NWT Open Report 2025-005
README - File and field descriptions

Northwest Territories snow survey data and methodology, 1965–2024

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Contents of this Publication

NWT Open Report 2025-005.pdf

An open data report for snow survey data collected between 1965 and 2024 in the NWT, titled "Northwest Territories snow survey data and methodology, 1965–2024." The report includes summarised and raw snow survey data, snow survey methodology, data quality control processes, and site metadata.

point_data.xlsx

Raw point measurements of snow water equivalent (SWE) and snow depth collected by manual snow surveys.

Fields:

site_ID - Site identification given following internal Government of Northwest Territories identification protocols.

site_name - Site name given following internal Government of Northwest Territories protocols. Names were often determined using nearby lakes.

date_time - Mountain Time, YYYY-MM-DD format.

year - YYYY

month - MM

day - DD

point - Snow survey point. There are usually 10 points per survey.

surface_type - Underlying surface type. Categories are relatively broad, consisting of meadow, lake, or upland surfaces. For sites below the treeline, upland surfaces are always within forested areas. Character values include: "fen", "fen_shield", "lake", "meadow", "mixed", "unknown" and "upland".

Instrument_id - Instrument id for the snow tube used to take SWE and snow depth measurements. Alphanumeric values include: "AD", "ESC30", "magnaprobe", "metric", "MSC" and "mt rose". For more information on instruments, see the instruments.csv file.

kit - Instrument kit number. This tracks specific snow tubes and scales used for snow surveys that are calibrated and maintained annually.

weight_empty - Weight of the empty snow tube (instrument).

weight_full - Weight of the snow tube and the snow sample.

SWE_cm - Snow water equivalent (SWE), calculated using fields "weight_full" and "weight_empty". Snow tubes are manufactured such that the difference between these fields yields the SWE (unit: cm).

snow_depth_cm - Vertical depth of the snow (unit: cm) as determined using the graduated lines on the side of the snow tube (instrument).

density_gcm3 - Density of the snow sample (unit: $g\ cm^{-3}$), calculated using the "SWE_cm" field and the "snow_depth_cm" field (density_gcm3 = SWE_cm/snow_depth_cm).

data_flag_1 - Field for flagging snow samples, following internal Government of Northwest Territories quality control protocols. Alphanumeric values include: "ED", "P", "S", "Sk", "Sk_2", "VAR", and "Y". For more information on data flags, see the flags.csv file.

data_flag_2 - Field for flagging snow samples, following internal Government of Northwest Territories quality control protocols. Character values include: "HS", "M", "P", "Q", "Sk", "unvrfd", and "Y". For more information on data flags, see the flags.csv file.

swe_notes - Field for recording any field notes and/or observations.

mean_daily_data.xlsx

Mean snow water equivalent (SWE) and snow depth for each site and measurement date, calculated by taking an average of raw point data. Values outside density thresholds (see NWT Open Report 2025-005.pdf, Methods section) and those with data flags "Y", "Sk", "Sk_2" and "P" in the "data_flag_1" and "data_flag_2" fields are removed from the mean value.

Fields:

site_ID - Site identification given following internal Government of Northwest Territories identification protocols.

site_name - Site name given following internal Government of Northwest Territories protocols. Names were often determined using nearby lakes.

date_time - Mountain Time, YYYY-MM-DD format

surface_type - Underlying surface type. Categories are relatively broad, consisting of meadow, lake, or upland surfaces. For sites below the treeline, upland surfaces are always within forested areas. Character values include: "fen", "fen_shield", "lake", "meadow", "mixed", "unknown" and "upland".

mean_SWE_cm - Mean snow water equivalent (SWE, unit: cm) for each measurement date and each site. This is calculated by taking the average of the raw point values for SWE.

mean_depth_cm - Mean snow depth (unit: cm) for each measurement date and each site. This is calculated by taking the average of the raw point values for snow depth.

mean_density_gcm3 - Mean density (unit: g cm^{-3}) for each measurement data and each site. This is calculated by taking the average of the point values for density.

data_flag_1 - Field for flagging snow samples, following internal GNWT quality control protocols. Character values include: "S", "VAR", and "Y". For more information on data flags, see the flags.csv file.

data_flag_2 - Field for flagging snow samples, following internal GNWT quality control protocols. Character values include: "HS", "M", "unvrfd", and "Y". For more information on data flags, see the flags.csv file.

sites.csv

Additional information pertaining to the locations where snow surveys have been performed (site metadata).

Fields:

site_id - Site identification given following internal Government of Northwest Territories identification protocols.

site_name - Site name given following internal Government of Northwest Territories protocols. Names were often determined using nearby lakes.

lng - Longitude (unit: decimal degrees). More precise site coordinates are used for field measurement purposes only.

lat - Latitude (unit: decimal degrees). More precise site coordinates are used for field measurement purposes only.

nwt_region - Administrative region that the site is located in. Character values include: "Dehcho", "Gwich'in", "Inuvialuit", "North Slave", "Sahtu", and "South Slave."

catchment - Catchment that the site is located within as determined using National Hydro Network shapefiles. Catchment is a sub-sub-drainage area, a hydrological unit that is smaller than a basin. For the complete list of catchments included, see the sites.csv file.

catchment_reference - Catchment reference ID that is linked to the "catchment" field. For the complete list of catchment references, see the sites.csv file.

ecological_region - Ecological region as determined using those classified by ECC-GNWT. Character values include specific classifications within Cordillera, Taiga Plains, Taiga Shield and Northern Arctic ecosystems. For the complete list of ecological regions included, see the sites.csv file.

activity - Site activity, where "inactive" sites will not be visited in the future (A: Active; IA: Inactive).

sites_notes - User notes on the site itself. Notes could include observations related to recent wildfire burn or missing site signage.

flags.csv

Flag metadata. Flags are generated in accordance with the Government of Northwest Territories–Department of Environment and Climate Change's internal quality control protocols (described in the report). See the action column for advice on whether to remove the flagged value.

Fields:

flag_id - An alphanumeric field used to identify a particular data flag.

flag_description - Meaning or description of the data flag.

action - Recommended user action depending on the data flag description. Data flags that are labelled "remove" should be removed for calculating mean values. For data flags that are labelled "consider remove," the decision to remove the value is left to the data user.

instruments.csv

Instrument metadata.

Fields:

instrument_id - An alphanumeric field used to identify a specific type of instrument.

instrument_name - Instrument name, as determined by the manufacturer.

area_cm2 - Cylindrical area of the snow tube (unit: cm^2). This is determined using the "internal_diameter_cm" field.

length_cm - Length of the instrument (unit: cm). For the "mt rose federal" and "standard federal" instruments, the length is given for each section, where an instrument can include multiple sections.

internal_diameter_cm - Cylindrical diameter of the instrument (unit: cm).

metric_imperial - Whether instrument units are metric or imperial.