Aquifer Name: Canyon Overburden Aquifer

Aquifer Number: 0489

Date of Mapping: March 8, 2024

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A. AQUIFER DESCRIPTION FOR AQUIFER 0489

A.1 CONCEPTUAL UNDERSTANDING OF HYDROSTRATIGRAPHY

A.1.1 AQUIFER EXTENTS

Aquifer 0489 is located on a terrace along the base of the Mount Thompson Mountain range south of Creston, British Columbia (see Figure 1; Lengyel et al. 2024). The aquifer boundaries are based on change in slope in the west and east and change in slope and surficial mapping of glaciofluvial sand and gravel mapped by Fulton et al. (1984) in the north. Its southern extent is delineated by the U.S. Border (and is thus likely to be continuous further south). The extent of the aquifer is uncertain in the south (where the aquifer may be continuous), west (where it may extend below Kootenay River Floodplain), and north (where no wells indicated its presence north of the Goat River).

A.1.2 GEOLOGIC FORMATION (OVERLYING MATERIALS)

Borehole records indicate that generally there is an average of 20.5 m of a lower conductivity layer of clay, silt, or till overlying the aquifer. Borehole records are inconsistent with surficial mapping (Fulton et al. 1984), which indicates that aquifer 0489 is overlain primarily by fine-grained glaciolacustrine deposits (silt and clay) and sandy loamy till and loamy till.

A.1.3 GEOLOGIC FORMATION (AQUIFER) – SUBTYPE: 4B – CONFINED GLACIOFLUVIAL

Based on borehole records, aquifer 0489 is comprised of medium to coarse sand and gravel. The aquifer is laterally discontinuous and may be encountered at a variable depth. It is expected to be thin or absent in topographically elevated positions along the terrace, which may reflect bedrock knolls.

A.1.4 VULNERABILITY – MODERATE

While the permeability of the aquifer has not been tested, it is expected to be high based on the type of aquifer material (glaciofluvial sand and gravel). Existing well records show that the aquifer is confined by a variable thickness of overburden. Overburden is generally primarily clay, silt, or till but in pockets can also be sand and/or gravel. The depth to water varies from shallow to deep, with an average depth to water of 26.2 m, indicating a moderately shallow water table. The overall vulnerability of the aquifer has been qualitatively assessed as moderate. Vulnerability may be higher where surface water features have eroded the thickness of the confining units (e.g., along Floyd Creek and its tributaries).

A.2 CONCEPTUAL UNDERSTANDING OF FLOW DYNAMICS

A.2.1 GROUNDWATER LEVELS AND FLOW DIRECTION

Static groundwater levels recorded in the provincial groundwater wells database (GWELLS) range from shallow (1.5 m) to deep (80.8 m). There is one provincial observation well within the aquifer extents (OW-509). No artesian wells are 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. Groundwater flow is inferred to be primarily from the east to the west toward the Kootenay River, with a north/northwesterly component toward Goat River.

A.2.2 RECHARGE

Recharge to the aquifer could occur via distributed infiltration of precipitation and snowmelt. However, as the aquifer is covered by a thick package of fine-grained sediments, deep groundwater flow associated with mountain block recharge in adjacent mountain ranges (Mount Thompson Mountain range) via the underlying bedrock aquifer 0488 may also play an important role. In addition, minor tributaries (e.g., Floyd Creek) of the Goat River may recharge this aquifer when water levels are elevated but may receive groundwater from this aquifer during drier periods, when water levels are lower. However, spatial and temporal understanding of the recharge mechanisms is uncertain, and further investigation is required to confirm hydraulic connections. Mountain block recharge from the Mount Thompson Mountain range may also be a source of recharge to the aquifer.

A.2.3 POTENTIAL FOR HYDRAULIC CONNECTION

The aquifer may be connected to the underlying bedrock aquifer (0488) where the intervening sediments are thin and/or permeable. Aquifer 0489 may also be laterally connected to Aquifer 0487.

A.3 WATER MANAGEMENT

A.3.1 ADDITIONAL INFORMATION ON WATER USE AND MANAGEMENT

Reported well yields from 66 of the 73 wells within the aquifer range between 0.12 L/s and 50.5 L/s, with a geometric mean of 1.2 L/s, indicating an aquifer with moderate productivity with localized zones of both low and high productivity. No other water quality or quantity concerns were noted in the well records of the GWELLS database.

The intended use of groundwater, where recorded, was for domestic, commercial, or 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.

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
20020220	1	Major	Initial mapping of aquifer	N/A
20240308	2	Minor	Remapping of aquifer	Tibor Lengyel, M.Sc., P.Geo., Simrat Verma, M.Sc., Judit Deri-Takacs, Ph.D., and Andrew Hinnell, Ph.D., P.Geo.

Note: Author of first mapping not available