REGIONAL DISTRICT OF NANAIMO

REGIONAL GROUNDWATER LEVEL ANALYSIS: PRE-SUMMER 2025

RECOMMENDATION

That the Board receive the report "Regional Groundwater Level Analysis: Pre-Summer 2025" for information.

BACKGROUND

Groundwater is essential to communities in our region, with most relying on it for their water supply. This includes water service areas operated by the Regional District of Nanaimo (RDN), District of Lantzville, City of Parksville and Town of Qualicum Beach. Four improvement districts also source groundwater for their waterworks systems, including Deep Bay Improvement District, Bowser Waterworks, Qualicum Bay Horne Lake Waterworks and North Cedar Improvement District. Additionally, Snaw-naw-as First Nation and Stz'uminus First Nation operate water supply systems that rely on groundwater from regional aquifers. EPCOR is a private water system that provides groundwater for residents in French Creek. In addition to these serviced water areas, there are over 4,500 registered wells and small water systems servicing residents' homes, businesses, institutions, and agricultural producers across the RDN.

The RDN Drinking Water and Watershed Protection (DWWP) program monitors groundwater levels in aquifers across the region, through the RDN Volunteer Observation Well Network, to understand water availability and assess trends over time. This supplements the monitoring done by the Province via the Provincial Observation Wells within the region. Since 2020, the RDN DWWP program has completed an annual regional analysis of groundwater levels to support water conservation decisions for the summer period ahead and provide an update on longer-term and seasonal trends observed in the aquifers within our region. This reporting has been supported by consulting professional hydrogeologists from Waterline Resources Inc (2020 and 2021) and GW Solutions Inc (2022, 2023, 2024 and 2025).

The historical trend analysis includes 63 wells – 27 RDN Volunteer Observation Wells (VOW) and 36 Provincial Groundwater Observation Network Wells (OW) – which monitor 13 surficial (sand and gravel) aquifers and 8 bedrock aquifers. The historical analysis considers all available data within the range between 2013-2025. The 2025 seasonal analysis includes 46 wells that have current data available at time of reporting. This covers 21 of the region's 22 aquifers that are monitored.

This memo will summarize both the seasonal and longer-term trends of the above-mentioned wells and aquifers and discuss the application of this information. The updated data tables and graphs provided as appendices.

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File No.

SUMMARY

Seasonal Conditions and Longer-Term Trends

Of the 21 aquifers that have 2025 monitoring data for the spring (April – June) season: 2 are at above average levels for this time of year; 12 are at average levels, while 7 are reporting below average levels. This is in the context of a drier than average winter and low snowpack accumulation. The variability across aquifer monitoring locations illustrates the complex nature of groundwater in our region and how different conditions exist in different aquifers. These trends are influenced by the physical attributes of the aquifers (bedrock or sand and gravel; confined or unconfined), the level of demand and pumping, the proximity of monitoring wells to areas of high pumping, the distribution and volume of precipitation received, among other factors.

Seasonally *above average* with increasing or stable historic trend:

- Aquifer 1098 – Nanoose - surficial

Seasonally *above average* with variable historic trend:

- Aquifer 217 – Qualicum Beach – surficial

Seasonally *at average* with increasing or stable historic trend:

- Aquifer 167 – Millstone Valley - surficial
- Aquifer 216 – Parksville – surficial
- Aquifer 163 – Cedar - surficial
- Aquifer 664 – Little Qualicum – surficial
- Aquifer 1250 – French Creek – surficial
- Aquifer 165 – South Wellington - bedrock
- Aquifer 219 – Nanoose – surficial

Seasonally *at average* with variable historic trend:

- Aquifer 160 – Lower Cassidy - surficial - (2 monitoring wells reporting: 1 stable, 1 moderate decline)
- Aquifer 162 – Cedar Yellowpoint – bedrock (8 monitoring wells reporting: 5 increasing, 3 declining)
- Aquifer 709 – Gabriola Island – bedrock (6 monitoring wells reporting: 5 stable, 1 moderate decline)

Seasonally *at average* with decreasing historic trend:

- Aquifer 218 – Nanoose Peninsula – bedrock
- Aquifer 161 – Upper Cassidy – surficial

Seasonally *below average* with increasing or stable historic trend:

- Aquifer 416 – Deep Bay - surficial
- Aquifer 213 – Upper Lantzville - bedrock

Seasonally *below average* with variable historic trend:

- Aquifer 662 – Dashwood – surficial
- Aquifer 220 – Errington - bedrock (2 monitoring wells reporting: 1 increasing, 1 large decline)
- Aquifer 214 – Nanoose – bedrock (5 monitoring wells reporting: 4 increasing, 1 declining)
- Aquifer 215 – Lantzville – surficial (3 monitoring wells reporting: 2 stable, 1 declining)

Seasonally *below average* with decreasing historic trend:

- Aquifer 211 – Mt. Benson foothills - bedrock

Application

This information provides a snapshot of groundwater conditions in the region heading into the summer months. The seasonal conditions observed in spring, as reported in this memo, can provide an indication of where heightened water conservation measures may be needed through the summer. Watching weather patterns over July and August and how that translates into community water demand and / or low streamflow, will further inform water service providers and well owners across the region.

Water purveyors have implemented the annual outdoor water conservation framework to promote water use reduction. This year's groundwater reporting will be shared with municipal, improvement district, and small water system staff to provide an outlook for groundwater conditions this coming summer and support their management considerations and communications to customers.

The *Groundwater Connections* RDN Get Involved Page also serves as a hub for sharing out this information on groundwater levels and science for residents across the region. This page was launched in early 2025 in conjunction with a mailed-out publication to groundwater-dependant residents in the RDN. It is intended as a resource to increase overall groundwater literacy and provide information about the state of local aquifers in a clear and engaging format with local and relevant examples of where groundwater interactions occur across our communities.

The primary measures to respond to potential groundwater shortages include water conservation (efficient irrigation, rainwater harvesting, soil improvements, efficient appliances) and eliminating leaks. Understanding the seasonal conditions of a well or aquifer in relation to longer-term groundwater level trends offers important context and can help prioritize policy solutions for areas that are regularly under more water stress due to aquifer characteristics, climate impacts and localized demand. Where trends indicate declining levels over time, as well as below average seasonal levels, it points not only to the need for increased water conservation measures going into the summer period but also to the longer-term need to encourage groundwater recharge across the landscape, supplement water storage, and practice water efficiency year-round. Increasing trends and above average seasonal levels may help to indicate where water management actions are having a positive effect.

Data Tables and Graphs

The updated data tables and hydrographs attached to this report include the following:

Appendix A – Summary of Groundwater Observation Well Data provides a detailed table that reports the historical and seasonal groundwater level trend per mapped aquifer, based on either Provincial or RDN observation wells with available data at time of reporting. It also notes which community water service areas, if any, are associated with which aquifer and lists the total number of registered wells correlated to each mapped aquifer to get a sense of the density of private wells relying on the aquifer outside the serviced areas. [Note that this number of private wells is not exhaustive as, a) there are also many registered wells that are uncorrelated to an aquifer but fall within the spatial extent of the aquifer and, b) there are many unregistered wells that are not accounted for].

Appendix B – Historical Groundwater Level Trend Results provides a table with the long-term groundwater level trend results calculations and hydrographs for each observation well used for this reporting, showing the full dataset available 2013-2025 for level fluctuations over time.

Appendix C – Seasonal Groundwater Level Trend Results provides hydrographs for each observation well that has updated data since the last report in 2024. These charts plot each year of data against the months of the year to

see inter-annual variation compared with the average across the data record to 2013. Fifty-six of the 63 graphs include 2025 data that was available at time of reporting to provide the seasonal trend analysis that is summarized in the table in Appendix A.

FINANCIAL IMPLICATIONS

This report has no financial implications.

STRATEGIC PLAN ALIGNMENT

Water Security - Understand our water resources and their risks, to manage our water resources effectively and sustainably.

REVIEWED BY:

- M. Walters, General Manager, Regional and Community Utilities
- D. Holmes, Chief Administrative Officer

ATTACHMENTS

1. Figure 1 – Observation Well Locations
2. Appendix A – Overview of Groundwater Observation Well Data 2025
3. Appendix B – Historical Groundwater Level Results 2013-2025
4. Appendix C – Seasonal Groundwater Level Results 2025