MEMO

DATE: September 22, 2023

TO: Mid-Columbia Kootenay Local Reference Group

FROM: Living Lakes Canada

SUBJECT: CBWMF Pilot Year Data Summary for Mid-Columbia Kootenay Hydrologic Region

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Living Lakes Canada acknowledges that the Columbia Basin Water Monitoring Framework project referenced in this Memo is taking place in the unceded traditional territories of the Ktunaxa, Lheidli T'enneh, Secwepemc, Sinixt and Syilx Nations who have stewarded these lands for generations. Recognizing Indigenous People as the rightful caretakers of their unceded territories, we work to complement their intergenerational work and Indigenous-led water stewardship initiatives.

Living Lakes Canada is completing its first year of data collection through the Columbia Basin Water Monitoring Framework (CBWMF) project. As part of the project's pilot year, water quantity, water quality, and climate were monitored in three sub-regions of the Canadian Columbia River Basin: the Mid-Columbia Kootenay (MCK), Columbia-Kootenay Headwaters (CKH), and Elk River Valley (ERV). The importance of this monitoring in understanding the state of freshwater in the Columbia Basin cannot be overstated — 2023 has been an unprecedented year with regard to snowfall, rainfall, drought, and wildfires. The following summary of surface water and climate conditions is based on the hydrometric and climate data that were collected in the MCK region. A full report will be released early 2024.

Across the MCK region, lower-than-average snowpack was followed by above-average spring and summer air temperatures, contributing to a very early melt of the snowpack and snow-free conditions one month earlier than is typically recorded. This early onset of spring snowmelt is what is expected under climate change and provides important context for future conditions. Climate monitoring at the Kokanee Glacier site (conducted by Alpine Club of Canada) found that the high air temperatures in April resulted in an early spring melt. These conditions are similar to what was observed throughout British Columbia.

Seasonal streamflow patterns show the effects of sustained high air temperatures, much earlier than normal snowmelt, and lower than normal precipitation during the spring. An exceptionally early melt was recorded by our hydrometric stations on MacDonald, Caribou, Silverton, Upper Wilson and Fitzstubbs Creeks. The data show that the above seasonal air temperatures at the end of April triggered snow melt resulting in streamflows and water levels peaking in mid-May, one month ahead of typical freshet events. During this time, all creeks in the CBWMF showed a strong diurnal pattern, demonstrating that streamflow was driven by run-off from snowmelt, which reaches a maximum during mid-day when unseasonal air temperatures and solar radiation were highest. Since this time,

exceptionally hot and dry weather during the summer have spurred continued declines in historically low levels for many streams through the MCK.

This early melt combined with a hotter and drier than normal summer has had a significant impact on glacial-dominated systems such as Upper Glacier Creek. After several days of maximum daily air temperatures above 30°C, we observed increasing flows in the creek driven by the melting of high elevation snow and glacier ice. Streamflow patterns observed on Glacier Creek to date indicate that it is being fed by glacial melt. Continued monitoring of Upper Glacier Creek will allow us to track the changing input to water systems from glacially-fed streams as glaciers continue to recede. Data obtained from Glacier Creek will help to inform our understanding of how fast glaciers are melting in the Columbia River Basin and the impact on streamflow; this information can then enable modeling of nearby basins that contain glaciers, many of which are important water sources for local residents.

The unseasonably high spring air temperatures and corresponding streamflow patterns also impacted lake levels across the region. According to The International Kootenay Lake Board of Control, high air temperatures in early spring caused water levels in Kootenay Lake to peak on May 18, 2023, one month earlier than historically reported. The Arrow Lake Reservoir has experienced lower than average inflows from tributary streams, contributing to a significant decline in water levels (Arrow Lake conditions). The CBWMF program is monitoring tributaries to both of these systems.

With continued monitoring, data collected by the CBWMF will be instrumental in supporting local climate adaptation and freshwater stewardship in the MCK region.

The CBWMF project is intended to expand upon the valuable monitoring and stewardship work carried out by local stewardship groups, First Nations, provincial agencies, municipal and regional governments, and the private sector to fill important data gaps across the region's complex landscapes. These include:

- Arrow Lakes Environmental Stewardship Society
- Alpine Club of Canada
- Central Kootenay Invasive Species Society
- Slocan Lake Stewardship Society
- Slocan River Streamkeepers Society
- Valhalla Mountain Touring
- Village of Silverton

Water data for the MCK are shared on the Columbia Basin Water Hub by many of these groups and can be found here. Preliminary MCK data from the CBWMF project is available here.

Living Lakes Canada continues to welcome community feedback and collaboration on the CBWMF project, and encourages the sharing of water data through the Columbia Basin Water Hub database.

If you have any questions, please contact: Paige Thurston, CBWMF Program Manager, at paige@livinglakescanada.ca.

To learn more about the CBWMF, visit www.livinglakescanada.ca/cbwmf.