NWT Open Report 2025-005

Northwest Territories snow survey data and methodology, 1965–2024

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Principal investigator, partnerships, and client/data owner

The Government of Northwest Territories–Department of Environment and Climate Change (GNWT–ECC) conducts on-the-ground snow surveys across the territory at the end of winter every year to inform flood monitoring, wildfire prediction, year-to-year variability, and research. The amount of snow received over winter is an important variable that influences water levels and flow on lakes and rivers during spring break-up. The summary values from these surveys are included in the annual NWT Spring Water Level Outlook report, provided by GNWT–ECC.

Snow survey work in the Snare River basin and the Yellowknife River basin is completed in partnership with Northwest Territories Power Corporation (NTPC).

These manual snow surveys include measurement of end-of-winter snow water equivalent (SWE) and snow depth. Many of the snow survey locations were initially established by the Department of Indian Affairs and Northern Development (DIAND). Initial SWE and snow depth data were published by DIAND in Snow Survey bulletins and by Transport Canada in Snow Cover Data reports.

The SWE and snow depth measurements are currently collected by employees from ECC (regional offices, Water Monitoring & Stewardship Division (WMSD), and Forest Management Division) and NTPC. Data are compiled and reviewed following internal quality assurance/quality control procedures similar to those of other jurisdictions.

Overview

Snow courses consist of multiple point manual measurements of SWE and snow depth performed at a given location. The first snow courses in the Northwest Territories were established in 1965 in the Taltson River basin. This report contains data for 142 sites in total, including 62 active and 80 inactive sites (Figure 1). Sites are assigned either an inactive or active status based on departmental priorities, logistics, and access safety concerns. Inactive sites are decommissioned for different reasons, including short-term projects where annual data are no longer required (Tokarski 2018), and safety concerns about takeoff and landing aircrafts on small, remote lakes. Most of the remote sites in the North and South Slave regions were established by DIAND in collaboration with NTPC to determine water supply for hydroelectric plants and are clustered in the Snare River basin, Yellowknife River basin, and Taltson River basins (Figure 2). All other active sites are near communities or accessible by road.

This report contains tables and maps that summarise SWE and snow depth data. Instrument, site metadata, and methodology are included to support and inform data use. Summarised data are also available *via* the CanSWE dataset compiled by Vionnet *et al.* (2021).

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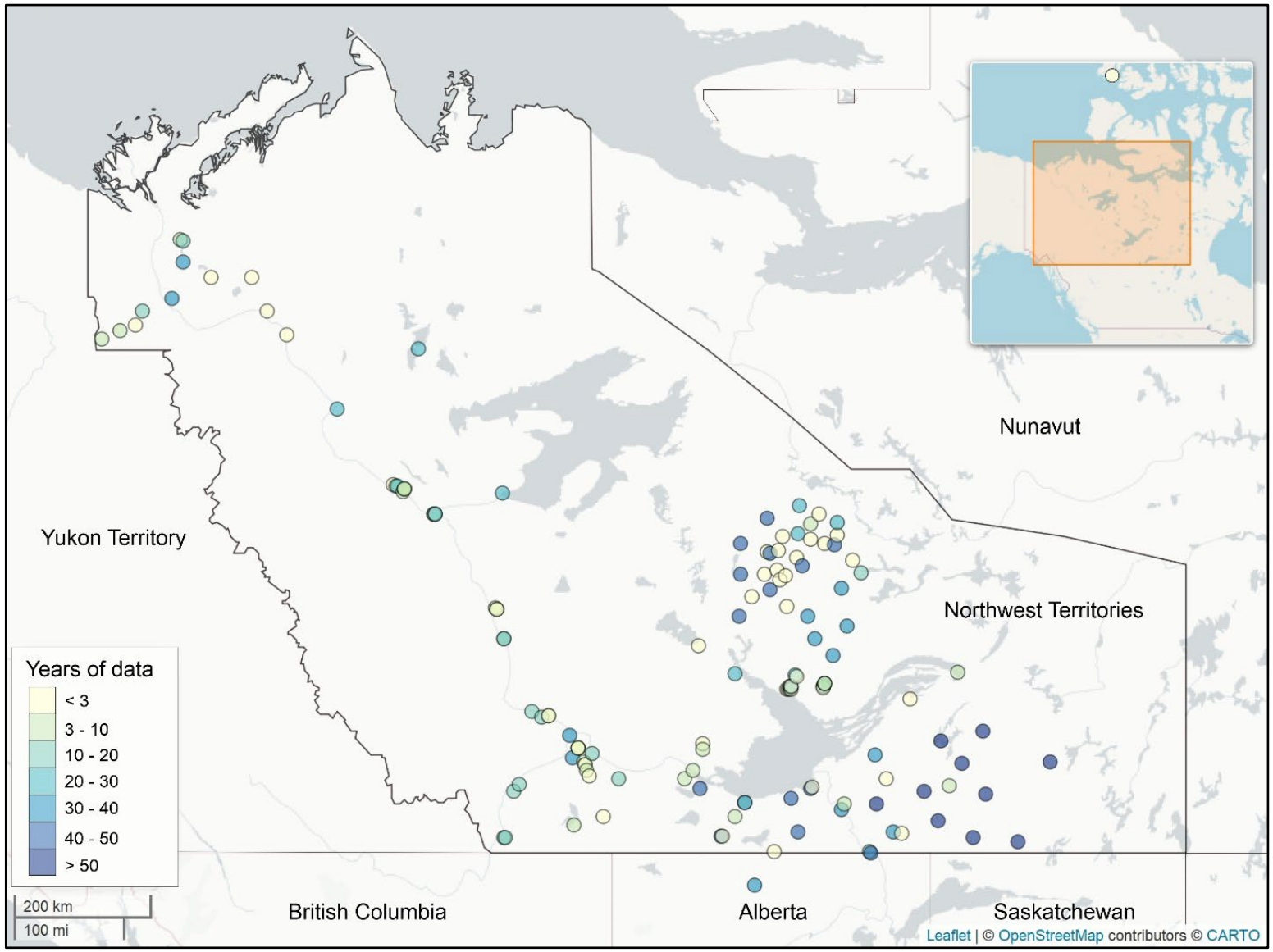

Figure 1. Snow survey sites across the Northwest Territories (active and inactive). Sites are colour graded based on the years of available snow water equivalent and/or snow depth data. Contributors: CartoDB, OpenStreetMap, Water Survey of Canada.

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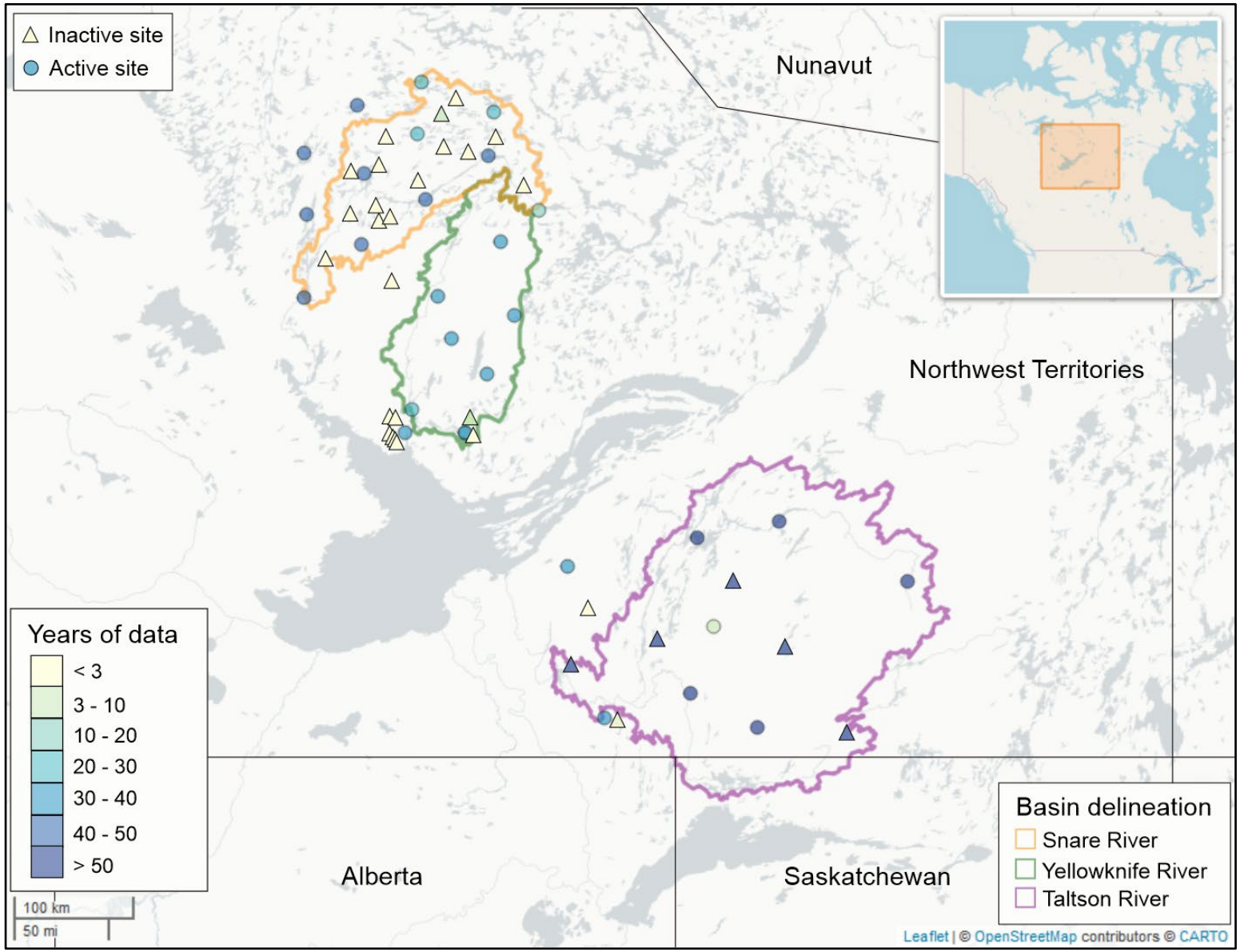

Figure 2. Snow survey sites used to assess the Snare River basin, Yellowknife River basin and Taltson River basin. The respective basin shapefiles are outlined. Many of these sites were initially established to inform spring flows for Snare, Bluefish, and Taltson hydroelectric operations. Sites are colour-graded based on the years of data available. Contributors: CartoDB, OpenStreetMap, Water Survey of Canada.

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Methods

Site selection

Most snow survey sites were established in upland areas near lakes, including forested and tundra locations, mostly away from human activity. Some transects were relocated years later to avoid snow drift measurement errors or wildfire damage. Transects typically follow a straight line or 'u-shaped' pattern (Figure 3).

Snow depth measurements on lakes started in 2018 and are available at many remote sites in the North Slave region, listed separately from upland sites report.

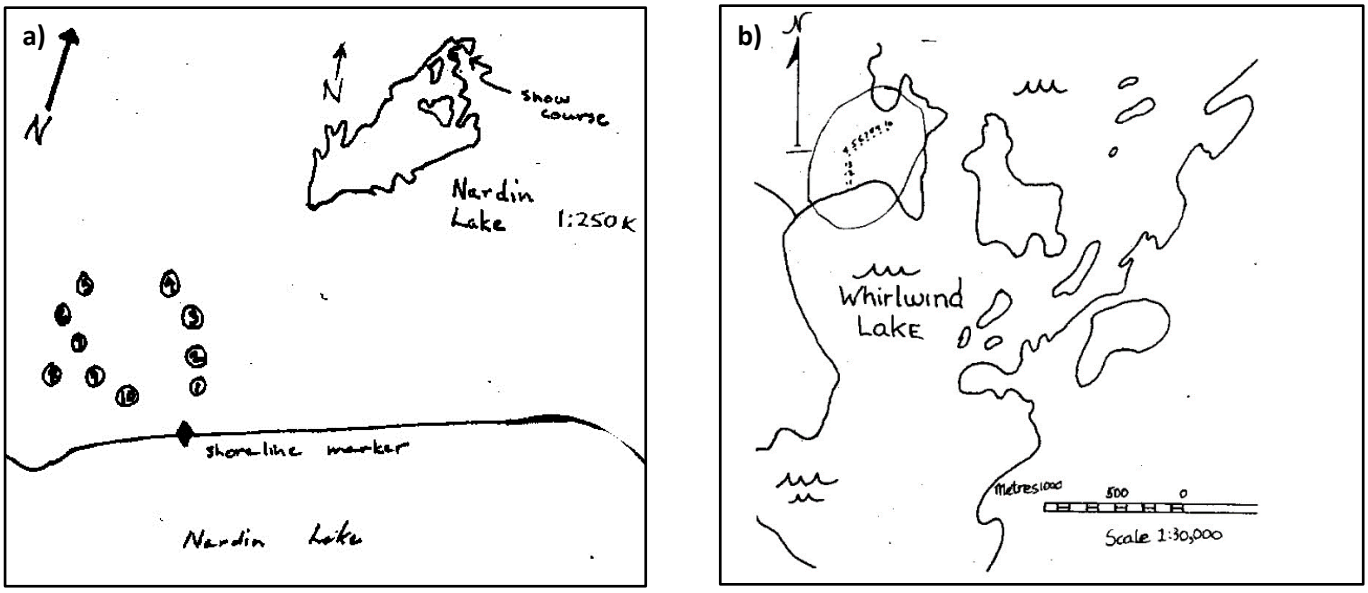

Figure 3. Original snow survey transect sketches for the surveys at a) Nardin Lake and b) Whirlwind Lake. Sketches were drawn by DIAND – Water Resources Division. Note that transect points follow either a "u-shaped" pattern (left) or a line (right).

Measurement techniques

Snow depth and SWE were measured at ten points, about 10 m apart, marked by metal signs on trees (Figure 4) or GPS points above the treeline.

At each measurement point, snow depth was measured by inserting a snow tube or ruler into the snowpack until resistance from vegetation or frozen soil was encountered. SWE was measured only with a snow tube, a cylindrical device designed for sampling the snowpack. Whenever possible, a soil plug (Figure 4) was captured at the base of the snowpack to ensure the entire snow column was included. The SWE sample was weighed on a calibrated scale to determine the water equivalent.

Snow tubes are available in different sizes and diameters, which typically vary depending on the environment in which it is used (Table 1). Wider diameter tubes such as the ESC-30, MSC and AD are most widely used in the Northwest Territories, given the relatively shallow snow depths (mean snow depth < 1 m).

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Figure 4. Snow survey photos: a) An example of a snow survey measurement using an ESC-30 snow tube. The diamond-shaped sign identifies the sampling location; b) Obtaining a soil plug using the ESC-30 snow tube; and c) Surveyors walk between survey points at an upland site above the treeline.

At the start of each transect, the snow tube was weighed empty (*i.e.*, tare weight). Tare weights were also measured at points 5 and 10 of each transect due to possible accumulation of ice, snow, or water in the tube. Changes in tare are most common when air temperatures approach or exceed 0 °C, causing snow to melt and/or refreeze in the tube.

Surveyors are trained using internal sampling protocols that are updated as needed. The SWE and snow depth measurements are re-sampled if the surveyor suspects a measurement error or if the sample density differs greatly from other transect samples. Instrument uncertainty is dependent on the snow tube used, where larger diameter tubes have uncertainties ranging from 2.6% to 4% (Beaudoin-Galaise and Jutras 2021). Measurement error could occur if a snow sample was obtained over fallen vegetation (*e.g.*, the snow tube hits a fallen tree instead of the ground) or if the scale was handled improperly.

Data quality control

Some snow depth and SWE measurements were flagged and removed from the dataset due to the high likelihood of surveyor error. The most common source of error is from transcribing data from the field book to a computer. Measurements are also removed based on surveyor notes—statements indicating problems obtaining the sample or uncertainty in the value based on nearby measurements. A filter was applied to review snow density values for the mean SWE calculated at each site. To ensure realistic values of SWE are included, this filter is two standard deviations below the mean and three standard deviations above the mean for each site, following methods by Connon *et al.* (2021).

Site metadata

Site coordinates were gathered and verified from multiple paper and electronic records. Coordinates were categorised first into Northwest Territories administrative regions. Coordinates were cross-referenced with the catchment shapefiles provided by the National Hydro Network (Natural Resources Canada 2022) and ecological regions provided by ECC-GNWT. A catchment area is based on sub-sub-drainage data provided by the Water Survey of Canada. Catchment shapefiles differ from the basin shapefiles mapped in Figure 2, which delineate the drainage area of active and discontinued hydrometric stations and are often at larger scales than the NHN catchments. Ecological regions were determined based on maps created by the Ecosystem Classification Group (2007, 2008, 2010, 2012), part of ECC-GNWT.

Table 1. Snow water equivalent and snow depth instrumentation used in the Northwest Territories manual snow surveys.

Instrument name	Instrument ID	Area	Length	Internal Diameter	Metric/Imperial
Adirondack	AD	34.9 (cm^2)	120 cm	6.7 cm	metric
Metric ESC-30	ESC30	30.0 (cm^2)	121.5 cm	6.2 cm	metric
Standard federal	metric	11.4 (cm^2)	multiple 76 cm sections	3.8 cm	metric
Mt rose federal	mt rose	11.4 (cm^2)	multiple 76 cm sections	3.8 cm	imperial
Meteorological Service of Canada	MSC	39.1 (cm^2)	110 cm	7.1 cm	imperial
Magnaprobe	magnaprobe	-	153 cm	-	metric

Mean snow depth and SWE data

Snow depth and SWE measurements are summarised for their respective periods of record as mean values along with standard deviations (SD) for all individual sites in Tables 2-6 (upland surveys) and Tables 7 and Table 8 (lake surveys). Snow depth measurements are also summarised for sites with mixed surfaces (Table 9). Sites are listed together by

region for ease of interpretation. These means are end-of-year values, which are typically measured in mid-to-late March, before spring snowmelt begins. Mid-season SWE and snow depth are flagged and included in the supplementary "point data" dataset. Start year, end year and years of record columns are included to provide temporal context. Site activity is labelled as "Y" and "N", where inactive sites are no longer visited.

Table 2. Dehcho region snow survey data for upland surveys.

Site name	Snow water equivalent (mm)						Depth (cm)						Active
	mean	SD	n	start	end	years	mean	SD	n	start	end	years	
Checkpoint	110	36	245	1983	2024	29	54.8	17	260	1983	2024	26	Y
Fort Liard (Forestry)	96	39	104	2005	2024	20	48.4	20	110	2005	2024	20	Y
Fort Simpson	101	29	238	1983	2024	38	50.5	13	251	1983	2024	34	Y
Jean Marie River (Forestry)	98	32	97	2011	2024	14	52.4	17	104	2011	2024	14	Y
Nahanni Butte	109	32	102	2005	2024	20	56.5	15	110	2005	2024	20	Y
Ndulee Crossing	95	22	108	2005	2024	20	53.2	11	110	2005	2024	20	Y
Trout Lake (Forestry)	102	34	103	2005	2024	20	52.1	16	110	2005	2024	20	Y
Wrigley (Forestry)	93	31	101	2005	2024	20	52.8	15	110	2005	2024	20	Y
Blackstone River	109	37	113	1988	2015	12	47.2	19	140	1987	2015	13	Y
Fort Liard	125	39	130	1983	2015	15	57.5	18	130	1983	2015	13	Y
IPL Pump stn 3	102	28	24	1987	1991	4	56.8	10	24	1987	1991	4	N
Jean Marie Creek	98	28	18	1987	1990	3	53.1	9	18	1987	1990	3	N
Mackenzie Highway SA	97	29	23	1987	1991	4	57.9	10	24	1987	1991	4	N
Mackenzie Highway SB	102	28	13	1987	1989	2	54.8	4	13	1987	1989	2	N
Manner's Creek A	98	29	18	1987	1990	3	49.8	13	18	1987	1990	3	N
Manner's Creek B	85	20	18	1987	1990	3	46.8	7	18	1987	1990	3	N
Manner's Creek C	102	17	24	1987	1991	4	52.8	6	24	1987	1991	4	N
Moraine South	108	26	24	1987	1991	4	63.1	7	24	1987	1991	4	N
Redknife Hills	64	0	3	1987	1987	1	38.5	2	3	1987	1987	1	N
Shale Creek	113	30	167	1986	2017	17	58.9	13	170	1986	2017	17	N
Table mtn A	128	45	24	1987	1991	4	62.2	15	24	1987	1991	4	N
Table mtn B	113	38	24	1987	1991	4	59.8	11	24	1987	1991	4	N
Table mtn C	112	35	18	1987	1990	3	58.3	11	18	1987	1990	3	N
Trail River Dune Crest	107	23	24	1987	1991	4	55.9	7	24	1987	1991	4	N
Trail River Dune Hollow	101	20	18	1987	1990	3	54.6	6	18	1987	1990	3	N
Trout Lake	124	49	21	1984	1986	2	62.8	21	21	1984	1986	2	N
Wrigley	97	30	110	1984	1996	11	52.2	9	120	1984	1996	12	N

Table 3. Gwich'in-Inuvialuit region snow survey data for upland surfaces.

Site name	Snow water equivalent (mm)						Depth (cm)						Active
	mean	SD	n	start	end	years	mean	SD	n	start	end	years	
Caribou Creek	121	34	204	1983	2024	39	65.8	13	190	2000	2024	20	Y
Fort McPherson	129	40	100	1991	2024	11	68.3	15	100	1991	2024	10	Y
James Creek	91	43	79	2016	2024	9	51.6	20	79	2016	2024	8	Y
Midway Lake	155	50	90	2016	2024	9	78.1	18	90	2016	2024	9	Y
Rengleng River	132	39	200	1983	2024	39	69.1	14	190	1999	2024	21	Y
Inuvik A	170	48	13	2003	2015	13	54.7	18	163	2002	2016	15	N
Inuvik UA	127	23	6	1983	1989	6	45.9	12	70	1982	1989	7	N
Little Chicago Airstrip	105	17	15	1991	1994	3	46.5	6	15	1991	1994	3	N
Mould Bay	46		1	1983	1983	1	13.7	3	15	1982	1983	2	N
Ninlin Lake	122	32	15	1991	1994	3	52.8	12	15	1991	1994	3	N
Shiltee Tower	229	88	13	1991	1993	3	90.5	31	15	1991	1993	3	N
Sunny Lake	120	14	15	1991	1994	3	58.7	10	15	1991	1994	3	N
Thunder River	110	30	15	1991	1994	3	49.5	13	15	1991	1994	3	N

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Table 4. North Slave region snow survey data for upland surfaces.

Site name	Snow water equivalent (mm)						Depth (cm)						Active
	mean	SD	n	start	end	years	mean	SD	n	start	end	years	
Allan Lake	87	22	348	1988	2024	36	48.2	9	557	1988	2024	36	Y
Big Lake	112	81	240	1995	2024	27	44.2	27	470	1995	2024	27	Y
Big Spruce Lake	100	26	369	1978	2024	46	51.6	13	380	1978	2024	38	Y
Bluefish Hydro	85	24	174	1988	2024	29	46.8	10	237	1988	2024	24	Y
Castor Lake	111	29	446	1978	2024	47	56.4	10	599	1979	2024	45	Y
Christison Lake	107	66	279	1995	2024	30	43.7	23	495	1995	2024	30	Y
Denis Lake	109	29	365	1988	2024	37	56.6	11	570	1988	2024	37	Y
Ghost Lake	103	27	455	1978	2024	47	54.3	11	610	1978	2024	46	Y
Indin Lake	109	30	443	1978	2024	46	59.2	12	595	1978	2024	45	Y
IT64NW	85	24	407	1982	2024	42	46.0	12	620	1982	2024	42	Y
IT64SE	81	23	251	1999	2024	26	44.3	11	497	1999	2024	26	Y
Jolly Lake	124	66	114	1995	2024	12	45.8	19	270	1995	2024	12	Y
Little Latham Lake	98	29	366	1988	2024	37	52.4	11	570	1988	2024	37	Y
Mattberry Lake	97	25	395	1978	2024	47	52.3	10	550	1979	2024	40	Y
Mesa Lake	121	72	423	1978	2024	47	50.9	24	591	1979	2024	44	Y
Mosquito Creek	102	23	245	1982	2024	25	52.2	12	500	1982	2024	25	Y
Nardin Lake	106	28	367	1988	2024	37	54.5	11	570	1988	2024	37	Y
Pocket Lake	97	27	179	1995	2024	26	53.4	9	364	1995	2024	26	Y
Sharples Lake	109	28	361	1988	2024	37	58.3	11	570	1988	2024	37	Y
Snare Lake	110	29	436	1978	2024	46	54.3	12	587	1978	2024	44	Y
Tibbitt Lake_m	85	22	244	2000	2024	25	45.7	10	450	2000	2024	25	Y
White Wolf Lake	119	65	259	1995	2024	29	44.6	22	430	1995	2024	29	Y
Winter Lake	80	57	407	1978	2024	45	39.1	21	668	1978	2024	42	Y
Longlegs Lake	66	45	31	1978	1982	5	24.7	14	34	1978	1982	5	N
Roulante Lake	98	47	10	2018	2018	1	43.2	14	10	2018	2018	1	N
Slave B1	123	28	10	2018	2018	1	56.4	13	10	2018	2018	1	N
Slave B10	84	17	10	2018	2018	1	48.7	9	10	2018	2018	1	N
Slave B11	82	22	10	2018	2018	1	46.7	11	10	2018	2018	1	N
Slave B2	78	22	10	2018	2018	1	35.0	7	10	2018	2018	1	N
Slave B3	89	30	10	2018	2018	1	38.0	10	10	2018	2018	1	N
Slave B6	88	19	10	2018	2018	1	49.9	7	10	2018	2018	1	N
Slave B7	90	18	10	2018	2018	1	51.6	8	10	2018	2018	1	N
Slave B8	85	10	10	2018	2018	1	49.0	4	10	2018	2018	1	N
Slave B9	81	15	10	2018	2018	1	47.0	5	10	2018	2018	1	N
Tibbitt Lake_pb	93	21	63	2000	2007	8	50.7	9	65	2000	2007	8	N
Tibbitt Lake_pub	85	18	64	2000	2008	9	47.1	9	68	2000	2008	9	N
Tibbitt_burn	92	24	29	1999	2001	3	44.7	16	50	1999	2001	3	N
Truce Lake	74	25	10	2018	2018	1	36.6	10	10	2018	2018	1	N
Yellowknife A	106	28	34	1966	2015	34	34.6	11	400	1966	2015	37	N
Yellowknife GG	99	NA	1	1983	1983	1	34.4	13	23	1982	1983	2	N

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Table 5. Sahtu region snow survey data for upland surfaces.

Site name	Snow water equivalent (mm)						Depth (cm)						Active
	mean	SD	n	start	end	years	mean	SD	n	start	end	years	
Colville Lake	95	24	85	2016	2024	9	60.1	6	90	2016	2024	9	Y
Deline	116	43	191	1997	2024	22	60.5	13	233	1997	2024	23	Y
Fort Good Hope	114	35	236	1997	2024	24	59.9	11	250	1997	2024	25	Y
Norman Wells	112	40	242	1997	2024	25	57.6	12	259	1997	2024	26	Y
Tulita	98	26	233	1997	2024	25	52.4	13	263	1997	2024	26	Y
Canyon Creek	137	56	26	1992	1997	3	78.1	27	30	1992	1997	3	N
Canyon Creek North	121	35	23	1987	1991	4	58.2	16	24	1987	1991	4	N
Canyon Creek Slope North	113	44	24	1987	1991	4	54.7	20	24	1987	1991	4	N
Canyon Creek Slope South	151	47	23	1987	1991	4	64.2	19	24	1987	1991	4	N
Great Bear River Alluvial Terrace	126	46	20	1987	1991	4	67.0	14	21	1987	1991	4	N
Great Bear River Slope Crest	96	44	10	1987	1989	2	46.6	18	12	1987	1989	2	N
Great Bear River South	106	12	10	1992	1992	1	59.1	4	10	1992	1992	1	N
IPL Pump stn 1	116	40	17	1989	1991	3	64.8	13	18	1989	1991	3	N
Norman Wells UA	132	91	27	1983	1988	4	46.4	23	449	1982	1989	7	N

Table 6. South Slave region snow survey data for upland surfaces.

Site name	Snow water equivalent (mm)						Depth (cm)						Active
	mean	SD	n	start	end	years	mean	SD	n	start	end	years	
Boundary Lake	161	42	290	1988	2024	30	80.6	15	301	1988	2024	31	Y
Crown Fire	90	15	68	2018	2024	7	51.2	6	70	2018	2024	7	Y
Dymond Lake	121	44	489	1965	2024	53	60.7	16	502	1965	2024	53	Y
Enterprise	112	21	70	2018	2024	7	59.0	8	70	2018	2024	7	Y
Fort Providence	102	20	99	2015	2024	10	60.6	9	100	2015	2024	10	Y
Fort Smith	90	24	397	1982	2024	41	50.6	11	400	1982	2024	41	Y
Gray Lake	106	42	517	1965	2024	56	50.5	14	520	1965	2024	52	Y
Hay River (Forestry)	105	27	97	2014	2024	10	63.4	13	100	2014	2024	10	Y
Hill Island Lake	99	34	482	1965	2024	53	51.5	15	491	1965	2024	52	Y
Hook Lake	99	27	309	1989	2024	32	52.1	13	321	1989	2024	33	Y
Kakisa River	105	30	371	1982	2024	43	57.4	13	376	1982	2024	42	Y
Kimble Tower	111	24	100	2015	2024	10	65.9	10	100	2015	2024	10	Y
Little Buffalo Tower	120	27	410	1982	2024	42	61.1	11	411	1982	2024	42	Y
Nonacho Lake	106	35	496	1965	2024	54	54.5	14	509	1965	2024	51	Y
Nyarling River	106	24	398	1982	2024	41	56.7	10	401	1982	2024	41	Y
Piers Lake	107	32	344	1983	2024	39	56.9	13	345	1983	2024	39	Y
Pine Point	138	32	401	1982	2024	42	67.0	12	401	1982	2024	41	Y
Powder Lake	112	27	90	2014	2024	9	64.9	12	90	2014	2024	9	Y
Swede Creek	94	30	343	1982	2023	41	50.1	14	356	1982	2023	41	Y
Thubun Lake	92	29	362	1982	2024	38	51.1	11	369	1982	2024	38	Y
Whirlwind Lake	101	30	483	1965	2024	52	55.1	15	489	1965	2024	50	Y
Alcantara Lake	104	30	463	1965	2021	51	53.6	13	482	1965	2021	50	N
Buchan Lake	139	28	10	1987	1987	1	70.5	8	10	1987	1987	1	N
Caen Tower	85	17	30	2015	2017	3	50.9	9	30	2015	2017	3	N
Courageous Lake	114	90	7	1978	1978	1	38.2	27	9	1978	1978	1	N
Dunvegan Lake	115	34	495	1965	2021	53	59.0	14	503	1965	2021	53	N
Fort Reliance	121	16	5	1983	1989	5	34.1	10	137	1982	1989	7	N
Fort Resolution	115	22	30	2015	2017	3	66.4	10	30	2015	2017	3	N
Fort Smith UA	98	17	23	1966	1989	14	42.5	12	132	1967	1989	14	N
Halliday Lake	106	32	482	1965	2021	53	55.2	15	500	1965	2021	53	N
Hay River	97	30	302	1982	2016	34	51.0	14	301	1982	2016	31	N
Hook Lake Air Strip	93	19	60	1982	1988	6	46.6	9	60	1982	1988	6	N
Lac Duhamel	78	16	28	1981	1983	3	40.0	6	30	1981	1983	3	N
Pilot Lake	76	20	10	1982	1982	1	44.2	6	10	1982	1982	1	N
Swede Creek (Forestry)	108	16	30	2015	2017	3	63.7	6	30	2015	2017	3	N
Thekulthili Lake	92	31	433	1965	2021	51	49.8	13	445	1965	2021	47	N
Tortuous Lake	88	32	439	1965	2021	51	45.6	16	454	1965	2021	51	N

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Table 7. North Slave region snow survey data for lake surfaces.

Site name	Snow water equivalent (mm)						Depth (cm)						Active
	mean	SD	n	start	end	years	mean	SD	n	start	end	years	
Allan Lake	58	12	20	2019	2024	5	35.2	6.4	72	2019	2024	5	Y
Big Lake	65	31	47	2019	2024	6	22.8	10.1	260	2019	2024	6	Y
Big Spruce Lake	69	16	7	1978	1981	3	28.4	8.0	7	1978	1981	3	Y
Castor Lake	68	12	55	2019	2024	6	41.0	5.4	225	2019	2024	6	Y
Christison Lake	65	25	51	2019	2024	6	25.1	10.0	260	2019	2024	6	Y
Denis Lake	74	16	20	2019	2024	4	34.3	5.0	70	2019	2024	4	Y
Ghost Lake	73	17	60	2019	2024	6	40.2	7.0	210	2019	2024	6	Y
Indin Lake	75	18	60	2019	2024	6	44.3	7.0	310	2019	2024	6	Y
Jolly Lake	57	21	51	2018	2024	7	20.7	9.5	221	2018	2024	7	Y
Little Latham Lake	70	11	20	2019	2024	4	36.3	3.6	70	2019	2024	4	Y
Mattberry Lake	67	17	60	2019	2024	6	38.4	4.4	210	2019	2024	6	Y
Mesa Lake	74	31	64	2018	2024	7	35.2	11.1	241	2018	2024	7	Y
Nardin Lake	74	13	20	2019	2024	4	36.9	4.4	70	2019	2024	4	Y
Pocket Lake	59	17	181	1994	2024	28	35.2	8.2	305	1994	2024	28	Y
Sharples Lake	77	32	20	2019	2024	4	35.8	11.6	70	2019	2024	4	Y
Snare Lake	77	19	60	2019	2024	6	42.2	10.9	210	2019	2024	6	Y
White Wolf Lake	69	36	53	2018	2024	7	26.0	11.3	217	2018	2024	7	Y
Winter Lake	67	29	61	2018	2024	7	30.3	10.4	267	2018	2024	7	Y
Longlegs Lake	73	23	3	1979	1980	2	25.6	8.3	5	1978	1980	3	N
Prosperous Lake north	54	12	19	2018	2019	2	23.7	3.4	20	2018	2019	2	N

Table 8. South Slave region snow survey data for lake surfaces.

Site name	Snow water equivalent (mm)						Depth (cm)						Active
	mean	SD	n	start	end	years	mean	SD	n	start	end	years	
Dymond Lake	92	34	6	1978	1981	3	38.2	16.2	6	1978	1981	3	Y
Gray Lake	78	12	6	1978	1981	3	36.0	10.6	6	1978	1981	3	Y
Hill Island Lake	68	18	6	1978	1981	3	30.2	11.6	6	1978	1981	3	Y
Nonacho Lake	93	30	4	1978	1981	2	36.4	12.5	5	1978	1981	2	Y
Whirlwind Lake	80	18	4	1980	1981	2	39.5	10.0	4	1980	1981	2	Y
Alcantara Lake	63	26	4	1980	1981	2	35.5	8.7	4	1980	1981	2	N
Dunvegan Lake	83	24	6	1978	1981	3	36.2	8.1	6	1978	1981	3	N
Halliday Lake	69	10	8	1978	1981	4	36.1	14.0	11	1978	1982	5	N
Pilot Lake	73	4	2	1982	1982	1	28.0	1.8	2	1982	1982	1	N
Thekulthili Lake	53	26	6	1978	1981	3	29.3	16.0	6	1978	1981	3	N
Tortuous Lake	68	17	4	1980	1981	2	36.8	17.3	4	1980	1981	2	N

https://doi.org/10.46887/2025-005

Table 9. North Slave and South Slave snow depth data for mixed surfaces.

Site name	Depth (cm)						Active
	mean	SD	n	start	end	years	
Big Lake	48.6	32.8	473	2016	2020	4	Y
Bluefish Hydro	41.3	11.8	430	2016	2019	2	Y
Castor Lake	51.6	14.5	638	2016	2020	5	Y
Christison Lake	39.3	19.4	644	2016	2020	5	Y
Ghost Lake	48.6	15.9	896	2016	2020	5	Y
Indin Lake	55.0	14.4	613	2016	2020	5	Y
Jolly Lake	40.4	24.5	454	2018	2020	3	Y
Mesa Lake	46.1	22.3	808	2016	2020	5	Y
Mattberry Lake	50.3	13.2	710	2016	2020	5	Y
Snare Lake	47.3	12.7	752	2016	2020	5	Y
White Wolf Lake	45.7	25.9	665	2016	2020	5	Y
Winter Lake	41.9	23.2	806	2016	2020	5	Y
Cotterill Lake	54.2	13.5	516	2016	2018	2	N
Fiddlers Lake	16.7	6.0	128	2019	2019	1	N
Handle Lake	11.7	16.3	45	2019	2019	1	N
Jackfish Lake	19.1	8.4	226	2019	2019	1	N
Martin Lake	40.7	11.4	638	2018	2018	1	N
Roulante Lake	64.8	29.6	627	2016	2018	3	N
Slave B1	44.0	21.7	485	2017	2018	2	N
Slave B10	56.5	10.7	265	2017	2018	2	N
Slave B11	66.3	17.2	137	2016	2016	1	N
Slave B12	56.4	14.0	140	2016	2016	1	N
Slave B13	54.8	4.7	46	2016	2016	1	N
Slave B2	38.1	23.1	510	2017	2018	2	N
Slave B3	45.0	24.0	445	2017	2018	2	N
Slave B6	60.2	12.5	231	2017	2018	2	N
Slave B7	61.9	22.3	686	2016	2018	3	N
Slave B8	62.0	10.2	352	2017	2018	2	N
Slave B9	59.4	11.5	224	2017	2018	2	N
Steeves Lake	64.9	15.7	40	2016	2016	1	N
Truce Lake	47.5	18.3	216	2017	2018	2	N
Vee Lake rd	42.8	9.5	195	2016	2016	1	N

Site Metadata

Site metadata, including latitude, longitude, region, catchment, catchment reference (CR) and ecological region are listed below for all sites in Tables 10-14. Sites are listed together by region for ease of interpretation. Site status is labelled as “Y” and “N”, where inactive sites are no longer visited.

Table 10. Dehcho region site metadata.

Site name	Longitude	Latitude	Active	CR	Catchment	Ecological region
Checkpoint	-121.25	61.45	Y	10FB	Upper Mackenzie – Jean Marie	Taiga Plains South Mackenzie Plain Mid Boreal
Fort Liard (Forestry)	-123.40	60.23	Y	10ED	Lower Liard – Mouth	Taiga Plains Liard Upland Mid Boreal
Fort Simpson	-121.33	61.80	Y	10GC	Upper Mackenzie – Martin	Taiga Plains South Mackenzie Plain Mid Boreal
Jean Marie River (Forestry)	-120.65	61.52	Y	10FB	Upper Mackenzie – Jean Marie	Taiga Plains South Mackenzie Plain Mid Boreal
Nahanni Butte	-123.11	60.95	Y	10ED	Lower Liard – Mouth	Taiga Plains Liard Plain Mid Boreal
Ndulee Crossing	-122.53	62.15	Y	10GC	Upper Mackenzie – Martin	Taiga Plains South Mackenzie Plain Mid Boreal
Trout Lake (Forestry)	-119.81	61.14	Y	10FA	Trout	Taiga Plains Trout Upland High Boreal
Wrigley (Forestry)	-123.41	63.20	Y	10HC	Central Mackenzie – Blackwater	Boreal Cordillera Central Mackenzie Valley High Boreal
Blackstone River	-122.90	61.05	N	10ED	Lower Liard – Mouth	Taiga Plains Liard Plain Mid Boreal
Fort Liard	-123.37	60.23	N	10ED	Lower Liard – Mouth	Taiga Plains Liard Upland Mid Boreal
IPL Pump stn 3	-120.90	61.40	N	10FB	Upper Mackenzie – Jean Marie	Taiga Plains South Mackenzie Plain Mid Boreal
Jean Marie Creek	-120.70	61.19	N	10FB	Upper Mackenzie – Jean Marie	Taiga Plains South Mackenzie Plain Mid Boreal
Mackenzie Highway SA	-120.87	61.36	N	10FB	Upper Mackenzie – Jean Marie	Taiga Plains South Mackenzie Plain Mid Boreal
Mackenzie Highway SB	-120.87	61.36	N	10FB	Upper Mackenzie – Jean Marie	Taiga Plains South Mackenzie Plain Mid Boreal
Manner's Creek A	-121.09	61.61	N	10FB	Upper Mackenzie – Jean Marie	Taiga Plains South Mackenzie Plain Mid Boreal
Manner's Creek B	-121.09	61.60	N	10FB	Upper Mackenzie – Jean Marie	Taiga Plains South Mackenzie Plain Mid Boreal
Manner's Creek C	-121.09	61.60	N	10FB	Upper Mackenzie – Jean Marie	Taiga Plains South Mackenzie Plain Mid Boreal
Moraine South	-120.81	61.28	N	10FB	Upper Mackenzie – Jean Marie	Taiga Plains South Mackenzie Plain Mid Boreal
Redknife Hills	-120.29	60.57	N	10FA	Trout	Taiga Plains Trout Upland High Boreal
Shale Creek	-122.20	62.07	N	10GC	Upper Mackenzie – Martin	Taiga Plains South Mackenzie Plain Mid Boreal
Table mtn A	-123.65	63.62	N	10HC	Central Mackenzie – Blackwater	Boreal Cordillera Central Mackenzie Valley High Boreal
Table mtn B	-123.63	63.61	N	10HC	Central Mackenzie – Blackwater	Boreal Cordillera Central Mackenzie Valley High Boreal
Table mtn C	-123.63	63.61	N	10HC	Central Mackenzie – Blackwater	Boreal Cordillera Central Mackenzie Valley High Boreal
Trail River Dune Crest	-122.00	62.09	N	10GC	Upper Mackenzie – Martin	Taiga Plains South Mackenzie Plain Mid Boreal
Trail River Dune Hollow	-122.00	62.09	N	10GC	Upper Mackenzie – Martin	Taiga Plains South Mackenzie Plain Mid Boreal
Trout Lake	-121.22	60.43	N	10FA	Trout	Taiga Plains Trout Upland High Boreal
Wrigley	-123.42	63.20	N	10HC	Central Mackenzie – Blackwater	Boreal Cordillera Central Mackenzie Valley High Boreal

Table 11. Gwich'in-Inuvialuit region site metadata.

Site name	Longitude	Latitude	Active	CR	Catchment	Ecological region
Caribou Creek	-133.48	68.05	Y	10LC	Eastern Mackenzie Delta	Taiga Plains Travaillant Upland High Subarctic
Fort McPherson	-134.74	67.47	Y	10MC	Lower Peel and Western Mackenzie Delta	Taiga Plains Arctic Red Plain High Subarctic
James Creek	-136.00	67.14	Y	10MC	Lower Peel and Western Mackenzie Delta	Tundra Cordillera Richardson Mountains High Subarctic
Midway Lake	-135.44	67.23	Y	10MC	Lower Peel and Western Mackenzie Delta	Tundra Cordillera Richardson Plateau High Subarctic
Rengleng River	-133.83	67.63	Y	10LC	Eastern Mackenzie Delta	Taiga Plains Arctic Red Plain High Subarctic
Inuvik A	-133.48	68.30	N	10LC	Eastern Mackenzie Delta	Taiga Plains Campbell Hills High Subarctic
Inuvik UA	-133.53	68.32	N	10LC	Eastern Mackenzie Delta	Taiga Plains Sitidgi Plain High Subarctic
Little Chicago Airstrip	-130.22	67.18	N	10LB	Lower Mackenzie – Ontaratue	Taiga Plains Arctic Red Plain High Subarctic
Mould Bay	-119.35	76.24	N	10VA	Prince Patrick Island	High Arctic Prince Patrick Upland
Ninlin Lake	-131.33	67.87	N	10ND	Southern Beaufort Sea – Eskimo Lakes	Taiga Plains Travaillant Upland High Subarctic
Shiltee Tower	-134.95	67.30	N	10MC	Lower Peel and Western Mackenzie Delta	Tundra Cordillera Richardson Plateau High Subarctic
Sunny Lake	-132.58	67.88	N	10LB	Lower Mackenzie – Ontaratue	Taiga Plains Travaillant Upland High Subarctic
Thunder River	-130.83	67.48	N	10LB	Lower Mackenzie – Ontaratue	Taiga Plains Arctic Red Plain High Subarctic

Table 12. North Slave region site metadata.

Site name	Longitude	Latitude	Active	CR	Catchment	Ecological region
Allan Lake	-113.05	62.95	Y	07SB	Yellowknife	Taiga Shield Great Slave Upland Low Subarctic
Big Lake	-112.93	64.80	Y	07SA	Snare	Taiga Shield Snare Plain High Subarctic
Big Spruce Lake	-116.00	63.50	Y	07SA	Snare	Taiga Shield Great Slave Upland High Boreal
Bluefish Hydro	-114.25	62.68	Y	07SB	Yellowknife	Taiga Shield Great Slave Upland High Boreal
Castor Lake	-115.99	64.52	Y	07TB	Marian - Mouth	Taiga Shield Calder Upland Low Subarctic
Christison Lake	-114.17	64.65	Y	07SA	Snare	Taiga Shield Snare Plain High Subarctic
Denis Lake	-112.62	63.37	Y	07SB	Yellowknife	Taiga Shield Great Slave Upland Low Subarctic
Ghost Lake	-115.07	63.88	Y	07SA	Snare	Taiga Shield Calder Upland Low Subarctic
Indin Lake	-115.03	64.38	Y	07SA	Snare	Taiga Shield Calder Upland Low Subarctic
IT64NW	-113.40	62.51	Y	07SB	Yellowknife	Taiga Shield Great Slave Upland High Boreal
IT64SE	-113.39	62.51	Y	07SB	Yellowknife	Taiga Shield Great Slave Upland High Boreal
Jolly Lake	-112.21	64.12	Y	07RA	MacKay Lake	Taiga Shield Snare Plain High Subarctic
Little Latham Lake	-113.63	63.20	Y	07SB	Yellowknife	Taiga Shield Great Slave Upland Low Subarctic
Mattberry Lake	-115.96	64.09	Y	07TB	Marian - Mouth	Taiga Shield Great Slave Upland High Boreal
Mesa Lake	-115.14	64.85	Y	07TB	Marian - Mouth	Taiga Shield Snare Plain High Subarctic
Mosquito Creek	-116.15	62.70	Y	07UA	Great Slave Lake - North Arm West Shore	Taiga Plains Great Slave Plain High Boreal
Nardin Lake	-113.85	63.51	Y	07SB	Yellowknife	Taiga Shield Great Slave Upland Low Subarctic
Pocket Lake	-114.37	62.51	Y	07SB	Yellowknife	Taiga Shield Great Slave Lowland High Boreal
Sharples Lake	-112.82	63.90	Y	07SB	Yellowknife	Taiga Shield Snare Plain High Subarctic
Snare Lake	-114.04	64.20	Y	07SA	Snare	Taiga Shield Snare Plain High Subarctic
Tibbitt Lake	-113.34	62.56	Y	07SB	Yellowknife	Taiga Shield Great Slave Upland High Boreal
White Wolf Lake	-114.11	65.01	Y	07SA	Snare	Taiga Shield Snare Plain High Subarctic
Winter Lake	-113.03	64.50	Y	07SA	Snare	Taiga Shield Snare Plain High Subarctic
Cotterill Lake	-114.81	64.15	N	07SA	Snare	Taiga Shield Calder Upland Low Subarctic
Fiddlers Lake	-114.51	62.47	N	07SB	Yellowknife	Taiga Shield Great Slave Lowland High Boreal
Handle Lake	-114.4	62.49	N	07SB	Yellowknife	Taiga Shield Great Slave Lowland High Boreal
Jackfish Lake	-114.39	62.47	N	07SB	Yellowknife	Taiga Shield Great Slave Lowland High Boreal
Lac La Martre	-117.27	63.10	N	07TA	La Martre	Taiga Plains Lac Grandin Plain Low Subarctic
Longlegs Lake	-113.76	64.77	N	07SA	Snare	Taiga Shield Snare Plain High Subarctic
Martin Lake	-114.43	62.52	N	07SB	Yellowknife	Taiga Shield Great Slave Upland High Boreal
Prosperous Lake North	-114.23	62.65	N	07SB	Yellowknife	Taiga Shield Great Slave Upland High Boreal
Roulante Lake	-113.77	64.56	N	07SA	Snare	Taiga Shield Snare Plain High Subarctic
Slave B1	-112.46	64.28	N	07SA	Snare	Taiga Shield Point Upland High Subarctic
Slave B10	-115.64	63.79	N	07SA	Snare	Taiga Shield Great Slave Upland High Boreal
Slave B11	-113.33	64.52	N	07SA	Snare	Taiga Shield Snare Plain High Subarctic
Slave B12	-114.56	64.08	N	07SA	Snare	Taiga Shield Calder Upland Low Subarctic
Slave B13	-114.53	63.65	N	07SA	Snare	Taiga Shield Great Slave Upland Low Subarctic
Slave B2	-112.93	64.63	N	07SA	Snare	Taiga Shield Snare Plain High Subarctic
Slave B3	-113.51	64.90	N	07SA	Snare	Taiga Shield Snare Plain High Subarctic
Slave B6	-114.79	64.42	N	07SA	Snare	Taiga Shield Calder Upland Low Subarctic

Table 12 continued on page 14…

Site name	Longitude	Latitude	Active	CR	Catchment	Ecological region
Slave B7	-114.20	64.32	N	07SA	Snare	Taiga Shield Snare Plain High Subarctic
Slave B8	-114.73	64.02	N	07SA	Snare	Taiga Shield Calder Upland Low Subarctic
Slave B9	-115.21	64.10	N	07SA	Snare	Taiga Shield Calder Upland Low Subarctic
Steeves Lake	-115.12	64.39	N	07SA	Snare	Taiga Shield Calder Upland Low Subarctic
Tibbitt Lake_pb	-113.34	62.56	N	07SB	Yellowknife	Taiga Shield Great Slave Upland High Boreal
Tibbitt Lake_pub	-113.34	62.56	N	07SB	Yellowknife	Taiga Shield Great Slave Upland High Boreal
Tibbitt_burn	-113.38	62.50	N	07SB	Yellowknife	Taiga Shield Great Slave Upland High Boreal
Truce Lake	-114.65	64.61	N	07SA	Snare	Taiga Shield Snare Plain High Subarctic
Vee Lake rd	-114.37	62.52	N	07SB	Yellowknife	Taiga Shield Great Slave Lowland High Boreal
Yellowknife A	-114.45	62.47	N	07SB	Yellowknife	Taiga Shield Great Slave Lowland High Boreal
Yellowknife GG	-114.47	62.48	N	07SB	Yellowknife	Taiga Shield Great Slave Lowland High Boreal

Table 13. Sahtu region site metadata.

Site name	Longitude	Latitude	Active	CR	Catchment	Ecological region
Colville Lake	-126.06	67.02	Y	10NB	Upper Anderson	Taiga Plains Colville Plain High Subarctic
Deline	-123.57	65.11	Y	10JC	Great Bear Lake – Mouth	Taiga Plains Great Bear Plain Low Subarctic
Fort Good Hope	-128.61	66.27	Y	10LB	Lower Mackenzie – Ontaratue	Taiga Plains North Mackenzie Plain Low Subarctic
Norman Wells	-126.76	65.28	Y	10KA	Central Mackenzie – Little Bear	Taiga Plains North Mackenzie Plain Low Subarctic
Tulita	-125.53	64.90	Y	10HC	Central Mackenzie – Blackwater	Taiga Plains North Mackenzie Plain Low Subarctic
Canyon Creek	-126.58	65.20	N	10KA	Central Mackenzie – Little Bear	Taiga Plains North Mackenzie Plain Low Subarctic
Canyon Creek North	-126.52	65.23	N	10KA	Central Mackenzie – Little Bear	Taiga Plains North Mackenzie Plain Low Subarctic
Canyon Creek Slope North	-126.51	65.23	N	10KA	Central Mackenzie – Little Bear	Taiga Plains North Mackenzie Plain Low Subarctic
Canyon Creek Slope South	-126.52	65.23	N	10KA	Central Mackenzie – Little Bear	Taiga Plains North Mackenzie Plain Low Subarctic
Great Bear River Alluvial Terrace	-125.58	64.91	N	10JC	Great Bear Lake – Mouth	Taiga Plains North Mackenzie Plain Low Subarctic
Great Bear River Slope Crest	-125.58	64.91	N	10JC	Great Bear Lake – Mouth	Taiga Plains North Mackenzie Plain Low Subarctic
Great Bear River South	-125.57	64.91	N	10JC	Great Bear Lake – Mouth	Taiga Plains North Mackenzie Plain Low Subarctic
IPL Pump stn 1	-126.89	65.29	N	10KA	Central Mackenzie – Little Bear	Taiga Plains North Mackenzie Plain Low Subarctic
Norman Wells UA	-126.80	65.28	N	10KA	Central Mackenzie – Little Bear	Taiga Plains North Mackenzie Plain Low Subarctic

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Table 14. South Slave region site metadata.

Site name	Longitude	Latitude	Active	CR	Catchment	Ecological region
Boundary Lake	-115.55	59.48	Y	07PA	Southern Great Slave Lake – Little Buffalo	Taiga Plains Northern Alberta Uplands
Crown Fire	-117.15	61.58	Y	10FC	Horn	Taiga Plains Great Slave Lowland Mid Boreal
Dymond Lake	-106.28	61.39	Y	07QD	Upper Taltson	Taiga Shield Wignes Plain Low Subarctic
Enterprise	-116.15	60.56	Y	07OB	Lower Hay	Taiga Plains Tathlina Plain Mid Boreal
Fort Providence	-117.46	61.26	Y	10FB	Upper Mackenzie – Jean Marie	Taiga Plains Great Slave Lowland Mid Boreal
Fort Smith	-111.87	60.00	Y	07NB	Central Slave	Taiga Plains Slave Lowland Mid Boreal
Gray Lake	-108.35	61.85	Y	07QD	Upper Taltson	Taiga Shield Porter Upland Low Subarctic
Hay River (Forestry)	-115.84	60.77	Y	07OB	Lower Hay	Taiga Plains Great Slave Lowland Mid Boreal
Hill Island Lake	-109.78	60.51	Y	07QC	Tazin	Taiga Shield Rutledge Upland High Boreal
Hook Lake	-112.82	60.67	Y	07NC	Lower Slave	Taiga Plains Slave Lowland Mid Boreal
Kakisa River	-117.25	61.00	Y	07UC	Kakisa	Taiga Plains Great Slave Lowland Mid Boreal
Kimble Tower	-117.73	61.14	Y	10FB	Upper Mackenzie – Jean Marie	Taiga Plains Great Slave Lowland Mid Boreal
Little Buffalo Tower	-113.78	61.00	Y	07PB	Southern Great Slave Lake – Little Buffalo	Taiga Plains Slave Upland Mid Boreal
Nonacho Lake	-109.67	61.72	Y	07QD	Upper Taltson	Taiga Shield Nonacho Upland High Boreal
Nyarling River	-114.17	60.33	Y	07PB	Southern Great Slave Lake – Little Buffalo	Taiga Plains Slave Upland Mid Boreal
Piers Lake	-111.17	60.32	Y	07QA	Lower Taltson	Taiga Shield Rutledge Upland High Boreal
Pine Point	-114.38	60.85	Y	07PB	Southern Great Slave Lake – Little Buffalo	Taiga Plains Great Slave Lowland Mid Boreal
Powder Lake	-109.41	61.04	Y	07QD	Upper Taltson	Taiga Shield Nonacho Upland High Boreal
Swede Creek	-116.57	60.27	Y	07OB	Lower Hay	Taiga Plains Tathlina Plain Mid Boreal
Tortuous Lake	-111.70	60.75	Y	07QA	Lower Taltson	Taiga Shield Rutledge Upland High Boreal
Whirlwind Lake	-108.69	60.24	Y	07QC	Tazin	Taiga Shield Nonacho Upland High Boreal
Alcantara Lake	-108.28	60.91	N	07QC	Tazin	Taiga Shield Nonacho Upland High Boreal
Buchan Lake	-114.93	60.02	N	07PC	Upper Buffalo	Taiga Plains Tathlina Plain Mid Boreal
Caen Tower	-117.16	61.67	N	10FC	Horn	Taiga Plains Great Slave Lowland Mid Boreal
Courageous Lake	-111.42	61.15	N	07QA	Lower Taltson	Taiga Shield Rutledge Upland High Boreal
Dunvegan Lake	-107.28	60.17	N	07QC	Tazin	Taiga Shield Abitau Upland Low Subarctic
Fort Reliance	-109.17	62.71	N	0701	Great Slave Lake	Taiga Shield East Arm Upland Low Subarctic
Fort Resolution	-113.73	61.01	N	07PB	Southern Great Slave Lake – Little Buffalo	Taiga Plains Slave Delta Mid Boreal
Fort Smith UA	-111.93	60.03	N	07NB	Central Slave	Taiga Plains Slave Lowland Mid Boreal
Halliday Lake	-109.03	61.38	N	07QD	Upper Taltson	Taiga Shield Nonacho Upland High Boreal
Hay River	-115.83	60.78	N	07OB	Lower Hay	Taiga Plains Great Slave Lowland Mid Boreal
Hook Lake Air Strip	-112.70	60.75	N	07NC	Lower Slave	Taiga Plains Slave Lowland Mid Boreal
Lac Duhamel	-110.65	62.33	N	07QB	Snowdrift	Taiga Shield East Arm Upland High Boreal
Pilot Lake	-110.93	60.30	N	07QA	Lower Taltson	Taiga Shield Rutledge Upland High Boreal
Swede Creek (Forestry)	-116.56	60.27	N	07OB	Lower Hay	Taiga Plains Tathlina Plain Mid Boreal
Thekulthili Lake	-110.23	60.96	N	07QD	Upper Taltson	Taiga Shield Rutledge Upland High Boreal
Thubun Lake	-111.75	61.50	N	07QA	Lower Taltson	Taiga Shield Slave Plain Mid Boreal

Datasets

README (*README.rtf*)
- File descriptions
- Field descriptions

Point data (point_data.xlsx)
- site_ID
- site_name
- date_time
- year
- month
- day
- point
- surface_type
- instrument_id
- kit
- weight_empty
- weight_full
- SWE_cm
- snow_depth_cm
- density_gcm3
- data_flag_1
- data_flag_2
- swe_notes

Mean daily data (*mean_daily_data.xlsx*)
- site_id
- site_name
- year
- date_time
- surface_type
- mean_SWE_cm
- mean_depth_cm
- mean_density_gcm3
- data_flag_1
- data_flag_2

Site metadata (*sites.csv*)
- site_id
- site_name
- lng
- lat
- nwt_region
- catchment
- catchment_reference
- ecological_region
- activity
- sites_notes

Data flag information (*flags.csv*)
- flag_id
- flag_description
- action

Instrument metadata (*instruments.csv*)
- instrument_id
- instrument_name
- area_cm2
- length_cm
- internal_diameter_cm
- metric_imperial

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