

TO: Committee of the Whole **MEETING:** June 9, 2020
FROM: Julie Pisani
Program Coordinator, Drinking
Water and Watershed Protection **FILE:** 5600-07
SUBJECT: Regional Groundwater Level Analysis Pre-Summer 2020

RECOMMENDATION

That the Board receive the Regional Groundwater Level Analysis Pre-Summer 2020 report for information.

SUMMARY

A regional analysis of groundwater levels has been completed to support water managers in the Regional District of Nanaimo to prepare for the summer period ahead. The technical report, by Waterline Resources Inc (Attachment 1), provides an update on historical and current seasonal trends observed in the aquifers within our region. The report provides a summary of the current regional groundwater conditions and how that relates to community water service areas and un-serviced areas.

Many aquifers in the region are tracking at average levels for this time of year. Several are below average and a few are above average. This illustrates how groundwater conditions vary across the region.

This current information 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. It is also important to share this information with residents on private wells who have an important role in protecting our shared groundwater resources. Water purveyors and communities can use this information to anticipate the potential need for heightened water conservation measures this summer. Long term trends can help inform land use and water management decisions.

BACKGROUND

Many communities within our region rely on groundwater for their water supply. This includes water service areas operated by the Regional District of Nanaimo (RDN) as well as 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.

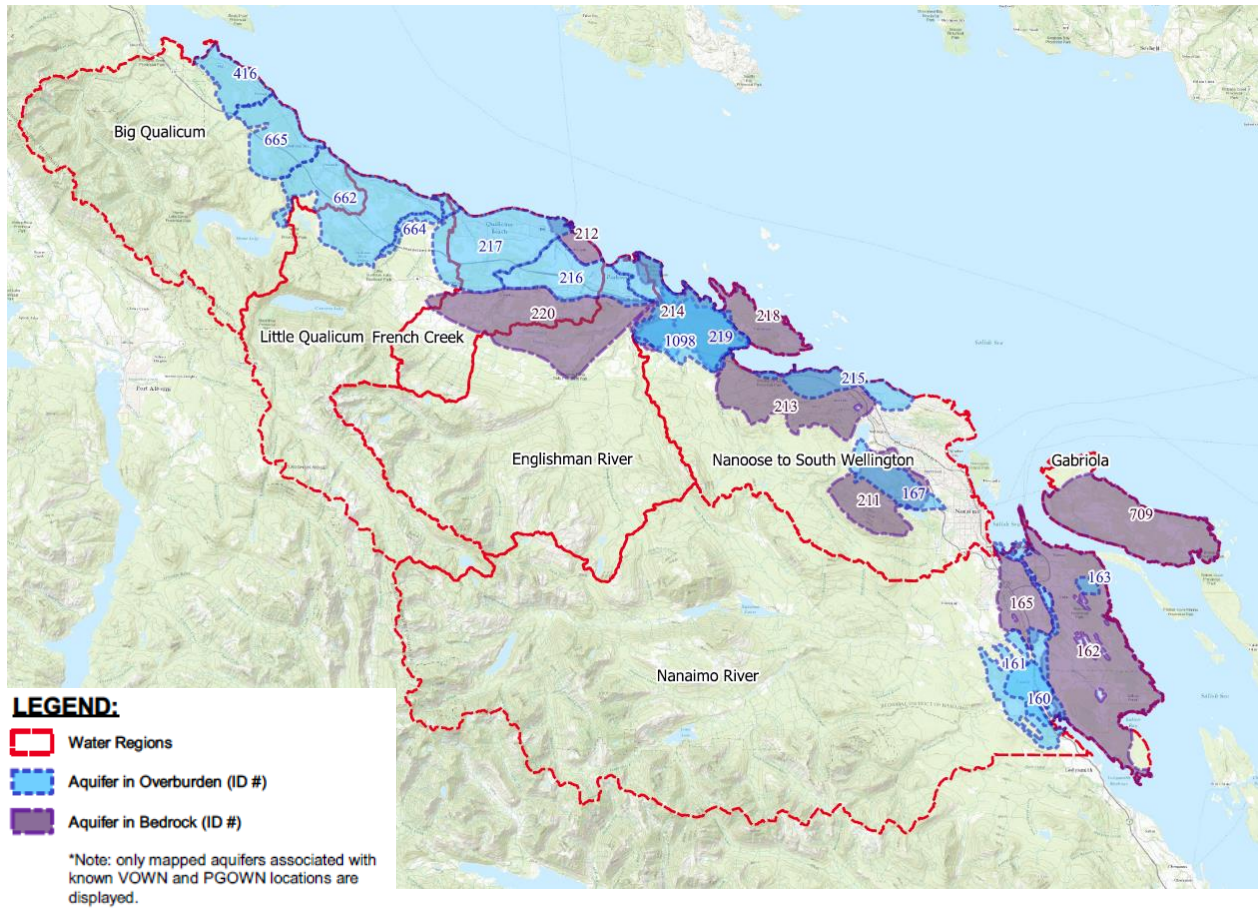
Recent years have shown increasing variability in our local climate, linked to the impacts of global climate change. One such impact has been prolonged and early onset summer drought conditions, something that is forecasted to increase in frequency and intensity over time. Regional water sources respond to climate and precipitation changes differently, with some aquifers and rivers being more resilient to drought than others. Changes to groundwater tables effect water availability for household purposes, irrigation, firefighting, as well as environmental baseflows in streams.

The RDN Drinking Water and Watershed Protection program monitors groundwater levels in aquifers across the region, (through the RDN Volunteer Observation Well Network) in order to understand water availability and assess changes over time. This supplements the monitoring done by the Province in Provincial Observation Wells within the region. Results from this monitoring have been previously reported to the Board and the public in various ways, including the State of our Aquifers report and mailout in 2017.

Waterline Resources Inc have prepared an analysis of historical trends and current seasonal conditions observed in the aquifers within the region (Attachment 1). The report includes data from both the RDN and Provincial monitoring wells, current to early May 2020, and provides an outlook to help plan for the months ahead. This analysis provides an understanding of where regional groundwater levels are tracking in May 2020, compared with previous recent years (2013- 2020).

Out of the 22 aquifers that are monitored in our region, 9 are bedrock and 13 are sand and gravel (also referred to as surficial or overburden); see map in Figure 1 below. Bedrock and surficial aquifers have different characteristics and response to precipitation, that affects their resilience to water extraction and drought.

Figure 1: Regionally Mapped Surficial and Bedrock Aquifers



Thirteen aquifers provide source water for the various local government water service areas (see Table 1 below); while the remaining 9 aquifers supply private domestic wells and small water systems such as mobile home parks (see Table 2).

In Table 2, note that the number of registered wells is generally recognized to be significantly below the true number of wells, as registration was not required by the Province until 2016. The number of registered wells is provided as a relative approximation of how heavily these aquifers are relied up as water sources for private domestic wells or small systems outside of service areas.

Table 1: Aquifer Level Seasonal Trend for May 2020 by Water Service Provider

CURRENT AQUIFER LEVEL	AQUIFER	WATER SERVICE PROVIDER
Above Average	Aquifer 662 - Little Qualicum Water Region	Qualicum Bay Horne Lake Waterworks (includes Qualicum First Nation)
	Aquifer 216 – Englishman River Water Region	City of Parksville & EPCOR French Creek
Average	Aquifer 416 – Big Qualicum Water Region	Deep Bay Improvement District & Bowser Waterworks
	Aquifer 217 – French Creek Water Region	Town of Qualicum Beach; RDN; & EPCOR French Creek
	Aquifers 218 & 219 – Nanoose Water Region	RDN
	Aquifer 214 – Nanoose Water Region	RDN
Below Average	Aquifer 664 – Little Qualicum Water Region	Town of Qualicum Beach & RDN
	Aquifer 215 – Lantzville to South Wellington Water Region	District of Lantzville & Snaw-naw-as First Nation
	Aquifer 162 - Nanaimo River Water Region	RDN& Stz'minuz First Nation
	Aquifer 1098 – Nanoose Water Region	RDN
Not Enough Data	Aquifer 161 – Nanaimo River Water Region	North Cedar Improvement District
	Aquifer 665 – Big Qualicum Water Region	Qualicum Bay Horne Lake Waterworks

Table 2: Aquifer Level Seasonal Trends for Aquifers that Support Un-serviced Areas May 2020

CURRENT AQUIFER LEVEL	AQUIFER	# REGISTERED WELLS
Average	Aquifer 212 – French Creek Water Region	19
	Aquifer 213 – Nanoose Water Region	132
Below average	Aquifer 220 – Englishman River Water Region	279
	Aquifer 167 – Lantzville to South Wellington Water Region	18
	Aquifer 211 – Lantzville to South Wellington Water Region	214
	Aquifer 709 – Gabriola Water Region	1041
	Aquifer 160 & 163 – Nanaimo River Water Region	53
	Aquifer 165 – Nanaimo River Water Region	326

Overall, the findings of the analysis are summarized as follows:

- Seven aquifers are tracking at **average** seasonal groundwater levels; 2 aquifers are tracking at **above average** seasonal groundwater levels; 11 aquifers are tracking at **below average** seasonal groundwater levels.
- It is important to note the out of the 11 aquifers that are *currently* tracking at levels below seasonal average, *overall* 4 are demonstrating longer term **increasing trends** since 2013, and 1 is demonstrating a **stable trend** overall during this same period.
- Six aquifers are currently both at below average levels *and* experiencing a degree of longer-term decline, 5 of which are bedrock aquifers. The five bedrock aquifers are not sources for larger community water supply systems, but they do support a number of private domestic wells and small water systems (i.e. mobile home parks).
 - Bedrock Aquifer 220 – Errington
 - Bedrock Aquifer 211 – Benson Meadows
 - Bedrock Aquifer 709 - Gabriola
 - Bedrock Aquifer 162 - Yellowpoint
 - Bedrock Aquifer 165 – South Wellington
 - Overburden Aquifer 1098 – Englishman / Nanoose
- This indicates that bedrock aquifers are more susceptible to seasonal groundwater shortages and declines over time with climate change and continued extraction.

This current trend information 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. This information is

also available to residents on private wells who have an important role in protecting our shared groundwater resources. This information provides early indication of where heightened water conservation measures may be needed this summer.

The primary measures to respond to potential groundwater shortages include water conservation (efficient irrigation, rainwater harvesting, soil improvements, efficient appliances) and eliminating leaks. Water service providers across the region have implemented the annual watering restrictions framework to promote conservation. Longer term measures include using this type of trend analysis to inform land development decisions in manner that is cognizant of areas that are under more water stress due to climate impacts, aquifer characteristics and localized demand.

ALTERNATIVES

1. That the Board receive the Regional Groundwater Level Analysis Pre-Summer 2020 report for information on regional groundwater levels pre-summer 2020.
2. That the Board provide alternate direction to staff.

FINANCIAL IMPLICATIONS

There are no financial implications of this report.

STRATEGIC PLAN IMPLICATIONS

Environmental Stewardship - Protect and enhance the natural environment, including land, water, and air quality for future generations.



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May 28, 2020

Reviewed by:

- M. Walters, Manager, Water Services
- R. Alexander, General Manager, Regional and Community Utilities
- P. Carlyle, Chief Administrative Officer

Attachment:

1. Waterline Report – Regional Groundwater Level Analysis for Summer 2020