Aquifer Name: Salmo River Overburden Aquifer

Aquifer Number: 0496

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A. AQUIFER DESCRIPTION FOR AQUIFER 0496

A.1 CONCEPTUAL UNDERSTANDING OF HYDROSTRATIGRAPHY

A.1.1 AQUIFER EXTENTS

Aquifer 0496 is defined in the valley bottom of the Salmo River and its tributary, Erie Creek (see Figure 1; Lengyel et al. 2024). The aquifer boundary was delineated based on surficial geological mapping of alluvial sediments by Fulton et al. (1984). It is separated from an adjacent aquifer (1284) by an inferred surface water/groundwater divide.

A.1.2 GEOLOGIC FORMATION (OVERLYING MATERIALS)

72 out of 151 well records indicate that the aquifer is overlain by 0.3 to 29.9 m of clay, gravel, hardpan, boulders, silt, till, and loose gravel and rock, with an average thickness of 5.5 m. The other 79 well records indicate that the aquifer is exposed at surface. Surficial mapping (Fulton et al. 1984) indicates that aquifer 0496 is overlain by alluvium (thickness is not defined).

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

Borehole logs and surficial mapping indicate that aquifer 0496 is comprised of glaciofluvial sand and gravel located in the valley bottom.

A.1.4 VULNERABILITY - HIGH

Well records indicate that aquifer 0496 is generally unconfined, however there are areas that are covered by a thin layer of till, hardpan, or clay. Depth to groundwater is shallow to moderately shallow with an average depth to water of 5 m. Due to limited thickness of the overlying deposits and potential permeability, the location, and use of the aquifer, the aquifer has been rated as high vulnerability.

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 (0.9 m) to moderately shallow (27.4 m). There are no artesian 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. Accordingly, groundwater is interpreted to flow primarily towards valley bottoms locally. Groundwater is interpreted to discharge into the Salmo River and its tributaries, which in turn discharges to the Pend-d'Oreille River.

A.2.2 RECHARGE

Recharge to the aquifer is likely from direct infiltration of precipitation and/or surface water features including the Salmo River, Erie Creek, and their tributaries. The aquifer may also be recharged by deep groundwater flow associated with mountain block recharge in adjacent mountain ranges via the underlying bedrock aquifer (0493).

A.2.3 POTENTIAL FOR HYDRAULIC CONNECTION

There is likely hydraulic connection to the Salmo River, Erie Creek, and Erie Lake and their minor tributaries to the wells that are constructed in the respective floodplains. The aquifer may also be connected to the underlying bedrock aquifers (0493).

A.3 WATER MANAGEMENT

A.3.1 ADDITIONAL INFORMATION ON WATER USE AND MANAGEMENT

The Salmo Refuse site is in the Sheep Creek Valley, 7 km south of Salmo. Because Sheep Creek enters Salmo River, it is of special interest to this aquifer and worksheet discussion. A review of the Salmo Refuse site monitoring program was carried out by M. Wei (1988) to review groundwater monitoring results and make recommendations for additional monitoring wells. The results of one year of sampling showed no obvious difference between water quality upstream and downstream of the refuse site and it was concluded that leachate had either not reached Sheep Creek yet from the refuse site or the amount of leachate entering Sheep Creek has been effectively diluted by the creek. Wei (1988) further recommended an expansion of monitoring wells downgradient of the refuse site and in the proposed landfill area to the south, in an effort to provide more information on the severity of contamination to the underlying sand and gravel unit. It is not known from a review of publicly available information in EcoCat if this recommendation was carried out.

In the water quality comments of the GWELLS database, one well record indicated that the water was hard, while one well record indicated the water is soft. Two well records indicated iron in the water. Well yields for 144 out of 151 wells (7 wells excluded due to being dry or no reported well yield) within the aquifer range between 0.06 L/s to 37.8 L/s with a geometric mean of 1.7 L/s, indicating an aquifer with moderate productivity with localized zones of both low and high productivity.

The wells within the aquifer consist of primarily domestic wells, with some irrigation and commercial use wells 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 Management 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.

Wei, M., 1988. Groundwater Monitoring Program at the Salmo Refuse Site. Memorandum prepared by the Water Management Branch, Ministry of Environment and Parks, for Regional Waste Manager, Ministry of Environment and Parks, Region 4, Kootenay District. NTS File: 82F/3 #2.

A.5 REVISION HISTORY

Date	Version	Revision Class	Comments	Author
20020226	1	Major	Initial mapping of aquifers	N/A
20221230	2	Major	Remapping and consolidation of aquifers	Tibor Lengyel, M.Sc., P.Geo., Simrat Verma, M.Sc., and Andrew Hinnell, Ph.D., P.Geo.

Note: Author of first mapping not available