

MONITORING DATA SNAPSHOT REVEALS RISKS TO LOW-ELEVATION WATER SOURCES

Summary: If you're a community that relies on snowpack melt for your summer water supply, it helps to live near lofty peaks.

The exceptionally warm 2025–26 winter brought rain instead of snow to many mid- and low-elevation areas. Some higher elevation areas in the East Kootenay retained more snowpack, and streams that drained from those areas maintained steadier summer flows.

The West Kootenay experienced winter melt, earlier low flows, and relied on rainfall starting in mid-August to avoid severe drought in its mid- and low-elevation watersheds.

The data highlights how climate change is making water supplies increasingly unreliable when they originate predominantly in lower-elevation areas. Location-specific monitoring is essential as warm, wet winters with less snow are severely decreasing water reliability.

In a more unpredictable and extreme climate, the hidden value of living near higher-elevation peaks may be a more secure water supply, according to preliminary trends emerging from monitoring data from Living Lakes Canada's Columbia Basin Water Monitoring Framework.

The story in this year's stream monitoring numbers from the East and West Kootenays also underscores why it's important to measure water flow in many different locations — even within the same region.



Living Lakes Canada collecting snowpack measurements at sub-alpine elevations in the West Kootenay. Photos by Paul Saso

ELEVATION TEMPERERS CLIMATE WARMING IMPACTS ON SNOWPACK

One big difference between these two subregions is that mountains in the East Kootenay are generally higher elevation than in the West Kootenay. That matters a great deal when you get a winter like the one we had, with temperatures well above average. Higher mountains retain snowpack better than at lower elevations. If streams draw more from higher-elevation areas than mid- to low-elevation areas, they are more likely to have a steadier supply of meltwater during summer months.

“The 2025-26 winter was exceptionally warm in the West Kootenay, with Nelson temperatures regularly in the top 10 per cent of records going back to 1904, and at low and middle elevations much of the winter's precipitation fell as rain,” said Rory Gallagher, a hydrologist and owner of Kootenay Environmental Innovations, who conducts monitoring for Living Lakes.

EARLY SNOW MELT PUSHES FLOW DECLINES AHEAD BY A MONTH

Early this year, West Kootenay creeks showed the impact of the warmer winter, with Living Lake's streamflow monitoring stations capturing this trend in watersheds such as Beaver Creek, near Fruitvale, B.C. Beaver Creek ran nearly three times higher through the winter than the year before. Snow that should have been banked for spring freshet was melting and running off in January.

The Province's Snow Survey and Water Supply Bulletin from April of this year used the West Kootenay region as an example of areas that had much lower snowpack than usual, despite some areas displaying normal conditions, describing how some lower-elevation watersheds "displayed well-below normal snowpack conditions (WLRS, 2026).

FRESHET:

An annual seasonal surge in stream water levels. In mountain regions, this is mostly caused by melting winter snow and ice, typically occurring between April and July.



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"Water that leaves in January is just not there during June, July and August," said Gallagher, relating back to Living Lakes' data. "Beaver Creek's spring freshet peak came early, and at about a third the size of that in 2025, and the creek reached its summer lows a month ahead of last year," as seen in Figure 1. Simply put, if more water leaves the system over the winter, there will be less in the spring and summer.

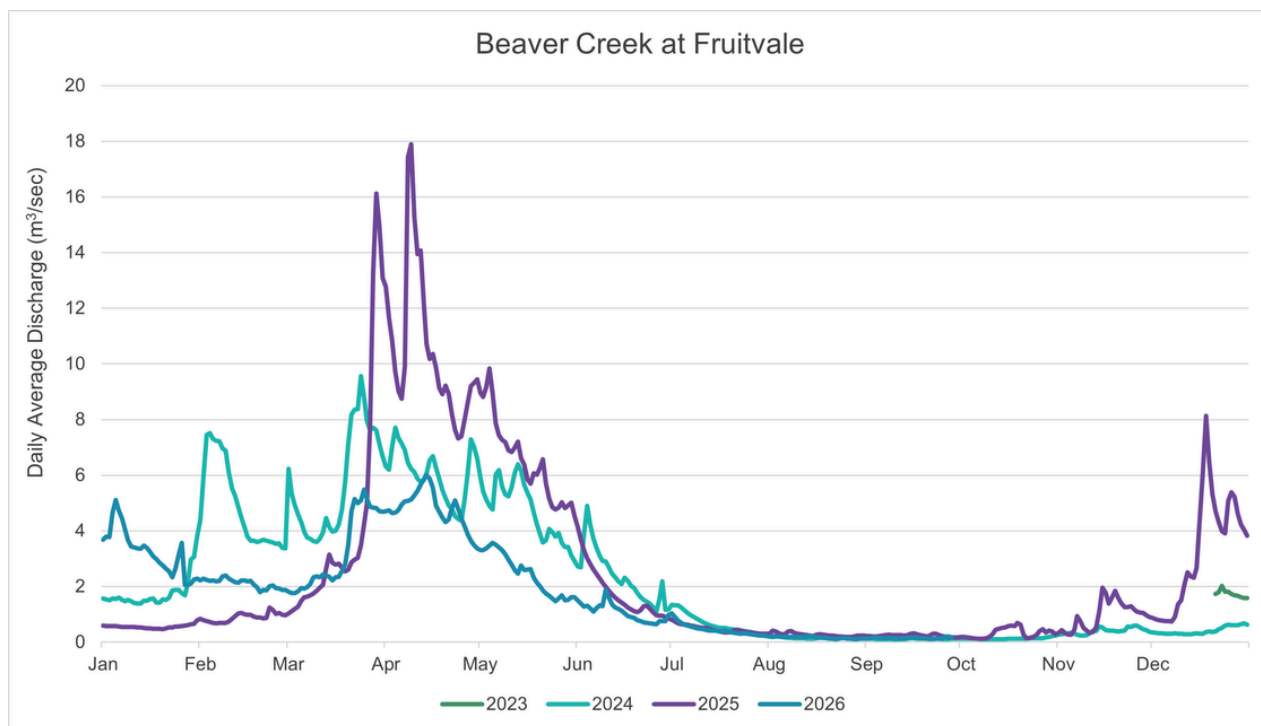


Figure 1. Beaver Creek discharge (volumetric flow rate)* at the hydrometric station near Fruitvale, BC. The 2026 spring freshet peak was lower than the flows in December and January. Flows from April to July were lower than in the previous two years because in the mid- to low-elevations, winter precipitation either fell as rain instead of snow, or melted much earlier.

*Based on preliminary hydrological data

The Province further explains in that same April Snow Survey Bulletin that these lower-elevation snow deficits aren't necessarily reflected in the overall snow condition reports, as they are "masked by the input of higher elevation snow sites" (WLRS, 2026). It is very difficult to make up for a deficit in snow accumulation in mid- to low-elevation areas with spring and summer precipitation. For example, the Water Survey of Canada station at Mather Creek (a mid-elevation watershed located north of Kimberley, B.C.) was flowing at very low (10th percentile) conditions in late summer.

HIGHER ELEVATIONS IN THE EAST KOOTENAY FARED BETTER WITH MORE SNOWPACK

Parts of the East Kootenay region were spared the worst impacts of drought in summer 2026, especially compared to parts of the Okanagan and Boundary regions of B.C. Most larger rivers in the East Kootenay were flowing at normal levels this past spring and summer, especially those which receive significant inputs from high elevation areas.

Rivers in this region were bolstered by normal winter snow accumulations at higher elevations, as well as a rainy, cool spring, said Ashlee Jollymore, with MacDonald Hydrology Consultants Ltd.

Flows measured at Shepp Creek (Figure 2) show an example of higher-elevation watersheds that can produce flows even through warmer winters, as they are still able to maintain the snowpack well into the drought season. These trend lines are very different from what we saw in the West Kootenay region at stations like Beaver Creek (Figure 1).

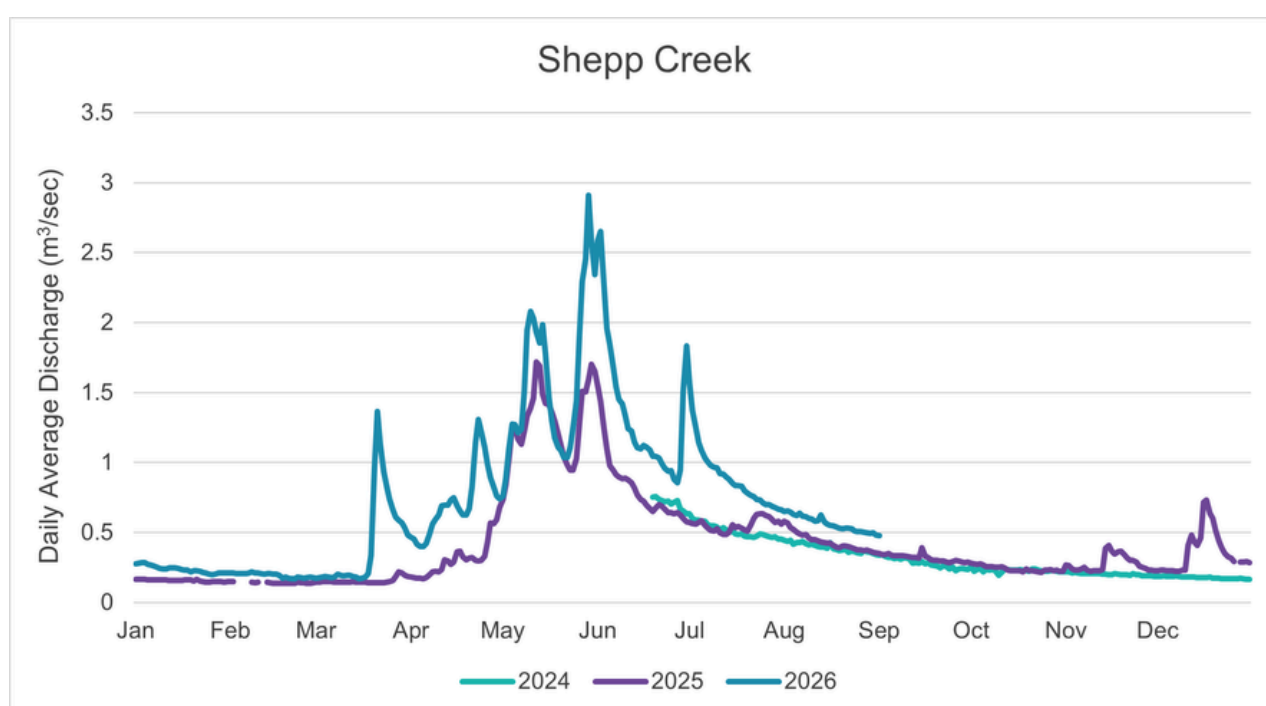


Figure 2. Shepp Creek discharge (volumetric flow rate)* at the hydrometric station in the East Kootenay. 2026 flows showed a much earlier peak freshet in mid-March to early April and continued flows above 2025 levels driven by the melt of snow from the near normal high-elevation snowpack that accumulated over the 2025-26 winter, as well as a relatively wet and cool spring.

*Based on preliminary hydrological data

“Winter snow is still important for flows even into the late summer and fall; it's hard to make up the deficit if we don't get a normal winter snowpack,” Jollymore said, as demonstrated in creeks where more of the watershed comprises mid- and low-elevations.

WEST KOOTENAY SAVED – THIS YEAR – BY SUMMER RAIN

The early and low-flow freshet in the West Kootenay led to concerns of a severe drought through the summer of 2026, but it never reached the severity pointed to by the foreboding spring conditions. That's largely because of periodic rain falling on five different days in August, in addition to mid- and early-July precipitation.

“In short, we went into the 2026 summer with very concerning low-flow conditions, and then got lucky. We should not rely on that happening every year.”
- Rory Gallagher, hydrologist and owner of Kootenay Environmental Innovations”

Last winter's warmth came during a weak La Niña effect, which normally makes British Columbia's winters cooler and snowier, Gallagher explained. The upcoming winter is a very strong El Niño, established in the Pacific since June and forecast by both the National Oceanic and Atmospheric Administration and the World Meteorological Organization to peak at near-record strength around the turn of the year. El Niño winters here are typically warmer with less snow, which will likely lead to another wet winter with a large proportion of precipitation falling as rain, rather than snow.

A repeat of high creek flows in December and January would be a concern. That could be most of next spring and summer's water supply leaving the landscape early. Without well-timed rain events to bail us out like it did this year, we might anticipate low flows far worse than the summer flows that we experienced this year.

CHANGING CLIMATE MEANS LOWER ELEVATIONS ARE LESS EFFECTIVE AS “WATER TOWERS”

Mountainous, high-elevation watersheds are often referred to as “water towers” because they store snow and ice from the winter and then slowly release it as meltwater during spring and summer. But with warmer winters, the lower alpine and subalpine areas are no longer cold enough to establish or maintain the snowpack. Often, the precipitation falls directly as rain and runs off right away.

This hydrological drought can vary considerably in an area, with the elevation of a mountainous stream’s catchment area playing a key role, especially during warmer winters.

This becomes particularly concerning when communities, like many in the West Kootenay, depend on mid- to low-elevation water sources for their domestic water supply through the summer. Their once reliable “water towers” are essentially non-functional when the snowpack fails to accumulate during winters that are too warm.

COMMUNITIES RELY ON MONITORING TO WARN THEM OF DROUGHT CONCERNS

The overall lesson from this year’s data is that there is a need to keep a closer eye on what warmer winters are doing to our water supplies. Local water monitoring is essential to understand how diverse hydrological patterns are affected by various climatic, geological, and topographical conditions. The results can be very different, even within the subregions (East Kootenay and West Kootenay), depending on where you are in each region, at what elevation, and even the direction a slope faces.

East Kootenay water sources at higher elevations were less impacted by the warmer winter than many lower-elevation places (such as those in the West Kootenay). Both regions, however, fared much better than the Okanagan and Boundary regions.

Many watersheds in the Okanagan and Boundary regions are relatively low-elevation, and experienced historically severe drought conditions in summer 2026. This was predicted in the spring, as parts of the Okanagan and Boundary regions had their lowest snowpacks in almost 50 years (WLRS, 2026). To fully understand these different water responses to the variable and unpredictable climate, tracking diverse stream conditions across the Columbia Basin through continuous monitoring is vital. This essential water monitoring gives communities the data they need to make informed decisions and plans to deal with water availability through the seasons.



Measuring water discharge through the cross-section method using a Sontek Flowtracker at Beaver Creek near Fruitvale, B.C.

[Read more](#) about local landscape factors that influence water retention in the Columbia Basin.

Looking ahead, there are key questions we need to answer to help plan for ecological and community needs. How long can the high-elevation snow hold out in the face of climate change? How will that change over time? And what will that mean for streams that drain both mid- and high-elevation watersheds? We also need to understand how the gradual shift from snow to rainfall will impact groundwater and groundwater contributions to streams across different watershed conditions. Monitoring is crucial because it helps us understand all of these dynamics and how they impact water supplies over time.

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