

Ymir Water System

2025 Quartz Creek Flow and
Water Quality Monitoring Report
Year End Report

Date of Report:	March 11, 2026
Reporting Period:	2025 Year End Report
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Quartz Creek Monitoring

Reporting Period

This is an annual report for the year 2025 and includes data from 01 Jan 2025 to 31 Dec 2025.

See prior years reporting for additional data and flow monitoring information.

Flow Monitoring Weir

In 2019 a flow monitoring weir was installed on Quartz Creek at the intake for the Ymir water system with funding provided by BC Timber Sales and the Ymir Water Service. Funding for current monitoring and reporting is provided by ATCO Wood Products Ltd. and the Regional District owned Ymir Water Service.

The Kindsvater-Carter Formula was adopted to calculate flow through the sharp crested aluminum weir installed in the concrete water system reservoir pool. Flow depth through the aluminum flow monitoring weir is measured by a pressure transducer installed December 13th 2024 (replacing an ultrasonic level sensor that was previously used for stage measurement). The aluminum primary weir measured flows up to about 560 mm or 742 L/s, above this level the concrete intake structure will overtop. Wing plates were added to the ends of the concrete weir to accommodate higher peak flows of up to 710 mm or 1,515 L/s. Flows associated with a water stage above 710 mm are considered inaccurate as they are influenced by a catwalk and spill over onto the creek banks.

New Pressure Transducer

In December of 2024, RDCK installed a new WIKA A-10 pressure sensor (0–200 PSIG range) at the Quartz Creek compound weir in Ymir to measure water level (stage). The sensor measures the pressure created by the height of water above it, which is then converted to stage and applied to the site-specific weir equations:

Primary weir:

$$Q=10.525(H+0.003)^{(3/2)}$$

Overflow weir:

$$Q=76.565(H+0.003)^{(3/2)}$$



Because discharge varies with the $3/2$ power of stage, small errors in measured water level can result in larger errors in calculated flow. The A-10 transmitter has a stated accuracy of $\pm 0.5\%$ of span, which improves confidence in stage measurements and therefore in computed discharge values across the full operating range of the compound weir.

For this reporting period, supplementary meteorological data were obtained from the NELSON CS Weather Station (WMO ID 71776), operated by Environment and Climate Change Canada – Meteorological Service of Canada. The station provides a comprehensive suite of daily (and hourly) climate variables including air temperature, rainfall, snowfall, total precipitation, and snow on ground. These data are included to support interpretation of runoff response, seasonal precipitation patterns, and snowmelt-driven hydrologic response.

The NELSON CS station is located approximately 30 km north of Quartz Creek at the Nelson Airport. Given this separation — and the potential for elevation and microclimatic differences between the airport location and the Quartz Creek watershed — recorded precipitation amounts should not be assumed to be directly representative of site-specific conditions at Quartz Creek. However, the dataset remains valuable for understanding regional storm timing, temperature trends, and broader precipitation and melt patterns that influence runoff dynamics within the watershed.

The NELSON CS station uses an automated total precipitation weighing gauge which determines precipitation amounts through a change in weight. This gauge reports total precipitation amounts hourly, in millimetres.

At Environment and Climate Change Canada (ECCC), snow is measured by automated observing stations which register the snowfall and snow-on-ground amounts using an acoustic snow sensor (SR50, SR50A). The automated sites report snowfall amounts hourly in centimetres.

Quartz Creek responds similarly in timing and seasonal pattern to a nearby long-term streamflow gauging reference station -Anderson Creek 08NJ130. This station is operated by the Water Survey of Canada, and is leveraged in this report as a regional comparator (hydrologic response analogue) stream to Quartz Creek for relative streamflow response and timing, not magnitude of flows

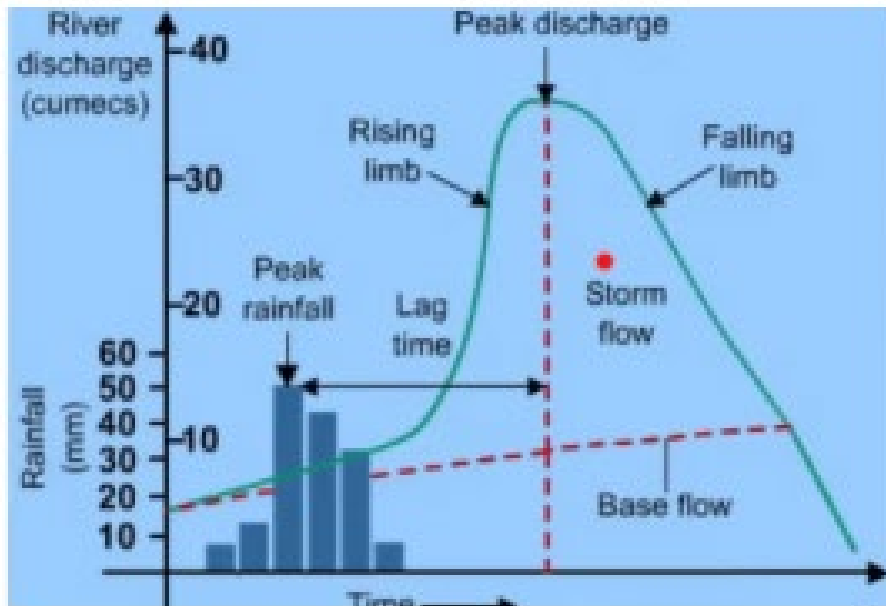
Quartz Creek: RDCK monitoring station output from the compound weir and pressure transducer. Flow is reported as Quartz Creek Corrected Flow (L/s) (FT-03) and stage as LT-02 level (mm). Quartz Creek records are predominantly at a 10-minute interval, with a small number of irregular intervals and a small number of duplicate timestamps that require routine QA/QC screening.

Quartz Creek – 2025 Hydrologic Summary

This section summarizes observed flow conditions in Quartz Creek for the 2025 monitoring year, based on daily mean discharge derived from the compound weir stage–discharge relationship. The discussion below describes seasonal patterns, event response characteristics, and low-flow metrics

relevant to watershed condition and water supply. The following section provides available Quartz Creek flows for the year 2025.

The rising limb of a hydrograph, also known as the concentration curve, represents the rapid increase in river discharge following a rainfall event.



Seasonal Flow Patterns

The following section provides information regarding monthly mean flow, daily mean flow and 7-day low flows for both the summer and winter.

Quartz Creek exhibited a pronounced seasonal hydrologic signal in 2025, consistent with a snowmelt-dominated interior British Columbia watershed with limited summer baseflow contribution.

Flows increased through early spring, with mean daily discharge rising from 268 L/s in March to approximately 510–513 L/s in April and May. These elevated spring values reflect freshet conditions and rainfall contributions during the late snowmelt period.

Following freshet, discharge declined sharply. Mean daily flow decreased to approximately 99 L/s in June and continued to recede through July (30 L/s) and August (19 L/s), reaching late-season minimum conditions in September (12 L/s) and October (14 L/s).

Flows began recovering in November (89 L/s), with a substantial increase in December (314 L/s) associated with late-fall and early-winter precipitation events. January 2026 flows remained elevated relative to late summer conditions, averaging 168 L/s.

Overall, the hydrograph demonstrates:

- A distinct spring freshet peak,
- A rapid post-freshet recession,
- Prolonged late-summer baseflow depletion,
- Fall/winter rainfall-driven event response.

Event Response and Rising Limb Characteristics

The rising limb of the hydrograph, representing the rapid increase in discharge following precipitation or rain-on-snow events, was evaluated using day-to-day increases in daily mean flow (ΔQ between consecutive days).

The five largest daily rises in 2025 occurred during December and spring runoff:

- 17 December 2025: +832 L/s/day
- 11 December 2025: +272 L/s/day
- 3 May 2025: +248 L/s/day
- 8 April 2025: +242 L/s/day
- 15 December 2025: +190 L/s/day

The December events reflect pronounced rainfall or rain-on-snow response under antecedent wet conditions. The May and April increases correspond with freshet-period snowmelt and transitional precipitation events.

The magnitude of the December 17 rise indicates a highly responsive watershed condition, likely influenced by saturated soils and limited storage capacity at that time of year. It should be noted that peak flows during this event are constrained by the upper measurement limit of the weir equation; therefore, the recorded peak should be interpreted as a minimum estimate of actual discharge.

Annual Maximum and Minimum Daily Mean Flows

Within this reporting period:

- **Maximum daily mean flow:**
17 December 2025 — 1,378.98 L/s

This value represents the highest daily mean discharge recorded during the year. However, because flows exceeded the calibrated range of the weir equation, this figure underestimates the true peak daily mean.

- **Minimum daily mean flow:**
10 October 2025 — 9.34 L/s

This value reflects late-season baseflow minimum conditions and provides an appropriate annual benchmark for evaluating inter-annual low-flow variability and long-term hydrologic trends.

Seven-day low-flow statistics (7-day moving mean of daily means)

Summer low-flow window (July–September)

7-day minimum flow:

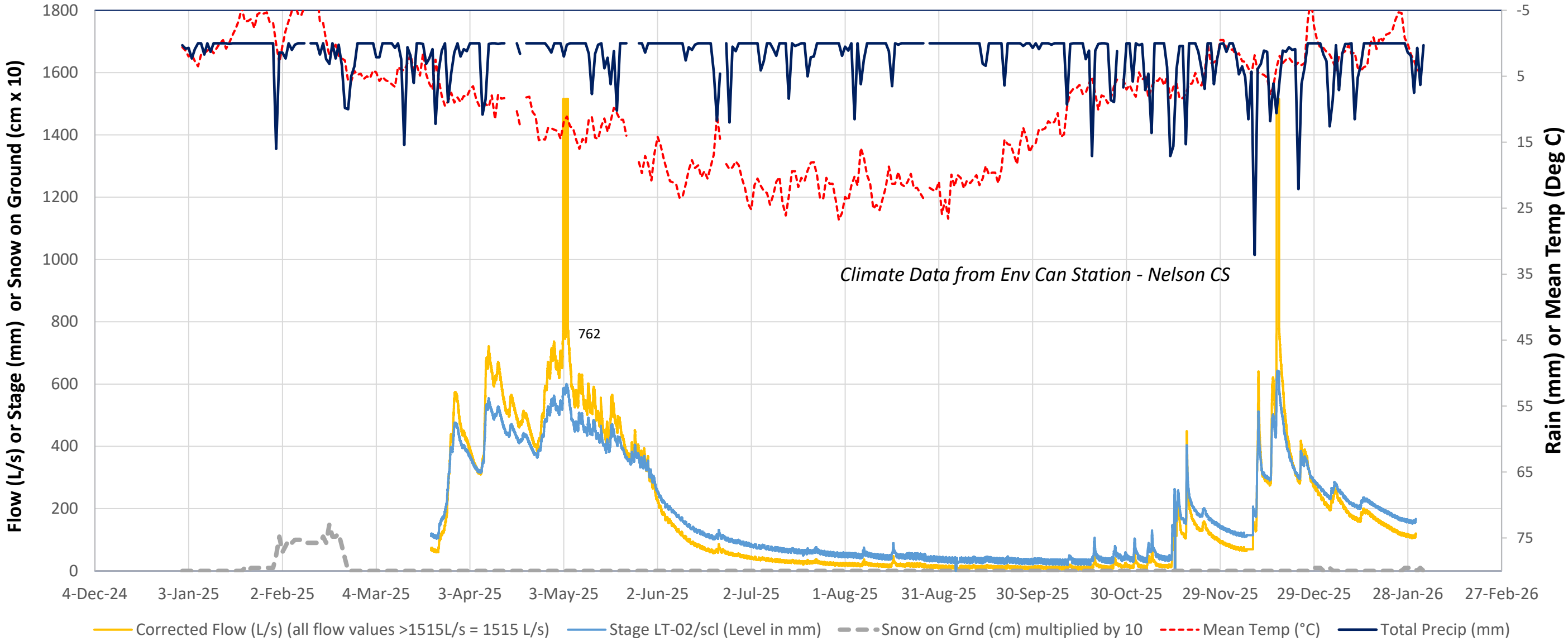
10.86 L/s

Late-season / early fall window (September–October)

7-day minimum flow:

10.05 L/s

Quartz Creek Flows



Quartz Creek Water Quality Monitoring

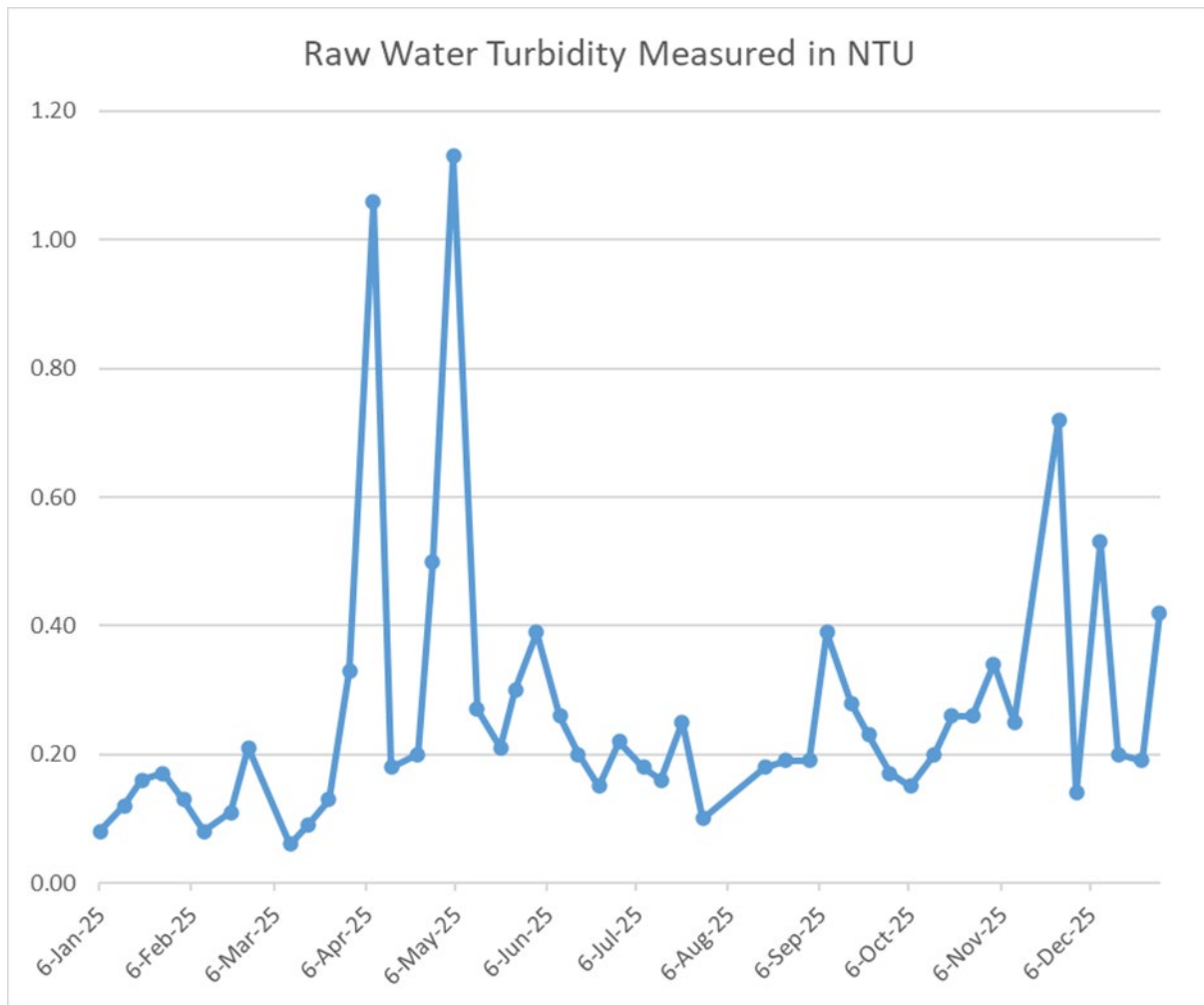
The Regional District is monitoring the following water quality parameters in association with the Quartz Creek Flow and Water Quality Monitoring initiative.

Water Quality Monitoring Parameter	Description	Desired Frequency
Raw Water Turbidity	Online turbidity meter	15 minutes
pH	Manual testing	When Technician on Site
Treated Water Bacteriological	Total Coliforms, E.coli & Fecal Coliform	Weekly
Raw Water Bacteriological	Total Coliforms, E.coli & Fecal Coliform	Bi-weekly
Raw Water Full Comprehensive	Chemical and physical parameters based on Guidelines for Canadian Drinking Water Quality	Quarterly
Treated Water THM & HAA	Trihalomethanes (THMs) and haloacetic acids (HAAs)	Quarterly

Quartz Creek Raw Water Turbidity

Turbidity is a measure of the cloudiness of water and it is reported in a unit called Nephelometric Turbidity Units (NTU). NTUs measure water clarity by gauging how suspended particles scatter light, acting as a primary indicator of water quality. Raw water turbidity is monitored online in the treatment plant.

Raw water turbidity is presented in the graph below. The maximum daily average turbidity for the reporting period was 1.13 NTU recorded on May 5, 2025 when creek flows were at their highest.



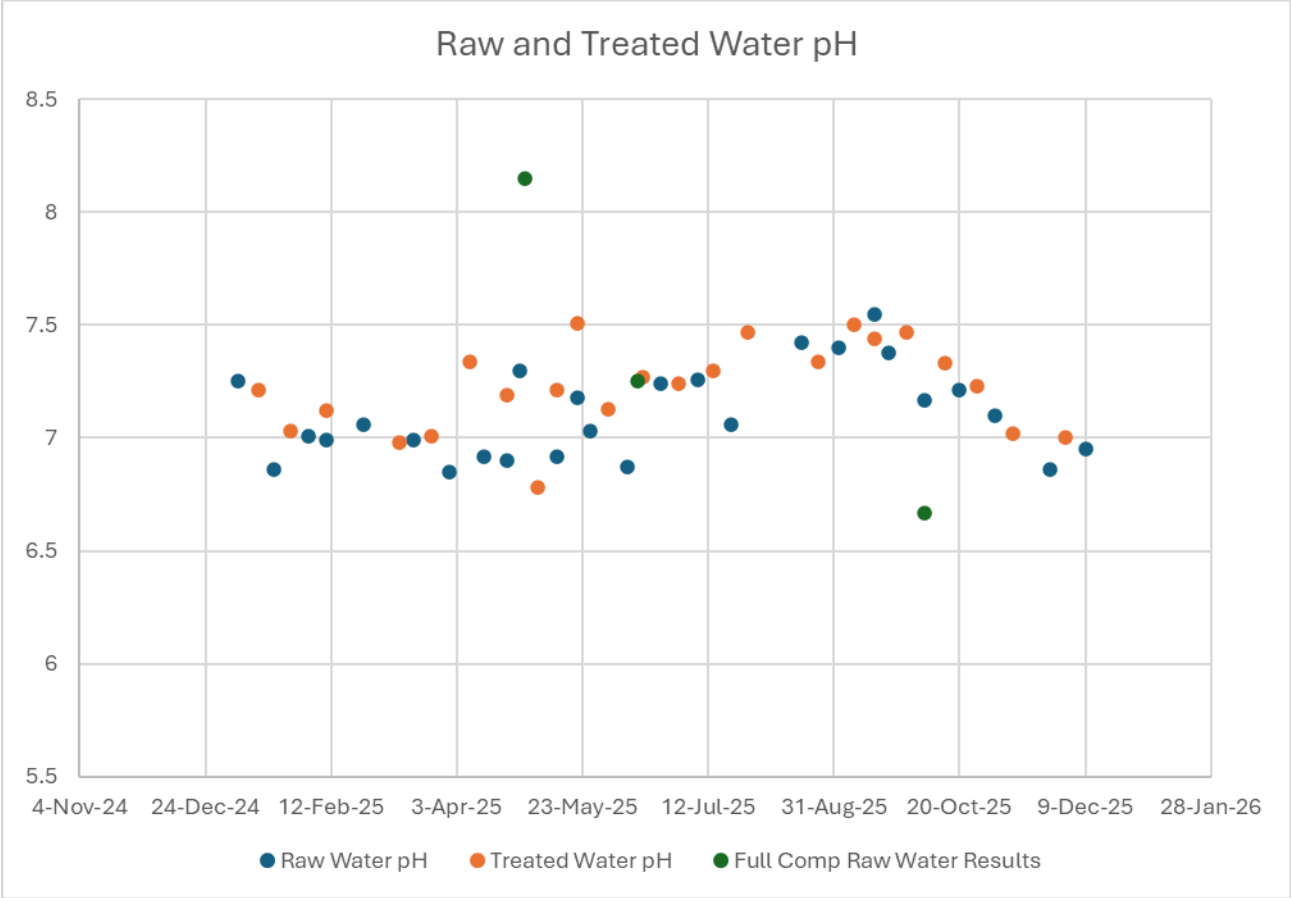
Quartz Creek pH

Health Canada Drinking Water Quality Guidelines identifies a pH range of 7.0 to 10.5 as acceptable for finished (treated) drinking water.

Raw and treated water pH was hand measured when water technicians were onsite at the Ymir water treatment plant.

Full comprehensive water quality testing takes place on a quarterly basis. There are 3 test results for pH that are also included in this report. pH varied from 6.67 to 8.15 over the 2025 monitoring period.

All results are shown in the table below.



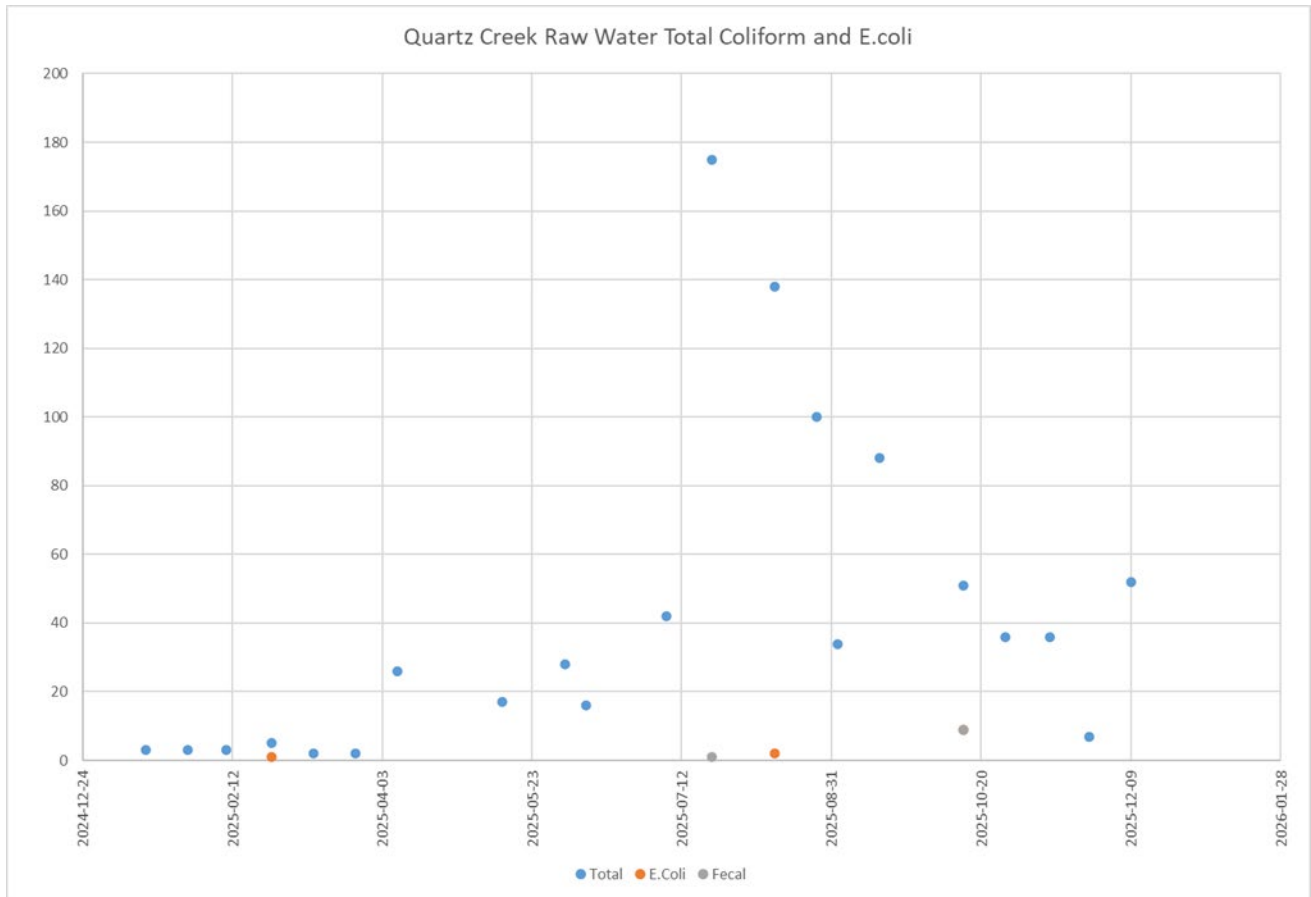
Treated Water Bacteriological

A treated water sample is taken weekly for Total Coliforms, and E.coli bacteria testing. Testing is provided by the BC Centre for Disease Control through Interior Health. Only adverse sample results are reported to the Regional District. No adverse treated water sample results occurred during the monitoring period.

Raw Water Bacteriological

A raw water sample is taken bi-weekly for Total Coliforms, E.coli and Fecal Coliform bacteria testing. Testing is conducted by Passmore Laboratory Ltd.

The following chart provides the Quartz Creek Total Coliform, Fecal Coliform and E.coli sample test results for 2025.



Raw Water Full Comprehensive

Raw Water Full Comprehensive test results are summarized in the following table.

Sample Date	Comments
2025-04-29	Test results within Canadian Drinking Water Guidelines
2025-05-06	Test results within Canadian Drinking Water Guidelines
2025-06-10	Test results within Canadian Drinking Water Guidelines
2025-10-02	Test results within Canadian Drinking Water Guidelines

Treated Water THM & HAA

Some studies have identified a potential link between disinfection byproducts, primarily trihalomethanes (THMs) and haloacetic acids (HAAs) and certain forms of cancer. Disinfection byproducts can be formed when chlorine reacts with source water that has higher levels of organic material.

Guidelines for Canadian Drinking Water Quality: Guideline Technical Document – Trihalomethanes, April 2009 addendum, identifies the maximum acceptable concentration (MAC) for trihalomethanes (THMs) in drinking water as 0.100 mg/L (100 µg/L) based on a locational running annual average of a minimum of quarterly samples taken at the point in the distribution system with the highest potential THM levels. The maximum acceptable concentration (MAC) for bromodichloromethane (BDCM) in drinking water is 0.016 mg/L (16 µg/L) monitored at the point in the distribution system with the highest potential THM levels.

Guidelines for Canadian Drinking Water Quality: Guideline Technical Document – Haloacetic Acids, 2008 identifies the maximum acceptable concentration (MAC) for total haloacetic acids in drinking water at 0.08 mg/L (80 µg/L) based on a locational running annual average of a minimum of quarterly samples taken in the distribution system.

Sample test results for the monitoring period are summarized in the following table.

Sample Date	Total Trihalomethanes (mg/L)	Bromodichloromethane (mg/L)	Total Haloacetic Acids (mg/L)
2024-06-04	0.0392	<0.0010	0.0284
2024-09-05	0.0212	<0.0010	0.0197
2025-09-22	0.0154	<0.0010	0.0191