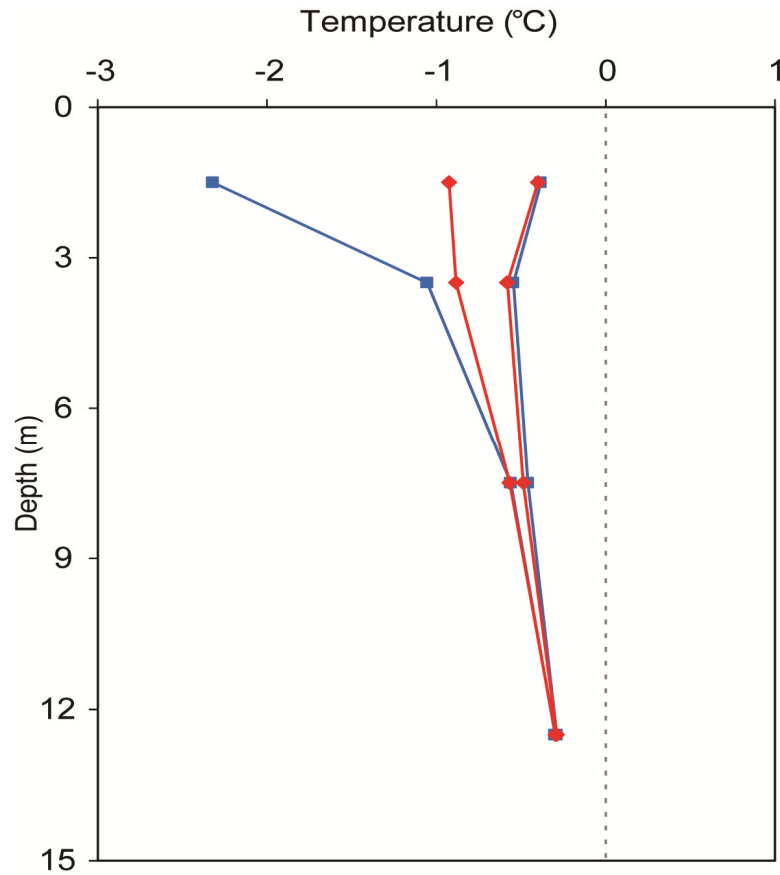
Elevation: 150 m a.s.l.

Landform: Transition lacustrine to alluvial to moraine terrain

Vegetation cover: Dense black spruce forest

Thaw Depth: n/a

Site visit: August 7, 2015



Aug 2013 – Jul 2014		
Depth (m)	Max (°C)	Min (°C)
1.5	-0.38	-2.32
3.5	-0.55	-1.05
7.5	-0.46	-0.56
12.5	-0.29	-0.30

Aug 2014 – Jul 2015		
Depth (m)	Max (°C)	Min (°C)
1.5	-0.40	-0.92
3.5	-0.58	-0.88
7.5	-0.49	-0.57
12.5	-0.29	-0.30

Willowlake River — WLR-01

Deh cho Settlement Region

Latitude: 62.71 N

Longitude: 123.08 W

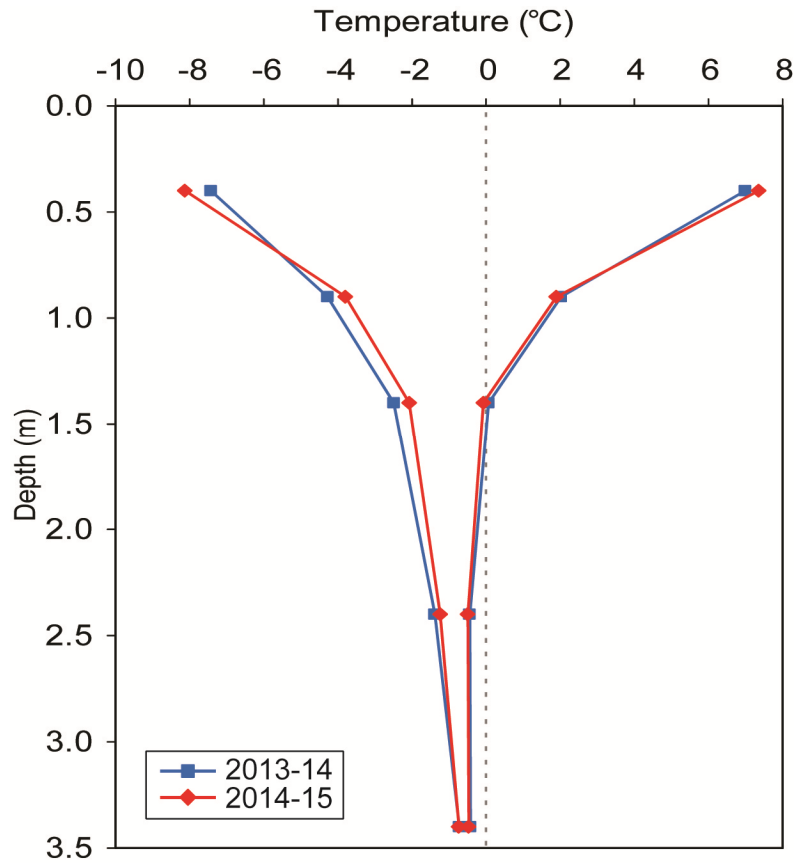
Elevation: 122 m a.s.l.

Landform: Alluvial fan

Vegetation cover: Open mixed forest

Thaw Depth: 1.53 m for 2014, 1.38 m for 2015

Site visit: August 7, 2015



Aug 2013 – Jul 2014		
Depth (m)	Max (°C)	Min (°C)
0.4	6.99	-7.43
0.9	2.02	-4.28
1.4	0.07	-2.49
2.4	-0.44	-1.39
3.4	-0.42	-0.72

Aug 2014 – Jul 2015		
Depth (m)	Max (°C)	Min (°C)
0.4	7.36	-8.13
0.9	1.90	-3.80
1.4	-0.07	-2.07
2.4	-0.50	-1.24
3.4	-0.47	-0.74

Willow Lake Burn — 93AG04

Deh cho Settlement Region

Latitude: 62.70 N

Longitude: 123.06 W

Elevation: n/a

Landform: n/a

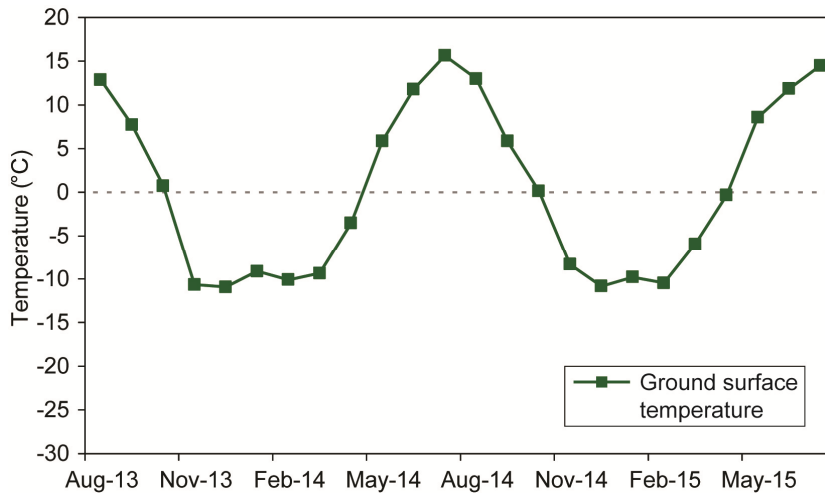
Vegetation cover: n/a

Thaw depth: n/a

Site visit: August 7, 2015

Month / Year	Temperature (°C)	
	Air	Surface
Aug / 2013	n/a	12.87
Sept / 2013	n/a	7.73
Oct / 2013	n/a	0.73
Nov / 2013	n/a	-10.67
Dec / 2013	n/a	-10.93
Jan / 2014	n/a	-9.11
Feb / 2014	n/a	-10.11
Mar / 2014	n/a	-9.36
Apr / 2014	n/a	-3.54
May / 2014	n/a	5.85
Jun / 2014	n/a	11.79
Jul / 2014	n/a	15.64

Month / Year	Temperature (°C)	
	Air	Surface
Aug / 2014	n/a	12.99
Sept / 2014	n/a	5.86
Oct / 2014	n/a	0.15
Nov / 2014	n/a	-8.32
Dec / 2014	n/a	-10.84
Jan / 2015	n/a	-9.80
Feb / 2015	n/a	-10.48
Mar / 2015	n/a	-5.95
Apr / 2015	n/a	-0.32
May / 2015	n/a	8.57
Jun / 2015	n/a	11.84
Jul / 2015	n/a	14.49



Wrigley Pines — 94AG2

Deh cho Settlement Region

Latitude: 62.32 N

Longitude: 122.69 W

Elevation: n/a

Landform: n/a

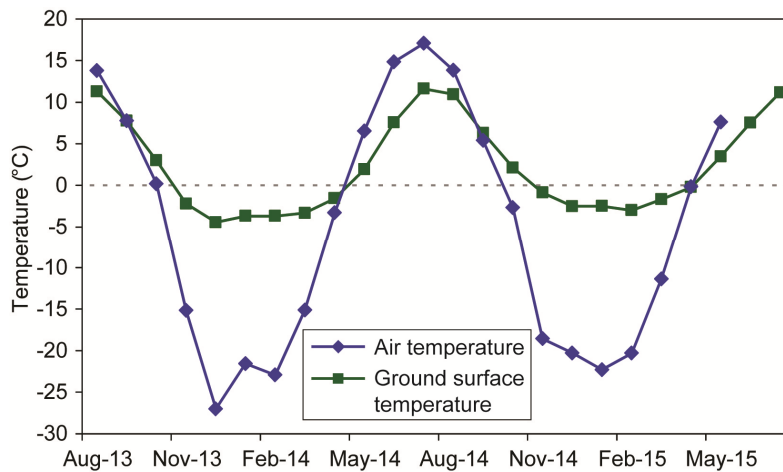
Vegetation cover: n/a

Thaw Depth: n/a

Site visit: August 8, 2015

Month / Year	Temperature (°C)	
	Air	Surface
Aug / 2013	13.79	11.29
Sept / 2013	7.74	7.74
Oct / 2013	0.20	3.00
Nov / 2013	-15.15	-2.20
Dec / 2013	-27.01	-4.44
Jan / 2014	-21.56	-3.69
Feb / 2014	-22.94	-3.68
Mar / 2014	-15.11	-3.33
Apr / 2014	-3.31	-1.56
May / 2014	6.53	1.91
Jun / 2014	14.85	7.58
Jul / 2014	17.05	11.62

Month / Year	Temperature (°C)	
	Air	Surface
Aug / 2014	13.81	10.93
Sept / 2014	5.39	6.31
Oct / 2014	-2.69	2.13
Nov / 2014	-18.57	-0.87
Dec / 2014	-20.29	-2.50
Jan / 2015	-22.30	-2.48
Feb / 2015	-20.30	-2.99
Mar / 2015	-11.37	-1.67
Apr / 2015	-0.18	-0.21
May / 2015	7.59	3.48
Jun / 2015	n/a	7.54
Jul / 2015	n/a	11.17



Wrigley peatland — 99TC4

Deh cho Settlement Region

Latitude: 62.28 N

Longitude: 122.60 W

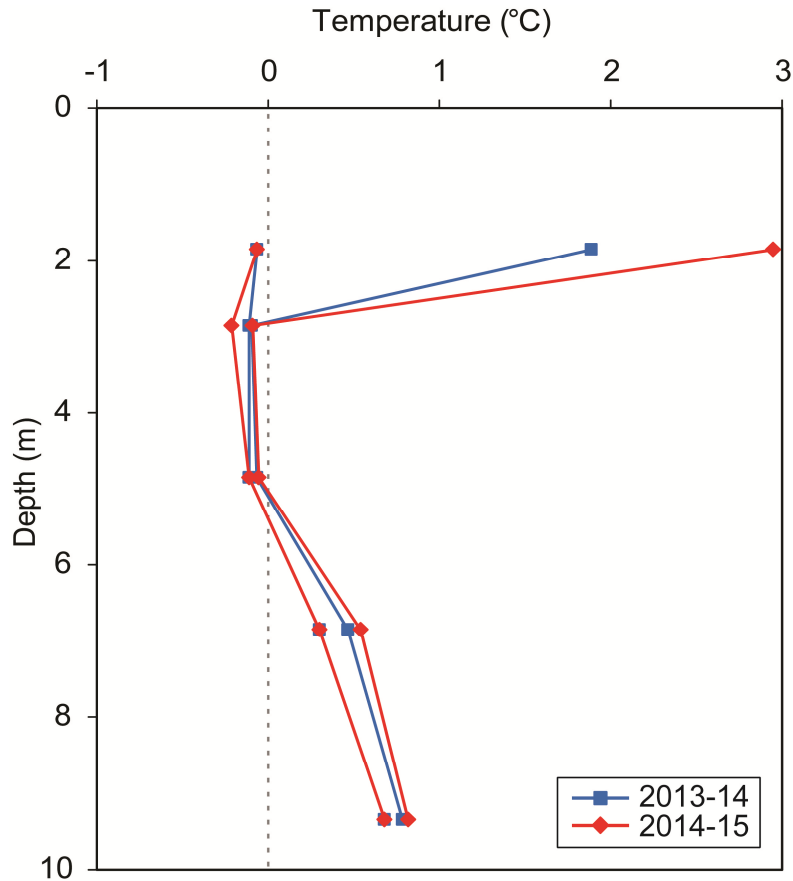
Elevation: n/a

Landform: Organic terrain on till plain, post glacial (>10Ka)

Vegetation cover: Boreal burn, scattered small spruce, pine and aspen, health ground cover

Thaw Depth: 2.80 m for 2014, 2.82 m for 2015

Site visit: August 8, 2015



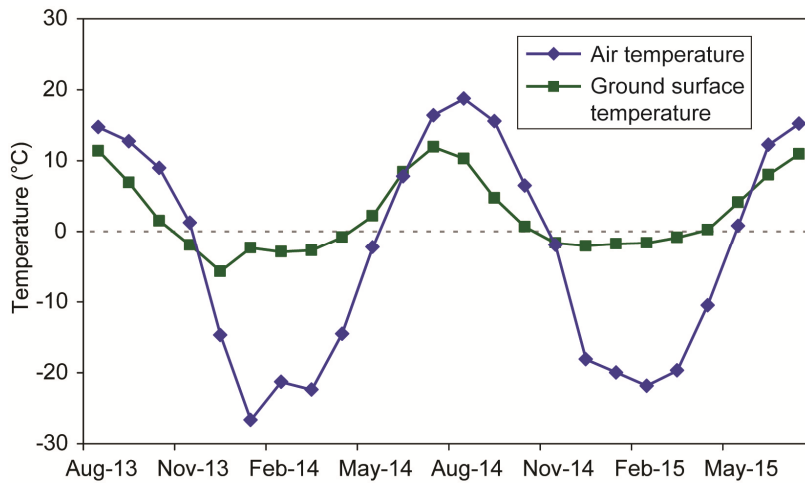
Aug 2013 – Jul 2014		
Depth (m)	Max (°C)	Min (°C)
1.85	1.89	-0.06
2.85	-0.10	-0.11
4.85	-0.06	-0.11
6.85	0.47	0.30
9.35	0.79	0.68

Aug 2014 – Jul 2015		
Depth (m)	Max (°C)	Min (°C)
1.85	2.95	-0.06
2.85	-0.09	-0.21
4.85	-0.05	-0.11
6.85	0.54	0.30
9.35	0.82	0.68

Wrigley peatland — 99TC4

Month / Year	Temperature (°C)	
	Air	Surface
Aug / 2013	14.74	11.38
Sept / 2013	12.74	6.93
Oct / 2013	8.97	1.51
Nov / 2013	1.23	-1.94
Dec / 2013	-14.69	-5.69
Jan / 2014	-26.68	-2.35
Feb / 2014	-21.29	-2.92
Mar / 2014	-22.40	-2.71
Apr / 2014	-14.50	-0.82
May / 2014	-2.26	2.19
Jun / 2014	7.81	8.39
Jul / 2014	16.42	11.94

Month / Year	Temperature (°C)	
	Air	Surface
Aug / 2014	18.75	10.30
Sept / 2014	15.57	4.75
Oct / 2014	6.50	0.67
Nov / 2014	-1.92	-1.65
Dec / 2014	-18.11	-2.05
Jan / 2015	-19.97	-1.78
Feb / 2015	-21.85	-1.66
Mar / 2015	-19.69	-0.85
Apr / 2015	-10.49	0.24
May / 2015	0.81	4.12
Jun / 2015	12.25	8.03
Jul / 2015	15.21	10.93



FS Bog — 93AG2

Deh cho Settlement Region

Latitude: 61.98 N

Longitude: 121.88 W

Elevation: n/a

Landform: n/a

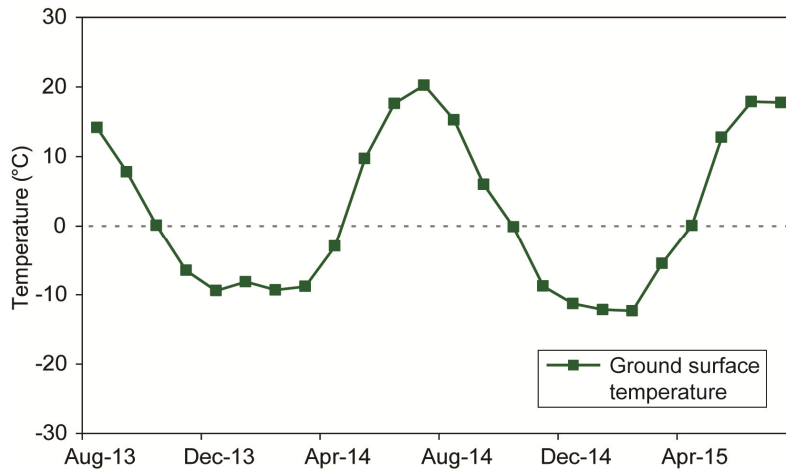
Vegetation cover: n/a

Thaw Depth: n/a

Site visit: August 8, 2015

Month / Year	Temperature (°C)	
	Air	Surface
Aug / 2013	n/a	14.16
Sept / 2013	n/a	7.80
Oct / 2013	n/a	0.11
Nov / 2013	n/a	-6.49
Dec / 2013	n/a	-9.43
Jan / 2014	n/a	-8.14
Feb / 2014	n/a	-9.32
Mar / 2014	n/a	-8.82
Apr / 2014	n/a	-2.95
May / 2014	n/a	9.70
Jun / 2014	n/a	17.63
Jul / 2014	n/a	20.26

Month / Year	Temperature (°C)	
	Air	Surface
Aug / 2014	n/a	15.27
Sept / 2014	n/a	6.01
Oct / 2014	n/a	-0.11
Nov / 2014	n/a	-8.77
Dec / 2014	n/a	-11.27
Jan / 2015	n/a	-12.16
Feb / 2015	n/a	-12.33
Mar / 2015	n/a	-5.46
Apr / 2015	n/a	0.07
May / 2015	n/a	12.77
Jun / 2015	n/a	17.89
Jul / 2015	n/a	17.77



Wrigley ferry transition — 97TC5

Deh cho Settlement Region

Latitude: 61.98 N

Longitude: 121.88 W

Elevation: 165 m a.s.l.

Landform: Surface of glaciolacustrine delta, post glacial (>10Ka)

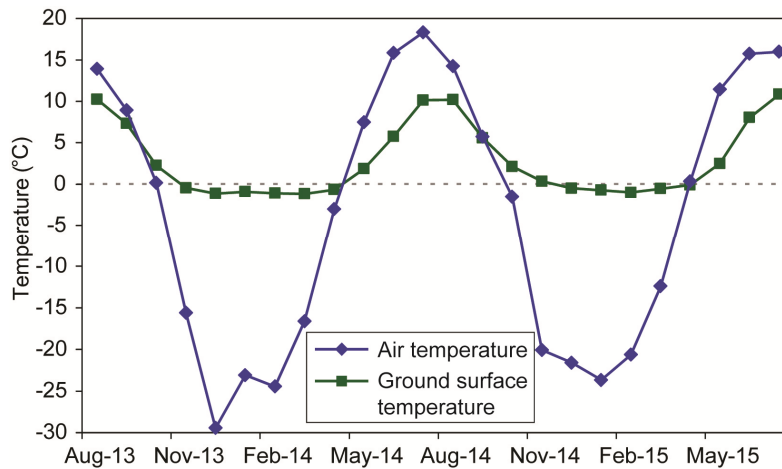
Vegetation cover: Boreal, open spruce (coniferous forest)

Thaw Depth: n/a

Site visit: August 8, 2015

Month / Year	Temperature (°C)	
	Air	Surface
Sept / 2013	8.94	7.31
Oct / 2013	0.15	2.26
Nov / 2013	-15.61	-0.46
Dec / 2013	-29.45	-1.14
Jan / 2014	-23.10	-0.91
Feb / 2014	-24.47	-1.10
Mar / 2014	-16.62	-1.17
Apr / 2014	-3.01	-0.66
May / 2014	7.46	1.85
Jun / 2014	15.83	5.76
Jul / 2014	18.33	10.13
Aug / 2014	14.25	10.19

Month / Year	Temperature (°C)	
	Air	Surface
Sept / 2014	5.73	5.58
Oct / 2014	-1.53	2.13
Nov / 2014	-20.07	0.35
Dec / 2014	-21.60	-0.49
Jan / 2015	-23.69	-0.74
Feb / 2015	-20.65	-1.00
Mar / 2015	-12.41	-0.55
Apr / 2015	0.32	-0.10
May / 2015	11.43	2.49
Jun / 2015	15.74	8.04
Jul / 2015	15.98	10.84
Aug / 2015	17.51	11.83



Spruce cutline — 93AG3

Deh cho Settlement Region

Latitude: 61.97 N

Longitude: 121.82 W

Elevation: n/a

Landform: Lacustrine plain

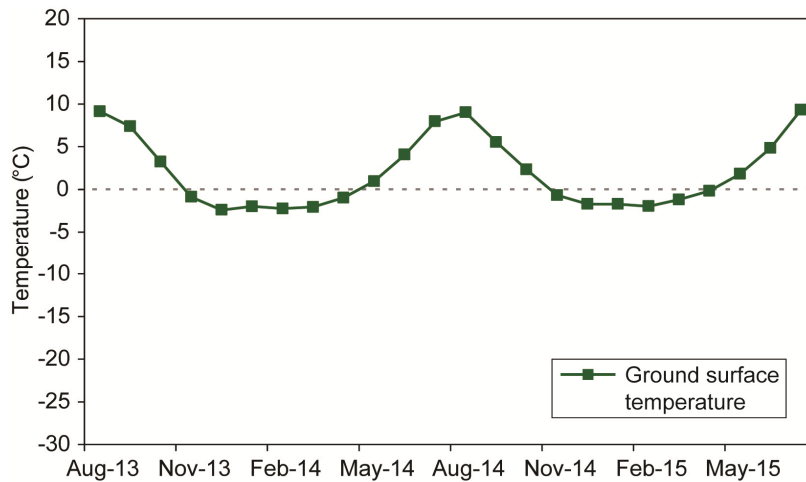
Vegetation cover: Closed canopy upland spruce with hardwood, complete ground cover of moss

Thaw Depth: n/a

Site visit: August 8, 2015

Month / Year	Temperature (°C)	
	Air	Surface
Aug / 2013	n/a	9.15
Sept / 2013	n/a	7.38
Oct / 2013	n/a	3.24
Nov / 2013	n/a	-0.87
Dec / 2013	n/a	-2.40
Jan / 2014	n/a	-1.99
Feb / 2014	n/a	-2.25
Mar / 2014	n/a	-2.07
Apr / 2014	n/a	-0.97
May / 2014	n/a	0.96
Jun / 2014	n/a	4.08
Jul / 2014	n/a	7.96

Month / Year	Temperature (°C)	
	Air	Surface
Aug / 2014	n/a	9.02
Sept / 2014	n/a	5.54
Oct / 2014	n/a	2.32
Nov / 2014	n/a	-0.67
Dec / 2014	n/a	-1.72
Jan / 2015	n/a	-1.72
Feb / 2015	n/a	-1.96
Mar / 2015	n/a	-1.18
Apr / 2015	n/a	-0.17
May / 2015	n/a	1.82
Jun / 2015	n/a	4.86
Jul / 2015	n/a	9.34



Aspen (Wrigley Highway) — 97TC1

Deh cho Settlement Region

Latitude: 61.95 N

Longitude: 121.76 W

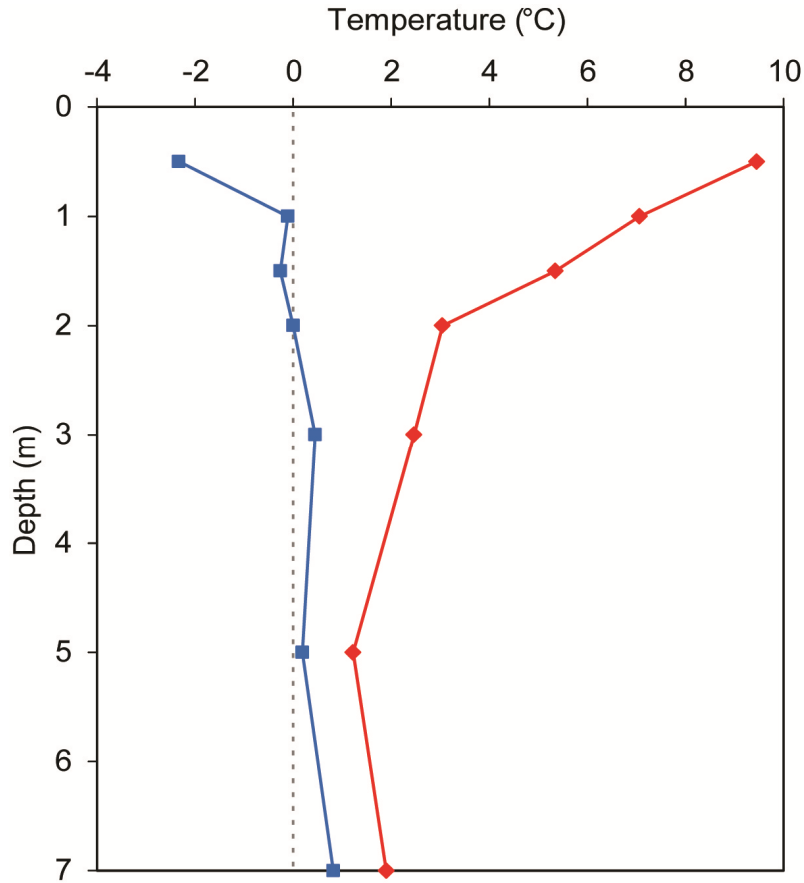
Elevation: 165 m a.s.l.

Landform: Surface of glaciolacustrine delta, post glacial (>10Ka)

Vegetation cover: Boreal, aspen grove (deciduous forest)

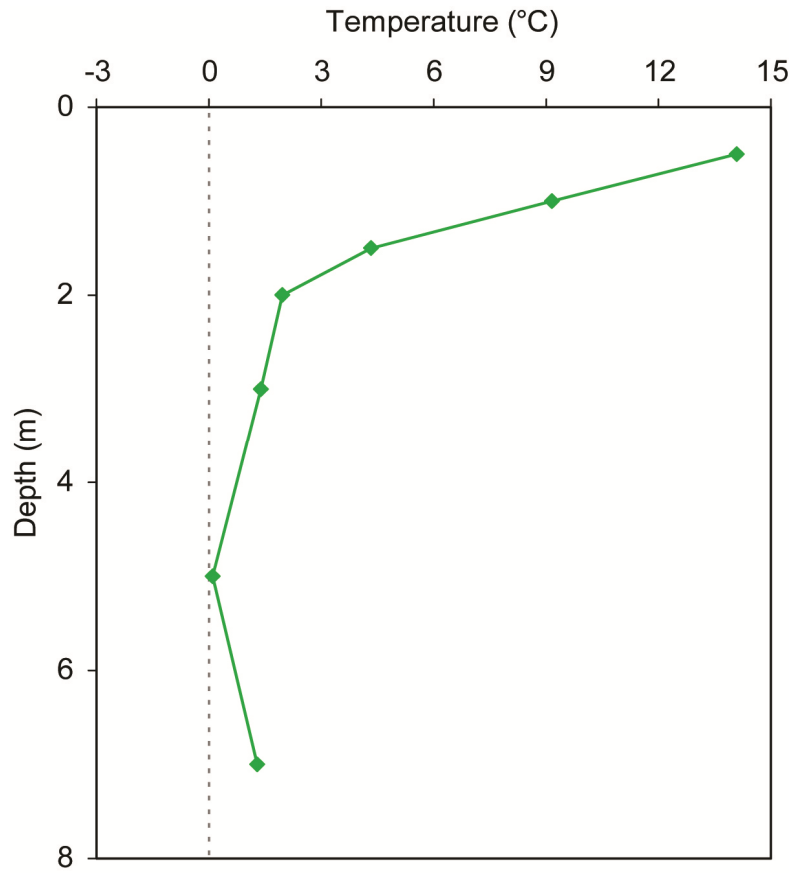
Thaw Depth: n/a

Site visit: August 8, 2015



Sept 2013 – Aug 2014		
Depth (m)	Max (°C)	Min (°C)
0.5	9.45	-2.33
1	7.06	-0.11
1.5	5.34	-0.26
2	3.04	0
3	2.46	0.45
5	1.22	0.19
7	1.9	0.82

Aspen (Wrigley Highway) — 97TC1

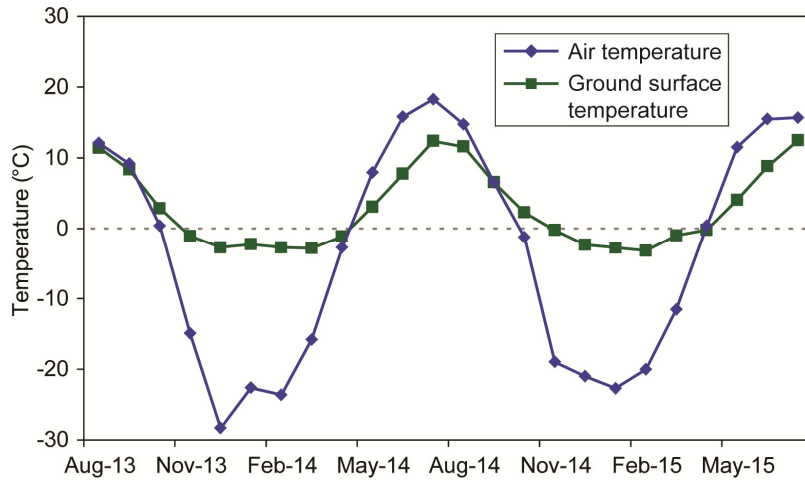


Depth (m)	Temp (°C)
0.5	14.09
1	9.16
1.5	4.33
2	1.96
3	1.39
5	0.1
7	1.29

Aspen (Wrigley Highway) — 97TC1

Month / Year	Temperature (°C)	
	Air	Surface
Aug / 2013	12.09	11.44
Sept / 2013	9.17	8.33
Oct / 2013	0.40	2.84
Nov / 2013	-14.95	-1.11
Dec / 2013	-28.35	-2.71
Jan / 2014	-22.63	-2.27
Feb / 2014	-23.64	-2.73
Mar / 2014	-15.80	-2.83
Apr / 2014	-2.74	-1.15
May / 2014	7.95	3.08
Jun / 2014	15.80	7.73
Jul / 2014	18.29	12.37

Month / Year	Temperature (°C)	
	Air	Surface
Aug / 2014	14.74	11.58
Sept / 2014	6.52	6.52
Oct / 2014	-1.26	2.27
Nov / 2014	-18.97	-0.24
Dec / 2014	-21.00	-2.35
Jan / 2015	-22.71	-2.77
Feb / 2015	-20.01	-3.17
Mar / 2015	-11.52	-1.01
Apr / 2015	0.36	-0.22
May / 2015	11.51	4.05
Jun / 2015	15.49	8.80
Jul / 2015	15.68	12.48



Mature Black Spruce (Wrigley Highway) — 97TC2

Deh cho Settlement Region

Latitude: 61.92 N

Longitude: 121.71 W

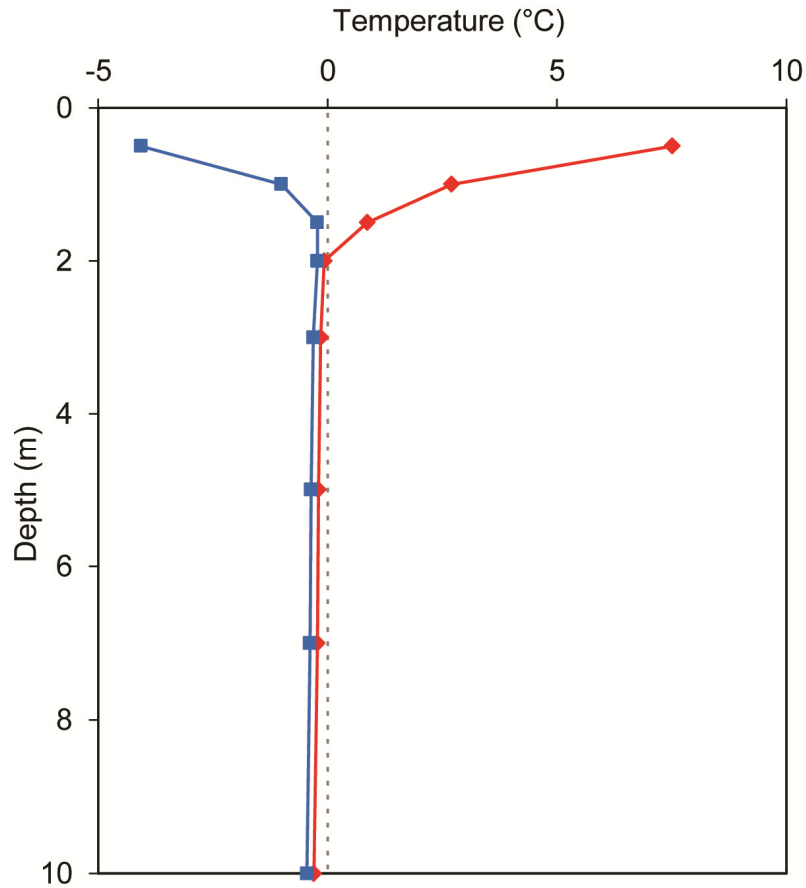
Elevation: 165 m a.s.l.

Landform: Surface of glaciolacustrine delta, post glacial (>10Ka)

Vegetation cover: Boreal, black spruce (coniferous forest)

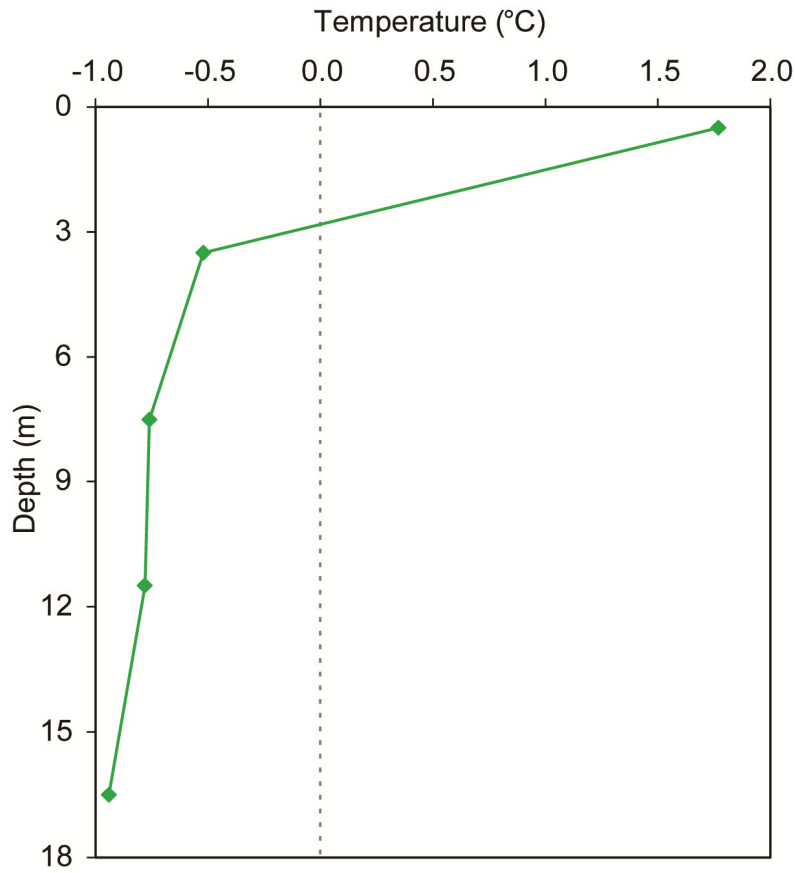
Thaw Depth: 1.96 m for 2014

Site visit: August 8, 2015



Sept 2013 – Aug 2014		
Depth (m)	Max (°C)	Min (°C)
0.5	7.51	-4.07
1	2.71	-1.01
1.5	0.87	-0.23
2	-0.08	-0.23
3	-0.15	-0.31
5	-0.20	-0.36
7	-0.23	-0.39
10	-0.30	-0.45

Mature Black Spruce (Wrigley Highway) — 97TC2

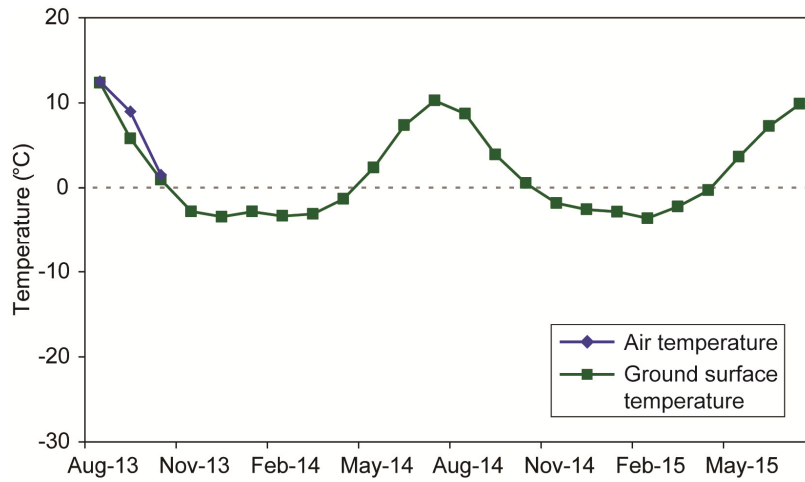


Depth (m)	Temp (°C)
0.5	3.45
1	0.87
1.5	-0.09
2	-0.15
3	-0.2
5	-0.24
7	-0.3

Mature Black Spruce (Wrigley Highway) — 97TC2

Month / Year	Temperature (°C)	
	Air	Surface
Aug / 2013	12.48	12.34
Sept / 2013	8.94	5.80
Oct / 2013	1.52	0.96
Nov / 2013	n/a	-2.78
Dec / 2013	n/a	-3.41
Jan / 2014	n/a	-2.80
Feb / 2014	n/a	-3.32
Mar / 2014	n/a	-3.08
Apr / 2014	n/a	-1.31
May / 2014	n/a	2.39
Jun / 2014	n/a	7.35
Jul / 2014	n/a	10.26

Month / Year	Temperature (°C)	
	Air	Surface
Aug / 2014	n/a	8.71
Sept / 2014	n/a	3.89
Oct / 2014	n/a	0.54
Nov / 2014	n/a	-1.80
Dec / 2014	n/a	-2.55
Jan / 2015	n/a	-2.83
Feb / 2015	n/a	-3.58
Mar / 2015	n/a	-2.21
Apr / 2015	n/a	-0.30
May / 2015	n/a	3.64
Jun / 2015	n/a	7.25
Jul / 2015	n/a	9.85



Martin River — 92TT6

Deh cho Settlement Region

Latitude: 61.89 N

Longitude: 121.60 W

Elevation: 165 m a.s.l.

Landform: Glaciolacustrine plain

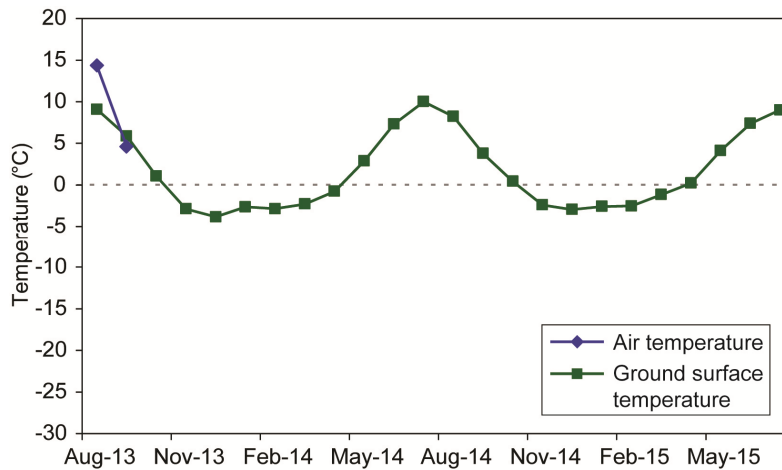
Vegetation cover: Mixed spruce, low to moderate density canopy

Thaw Depth: n/a

Site visit: August 8, 2015

Month / Year	Temperature (°C)	
	Air	Surface
Aug / 2013	14.34	9.07
Sept / 2013	4.61	5.88
Oct / 2013	n/a	1.06
Nov / 2013	n/a	-2.87
Dec / 2013	n/a	-3.83
Jan / 2014	n/a	-2.65
Feb / 2014	n/a	-2.87
Mar / 2014	n/a	-2.30
Apr / 2014	n/a	-0.76
May / 2014	n/a	2.89
Jun / 2014	n/a	7.31
Jul / 2014	n/a	10.01

Month / Year	Temperature (°C)	
	Air	Surface
Aug / 2014	n/a	8.22
Sept / 2014	n/a	3.78
Oct / 2014	n/a	0.43
Nov / 2014	n/a	-2.40
Dec / 2014	n/a	-2.95
Jan / 2015	n/a	-2.59
Feb / 2015	n/a	-2.53
Mar / 2015	n/a	-1.16
Apr / 2015	n/a	0.22
May / 2015	n/a	4.13
Jun / 2015	n/a	7.39
Jul / 2015	n/a	9.01



Open Black Spruce — 99TC3

Deh cho Settlement Region

Latitude: 61.66 N

Longitude: 121.34 W

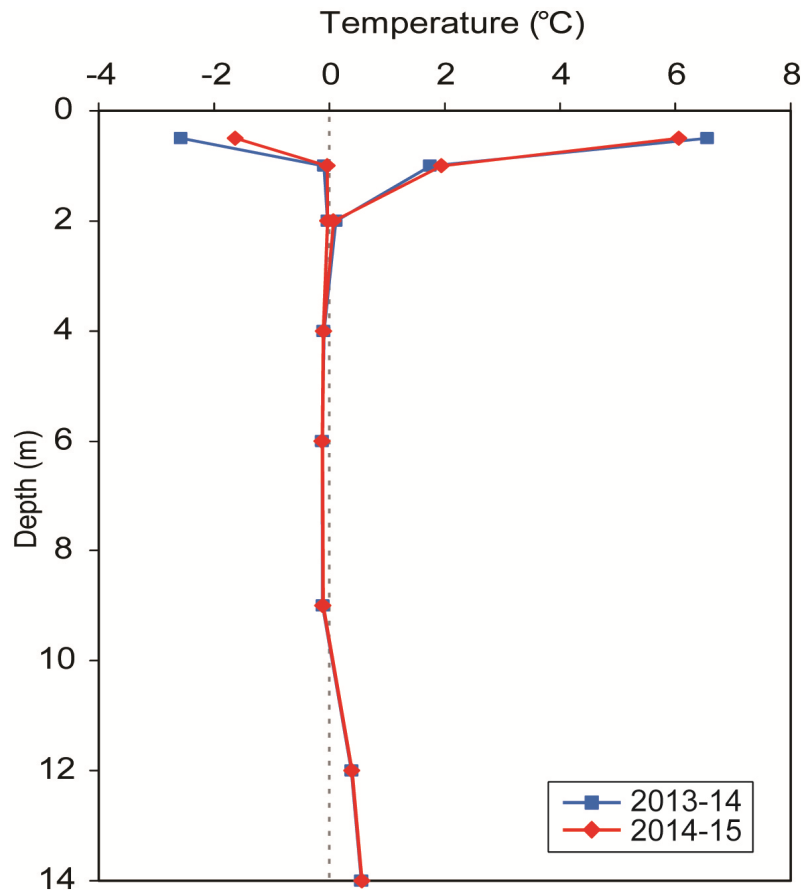
Elevation: 183 m a.s.l.

Landform: Surface of glaciolacustrine delta, late glacial (>10Ka)

Vegetation cover: Small black spruce thicket with willow shrub, 100% cover of moss with lichen and boreal health (coniferous)

Thaw Depth: 3.08 m for 2014, 2.85 m for 2015

Site visit: August 10, 2015



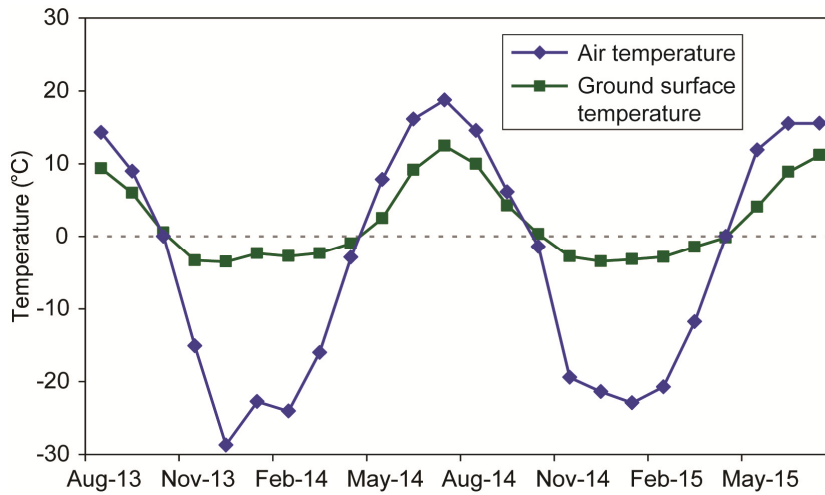
Aug 2013 – Jul 2014		
Depth (m)	Max (°C)	Min (°C)
0.5	6.56	-2.57
1	1.75	-0.09
2	0.11	-0.03
4	-0.10	-0.10
6	-0.12	-0.13
9	-0.11	-0.12
12	0.39	0.38
14	0.56	0.55

Aug 2014 – Jul 2015		
Depth (m)	Max (°C)	Min (°C)
0.5	6.06	-1.63
1	1.94	-0.04
2	0.07	-0.03
4	-0.10	-0.10
6	-0.12	-0.12
9	-0.11	-0.11
12	0.39	0.39
14	0.57	0.56

Open Black Spruce — 99TC3

Month / Year	Temperature (°C)	
	Air	Surface
Aug / 2013	14.31	9.37
Sept / 2013	9.00	5.99
Oct / 2013	0.04	0.54
Nov / 2013	-15.07	-3.32
Dec / 2013	-28.70	-3.52
Jan / 2014	-22.74	-2.34
Feb / 2014	-24.06	-2.75
Mar / 2014	-15.99	-2.33
Apr / 2014	-2.88	-0.96
May / 2014	7.82	2.50
Jun / 2014	16.14	9.17
Jul / 2014	18.77	12.47

Month / Year	Temperature (°C)	
	Air	Surface
Aug / 2014	14.55	9.96
Sept / 2014	6.15	4.27
Oct / 2014	-1.43	0.32
Nov / 2014	-19.41	-2.78
Dec / 2014	-21.38	-3.46
Jan / 2015	-22.92	-3.18
Feb / 2015	-20.70	-2.85
Mar / 2015	-11.76	-1.45
Apr / 2015	0.02	-0.13
May / 2015	11.92	4.07
Jun / 2015	15.54	8.87
Jul / 2015	15.57	11.19



Liard Spruce — 97TC4

Deh cho Settlement Region

Latitude: 61.55 N

Longitude: 121.39 W

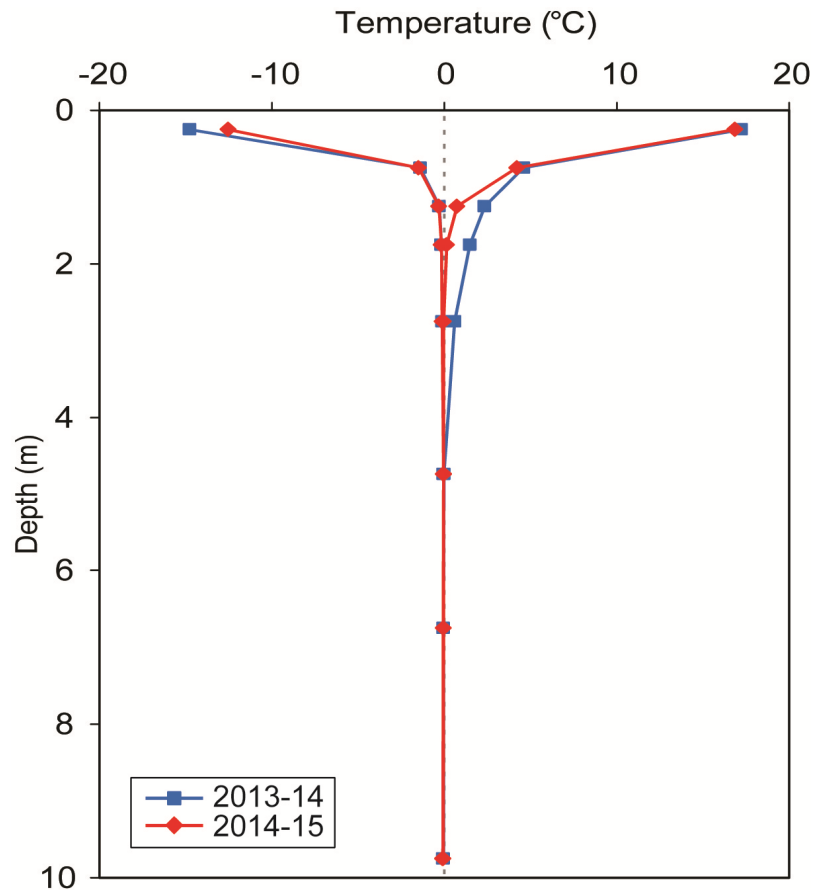
Elevation: 180 m a.s.l.

Landform: Surface of glaciolacustrine delta, late glacial (>10Ka)

Vegetation cover: Boreal, wetland shrub and sedge

Thaw Depth: 4.68 m for 2014, 2.48 m for 2015

Site visit: August 10, 2015



Aug 2013 – Jul 2014		
Depth (m)	Max (°C)	Min (°C)
0.25	17.24	-14.77
0.75	4.59	-1.40
1.25	2.34	-0.30
1.75	1.49	-0.17
2.75	0.60	-0.12
4.75	-0.02	-0.04
6.75	-0.04	-0.06
9.75	-0.05	-0.08

Aug 2014 – Jul 2015		
Depth (m)	Max (°C)	Min (°C)
0.25	16.85	-12.54
0.75	4.21	-1.49
1.25	0.74	-0.32
1.75	0.14	-0.17
2.75	-0.05	-0.12
4.75	-0.04	-0.05
6.75	-0.05	-0.06
9.75	-0.07	-0.09

Liard Spruce — 97TC4

Month / Year	Temperature (°C)	
	Air	Surface
Aug / 2013	n/a	11.44
Sept / 2013	n/a	7.00
Oct / 2013	n/a	0.95
Nov / 2013	n/a	-4.43
Dec / 2013	n/a	-5.85
Jan / 2014	n/a	-4.94
Feb / 2014	n/a	-5.89
Mar / 2014	n/a	-5.00
Apr / 2014	n/a	-2.01
May / 2014	n/a	4.65
Jun / 2014	n/a	10.13
Jul / 2014	n/a	12.79

Month / Year	Temperature (°C)	
	Air	Surface
Aug / 2014	n/a	10.49
Sept / 2014	n/a	4.69
Oct / 2014	n/a	4.69
Nov / 2014	n/a	-3.35
Dec / 2014	n/a	-4.64
Jan / 2015	n/a	-5.21
Feb / 2015	n/a	-5.38
Mar / 2015	n/a	-2.82
Apr / 2015	n/a	-0.41
May / 2015	n/a	6.58
Jun / 2015	n/a	10.42
Jul / 2015	n/a	12.43

