Aquifer Name: Creston-Kootenay River Overburden Aquifer

Aquifer Number: 0487

Date of Mapping: March 8, 2024

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A. AQUIFER DESCRIPTION FOR AQUIFER 0487

A.1 CONCEPTUAL UNDERSTANDING OF HYDROSTRATIGRAPHY

A.1.1 AQUIFER EXTENTS

Aquifer 0487 is in the floodplains of the Kootenay Valley in the vicinity of Creston, British Columbia (see Figure 1; Lengyel et al. 2024). The aquifer is along the Kootenay and Goat rivers. Its southern extent is delineated by the U.S. Border (and is thus likely to be continuous further south). The western and eastern boundaries of the aquifer were delineated based on change in slope (600-m topographic elevation contour). The northern boundary of the aquifer is the Kootenay Lake. The extent of the aquifer is uncertain in the south. Aquifer 0487 is separated from aquifer 0984 to the east by inferred bedrock outcrops separating the overburden aquifer systems.

A.1.2 GEOLOGIC FORMATION (OVERLYING MATERIALS)

Fulton et al. (1984) described the area of the aquifer to be overlain by fine grained sand and silt overbank sediments, generally overlying coarser grained sediments along the Kootenay River floodplain. Based on borehole logs, where the coarse-grained material (e.g., sand, gravel) is not on the surface, a variation of clay, sandy clay, silty clay, till, and/or cobbles may overlie the aquifer with variable thickness.

A.1.3 GEOLOGIC FORMATION (AQUIFER) – SUBTYPE: 4A – UNCONFINED ALLUVIAL

The aquifer is generally unconfined. Borehole logs indicate that the aquifer consists predominantly of alluvial sands and gravels.

A.1.4 VULNERABILITY – HIGH

The depth to groundwater varies from shallow to moderately deep, with an average depth to water of 6.7 m. While the permeability of the aquifer has not been tested, it is expected to be high based on the type of aquifer material (sand and gravel). A confining layer with variable thickness consisting generally of silt, clay, sandy clay, till may be locally present. The overall vulnerability of the aquifer has been qualitatively assessed as high.

A.2 CONCEPTUAL UNDERSTANDING OF FLOW DYNAMICS

A.2.1 GROUNDWATER LEVELS AND FLOW DIRECTION

Static water levels recorded in the provincial groundwater wells database (GWELLS) range from shallow (0.3 m) to moderately deep (54.3 m)[1]. Four artesian wells were reported within the aquifer extents. There are six observation wells within the aquifer extents.

The groundwater surface is interpreted to be a subdued representation of the topography based on regional interpolation of groundwater surface elevations (i.e., from locations of high head to locations of low head). Groundwater is interpreted to flow primarily towards the Kootenay River from both the east and west. On the east side of the Kootenay River, localized flow is interpreted toward Goat River from the north and south.

A.2.2 RECHARGE

Recharge to the aquifer could occur via distributed infiltration of precipitation and snowmelt. Much of the recharge is expected to occur in the spring associated with snowmelt. The aquifer may also be recharged by the overlying Kootenay River and its tributaries, as well as deep groundwater flow associated with mountain block recharge in adjacent mountain ranges via the underlying bedrock aquifers (0488 and 1280). However, spatial and temporal understanding of the recharge mechanisms is uncertain and further investigation is required to confirm hydraulic connections.

A.2.3 POTENTIAL FOR HYDRAULIC CONNECTION

Groundwater is inferred to be hydraulically connected to the Kootenay and Goat rivers. The aquifer may be connected to the underlying bedrock aquifers (0488 and 1280). Aquifer 0487 may also be laterally connected to Aquifer 0489.

A.3 WATER MANAGEMENT

A.3.1 ADDITIONAL INFORMATION ON WATER USE AND MANAGEMENT

Based on the water quality comments in the GWELLS database, one well record noted iron in the water. Well yields for 82 out of 107 wells within the aquifer range between 0.00003 L/s and 84.8 L/s, with a geometric mean of 1.3 L/s, indicating an aquifer with moderate productivity with localized zones of low and high productivity.

The intended use of groundwater, where recorded, was for domestic, commercial, and irrigation purposes based on land use and well records.

A.3.2 ADDITIONAL ASSESSMENTS OR MANAGEMENT ACTIONS

No water availability or water budget studies have been completed in the area.

[1] Groundwater well with the deepest static water level of 139.9 m (Well Tag Number 105605) was not included as it was suspected to be an erroneous measurement.

A.4 AQUIFER REFERENCES

Berardinucci J. and K. Ronneseth, 2002. Guide to Using the BC Aquifer Classification Maps for the Protection and Management of Groundwater. BC Ministry of Water, Land and Air Protection, Water Air and Climate Change Branch, Water Protection Section.

Fulton, R.J., Shetsen, I., and Rutter, N.W., 1984. Surficial geology, Kootenay Lake, British Columbia-Alberta. Geological Survey of Canada, Open File 1084, 1:1,000,000 scale.

Geographic datasets from the BC Data Catalogue, accessed December 2022 https://data.gov.bc.ca/.

Lengyel, T., Verma, S., Deri-Takacs, J., and Hinnell., A. 2024. Aquifer Mapping in the Kootenay/Boundary Region of British Columbia: Creston, Rossland, Castlegar, and Salmo. Water Science Series, WSS2024-05. Prov. B.C., Victoria B.C.

A.5 REVISION HISTORY

Date	Version	Revision Class	Comments	Author
20020128	1	Major	Initial mapping of aquifer	NA
20240308	2	Major	Remapping and consolidation of aquifers	Tibor Lengyel, M.Sc., P.Geo., Simrat Verma, M.Sc., Deri-Takacs, J., Ph.D., and Andrew Hinnell, Ph.D., P.Geo.

Note: Author of first mapping not available