December 18, 2025

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Re: 2024 Elk River Alliance Hydrometric Data Review

Background

Elk River Alliance (ERA) has been conducting hydrometric monitoring in the Elk River watershed in southeastern British Columbia to support monitoring efforts with Living Lakes Canada's (LLC) Columbia Basin Water Monitoring Framework (CBWMF) program.

MacDonald Hydrology Consultants Ltd. (MacHydro) was tasked with helping to support the ERA in reviewing field data, processed stage-discharge data, and providing recommendations for data quality improvements. This memo summarises the review provided by MacHydro for hydrometric data collected until the end of 2024.

Data Provided

ERA collects and processes hydrometric data at five streams within the Elk Valley – Alexander Creek (ALX004), Coal Creek (COL006), Forsyth Creek (FOR001), Lizard Creek (LIZ001), and Morrissey Creek (MOR001). As per all data collected within the CBWMF program, hydrometric data is processed in Aquarius Time-Series application (Aquatic Informatics Ltd.).

As part of data review, the ERA provided continuous water level and water temperature records for each site. This data had undergone initial checks and processing including corrections for site visit offsets, flagging of suspected data quality concerns, and removal of clearly erroneous data such as non-realistic water level or water temperature values. Manual stage-discharge measurements collected at each site were processed to create a log-linear stage-discharge relationship used to convert continuous stage measurements to continuous discharge/flow. The ERA also provided context regarding data collection and analysis protocols applied.

Summary of Work Completed

ERA's Hydrometric Data Collection Standards of Practice, Fieldwork Protocols, Hydrometric Review Standards of Practice, and Hydrometric Data Sheets were reviewed and found to align with partner protocols and the Manual of British Columbia Hydrometric Standards (RISC, 2018). An initial review of all continuous stage, continuous temperature, and stage-discharge data was performed by Spencer Spannier to the hydrometric operator level from March 12-13, 2025. A final review was completed by Ashlee Jollymore to the hydrometric reviewer level on April 2, 2025.

Continuous stage and temperature datasets were compared against reference Water Survey of Canda Hydrometric Gauges and nearby Climate Stations to assess erroneous data events against similarly timed events in nearby reference streams and precipitation events in the region. Water Survey of Canada Gauges 08NK002 (Elk River at Fernie) and 08NK018 (Fording River at Mouth) were used as reference streamflow. The Co-operative Climate Network meteorological station at Fernie (Climate ID 1152850) and LLC Galton Climate Station (UKKGAL01C) were used as reference air temperature and

precipitation. All concerns with stage, discharge, and stage-discharge datasets were compiled into an Excel spreadsheet documenting data quality concerns and recommendations for improvements to current in-review data and recommendations for future data collection.

Data Review Recommendations and 2025 Outcomes

The main comments from review of continuous stage datasets were to investigate suspected erroneous stage events identified from comparison to reference sites and how to handle ice-effected stage data. Water temperature data was consistently high quality throughout the review period and recommendations were to remove identified erroneous temperature events and add missing temperature data to COL006. Across all sites, the main concern for data quality was extension of stage-discharge relationships above the largest manually measured stage-discharge pairs. Recommendations for rating extensions from the Water Survey of Canada Hydrometric Manual are to not exceed twice the highest valid measurements and only if control geometry and channel roughness remain consistent over the extension range (2016). At all sites, the yearly highs from continuous stage measurements during freshet and short-term peaking events resulted in derived discharge above twice the largest valid manual measurements. Although data grading was not completed at this time, under BC RISC standards, any derived discharge from stage extrapolated above the largest valid manually measured stage is considered as E-Estimated where in many cases an A or B rating is achievable (RISC, 2018). It was thereby recommended to increase site visits frequency during high flow periods and implement various discharge measurement methods to achieve high quality data collection across the entire range of flows.

After initial data review, ERA addressed all 2024 data quality concerns with the continuous stage and temperature datasets. Derived discharge datasets were limited to only provide discharge within the range of ½ of the lowest valid discharge measurements and twice the highest valid discharge measurement. Throughout the 2025 monitoring season, field visits were targeted to fill in gaps of stage-discharge relationships and limit extensions to within recommended ranges wherever possible. The use of an Acoustic Doppler Current Profiler (ADCP) was helpful to achieve these goals by measuring flow data at levels that were previously not possible using the mid-section area-velocity flow measurement method.

Data Rating

At this time no data rating was applied to data, reflecting that such a data grading protocol is not a part of CBWMF data analysis. This review should be considered a step towards such data grading when and if this becomes a part of the CBWMF protocol.

Closure and Next Steps

The next step for ERA Hydrometric data is to release all 2024 data to the Columbia Basin Waterhub. The 2025 hydrometric data should undergo initial checks followed by review by MacHydro prior to release. Ideally, data review should be completed before the start of the 2026 field season to provide time to plan a continued targeted approach for filling in data gaps and improving the established stage-discharge relationship (i.e., use data review to provide feedback for continuous improvement to data collection, review, and

If you have any questions, please do not hesitate to contact us.

Sincerely,

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References

Environment and Climate Change Canada (2016), Hydrometric Manual-Data Computation, Stage-Discharge Model Development and Maintenance. Water Survey of Canada, Environment and Climate Change Canada, Ottawa, Ont. qSOP-NA049-01-2016

Resources Information Standards Committee (RISC). 2018. Manual of British Columbia Hydrometric Standards, Version 2.0, December 2018. Knowledge Management Branch, B.C. Ministry of Environment and Climate Change Strategy, Victoria, B.C.