

Regional Groundwater Monitoring

**VOW
Background**

**Groundwater
Monitoring**

**Related
Programs**

**Resources &
Contacts**



**REGIONAL
DISTRICT
OF NANAIMO**

Lauren Fegan,
Monitoring Network Coordinator,
Drinking Water & Watershed Protection

The RDN's Volunteer Observation Well Network (VOW)

Background on program development



Who?

What?

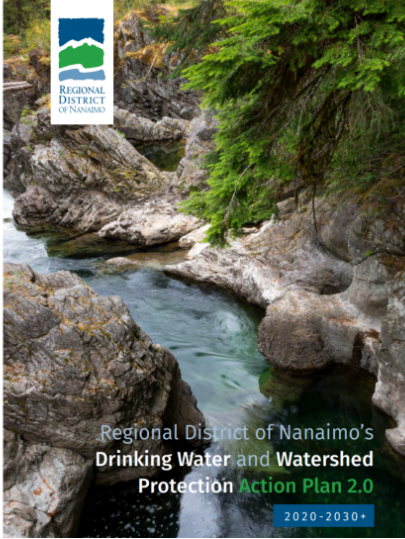
Where?

Why?

How?



RDN's Drinking Water & Watershed Protection Program



Our vision is for healthy, safe and resilient water resources in the region, enabled through strong partnerships.

Our mission is to provide regional leadership at the watershed scale to support water management, land-use planning, and community outreach and advance drinking water sustainability, climate adaptation, and healthy ecosystems.

Provincial Groundwater Observation Well Network

- Established in 1961
- Network includes 226 observation wells
- Collects, interprets, and reports on groundwater quantity and chemistry
- Goal to understand groundwater patterns and trends

RDN's groundwater monitoring network (VOW) modelled after the provincial program



A provincial OW site with a data logger & telemetry

RDN Water Budget Projects

Goal to examine the relationship between surface and groundwater, current water demands, and the long-term impacts of climate change

Phase 1 Water Budget

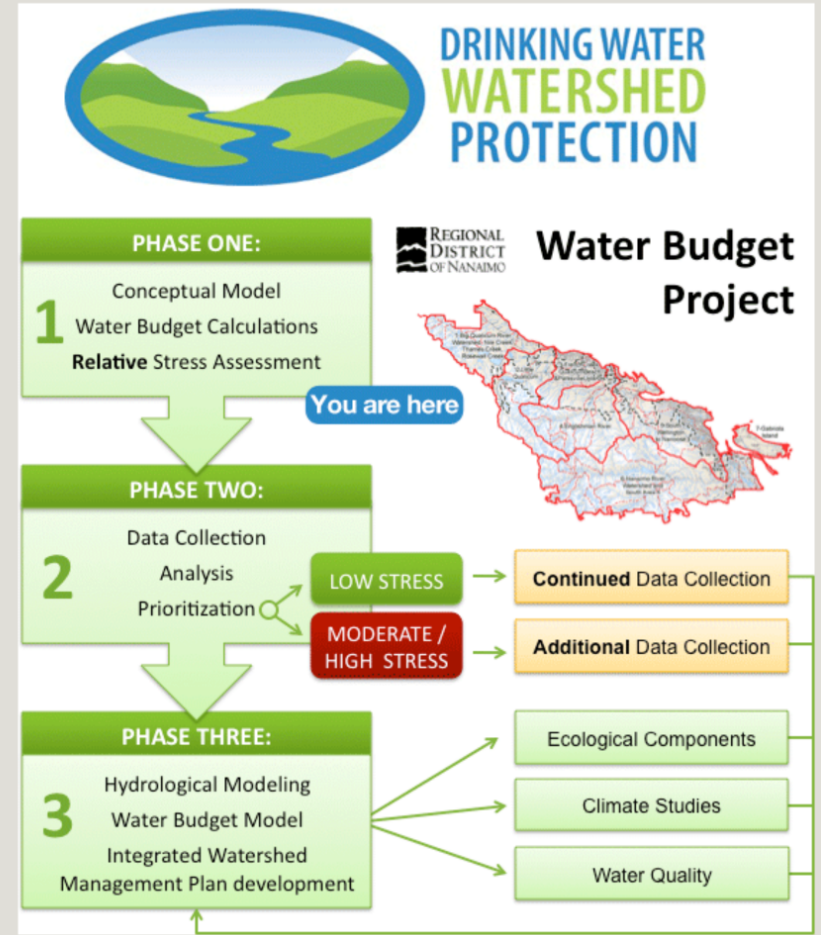
- Regional study completed Jan - Dec 2012
- **Highlighted where more data was needed**

Phase 2 Water Budget

- Prioritized areas of greater relative stress
- Data collection projects initiated (2011 & ongoing)

Phase 3 Water Budget

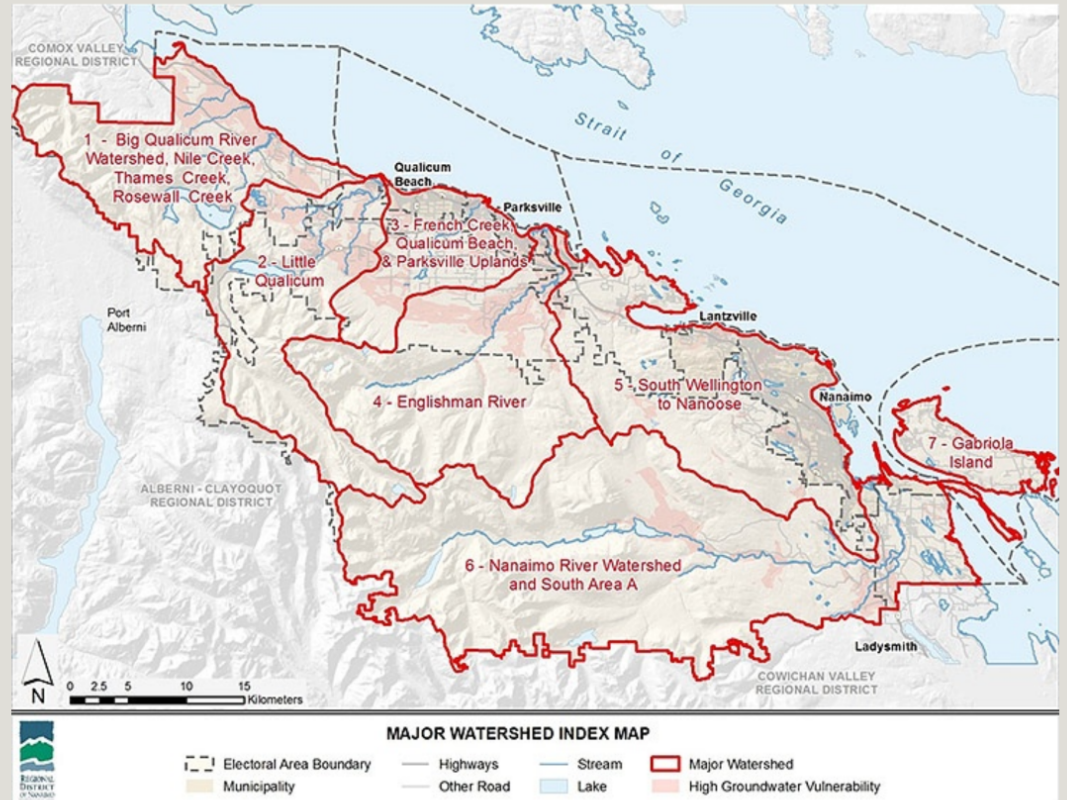
- In-depth analysis and research in three prioritized Water Regions (WR)
 - WR 5 Nanoose (2020), WR 3 French Creek (2022), WR 6 Yellow Point (2024)



Filling Data Gaps

- 1 Collaboration with the province increased BC Observation Wells within the RDN from 19 to 35 (2011 - 2013)
- 2 Water Budget Project identified priority areas (2012)
- 3 RDN groundwater monitoring sites focused in priority areas

Filling data gaps yields a better understanding and management of water resources



Towns for Tomorrow Grant



2011

BC OW
Expansion

2011 - 2013

RDN VOW
9 Initial Sites

2013

2015

Nanoose
7 sites added

2017

French Ck &
Yellow Pt 15 sites

DWWP Budget

TIMELINE

- 31 Sites in VOW program
- Added over 5 years
- Via two funding sources

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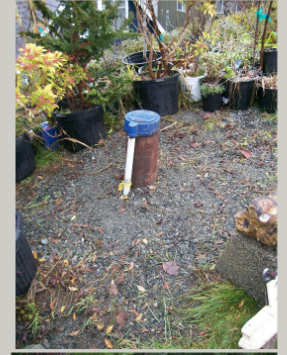
Site Selection

- Recommendation to use existing private wells
- Letters mailed to well owners in priority areas
- Sites groundtruthed for viability



Selection parameters include

- Ease of access - can a crane truck reach, 10 m clearance above wellhead, safety of RDN staff who will be completing download of data
- Well construction - 2005 best practices met, type of well cap
- Well record available - to discern aquifer source, well depth, static water level



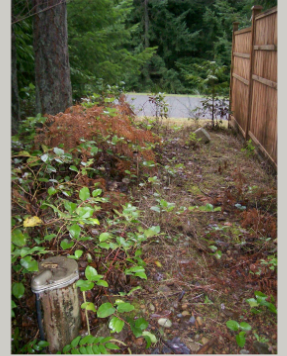
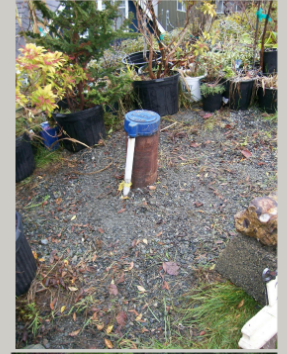
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Monitoring Site Set-up

- Installation completed by Registered Well Water Drillers
- 1", de-contaminated, flush joint PVC (threaded sounder tube), 5 - 10' lengths
- Larger cap, threaded and glued
- Perforated threaded sounder tube, 5 - 10' depending on estimated well yield
- Threaded end plug with drilled hole
- Custom saddle to support sounder tubes
- If needed, new vermin proof well cap



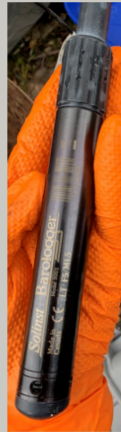
Equipment

- Pressure Transducer
- Direct Read Cable
- Bluetooth Adaptor

- Barologger
- Gloves
- 10% Bleach

- Manual Water Level Tape
- Ruler

- Zap straps
- Labels
- Electrical Tape



How and When Data is Downloaded

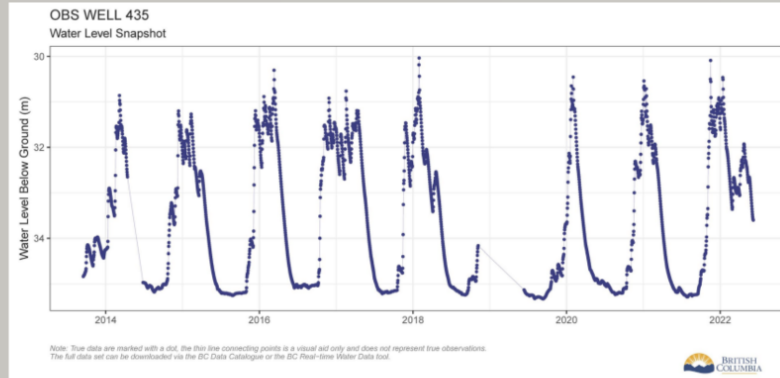


- Using laptop or bluetooth data is downloaded via direct read cable
- While at site, a manual water level (MWL) reading is taken
- MWL reading coincides with logger reading for data verification
- Downloads are completed quarterly, every 3 - 4 months
- If conductivity logger, calibration completed every 6 months



What's recorded?

- Pressure transducer measures water column above the logger every 15 minutes
- Barologgers used to compensate for atmospheric pressure
- MWL reading gives you depth of water
- Yields level of water below ground hydrographs

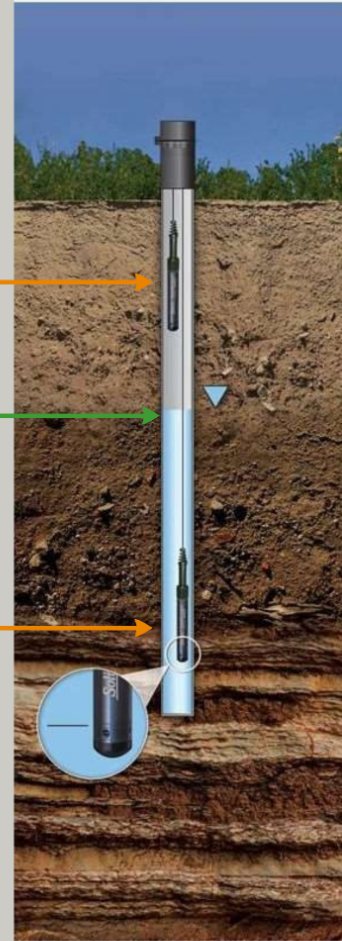


Example hydrograph associated with bedrock aquifer 165

Barologger

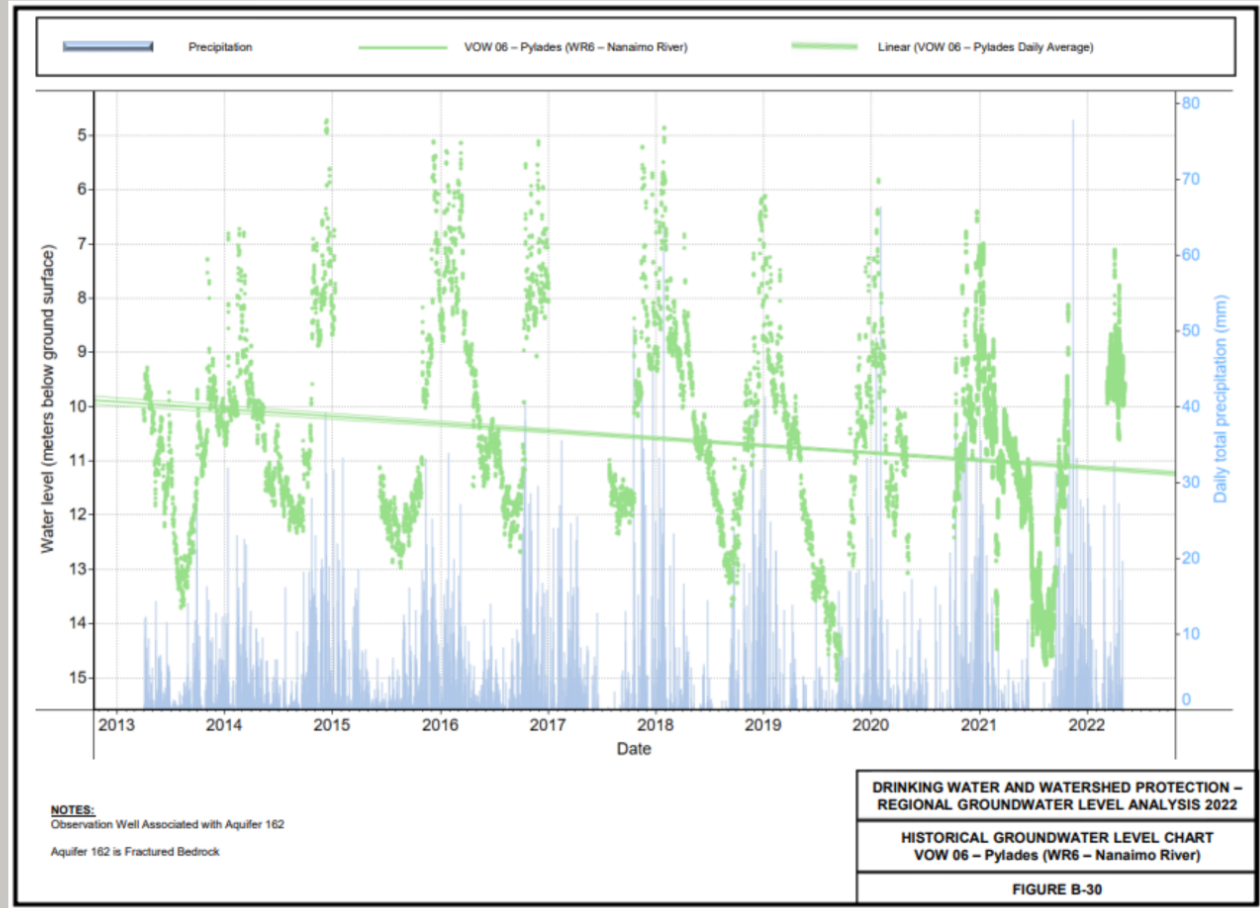
Level recorded by logger

Levelogger



Data Analysis - Historical Data

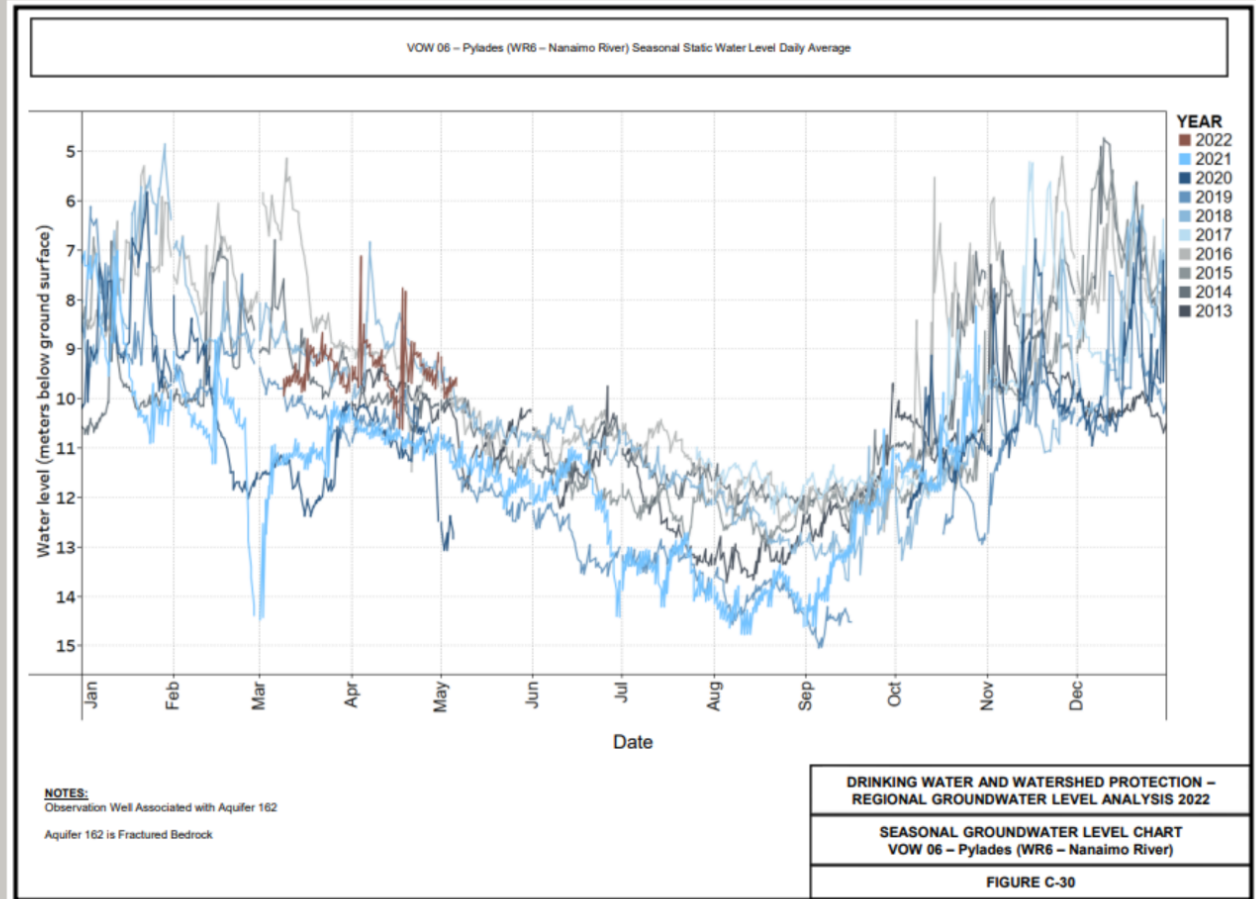
- Since 2020, data collected through the RDN VOW has been reported out on annually in a Pre-summer Groundwater Level Analysis
- Analysis reports on both historical and seasonal averages
- The historical groundwater level chart helps us to understand if aquifer levels are increasing, decreasing, or remaining stable over time



Data Analysis - Seasonal Data

- Seasonal groundwater analysis helps us to understand where current levels are in relation to previous years of data
- 10 years of groundwater data is needed to have confidence in trends
- To support RDN VOW data, the BC OW data with longer datasets are included

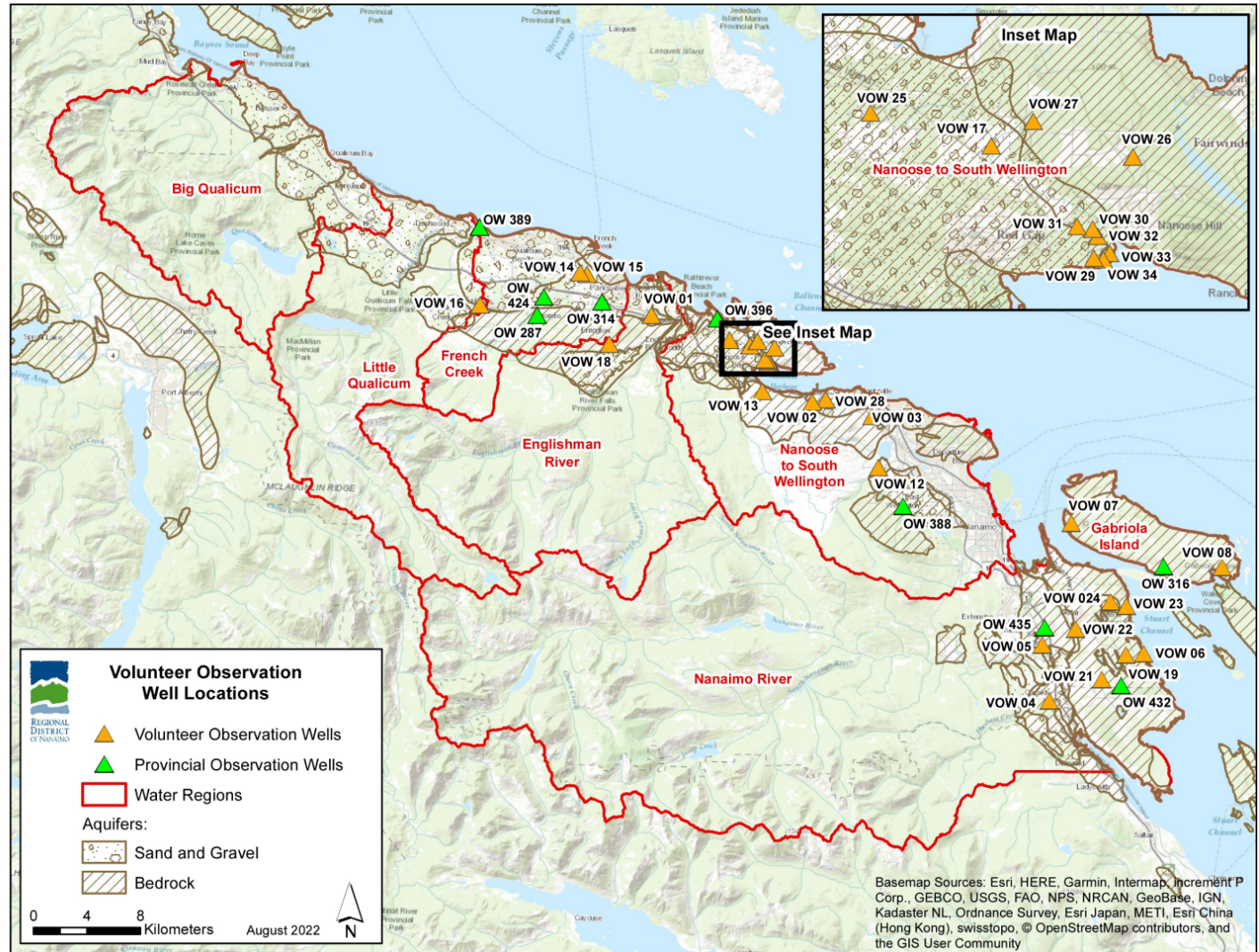
2020, 2021, and 2022 reports are available at www.rdn.bc.ca/dwwp-reports



Volunteer Observation Well Network

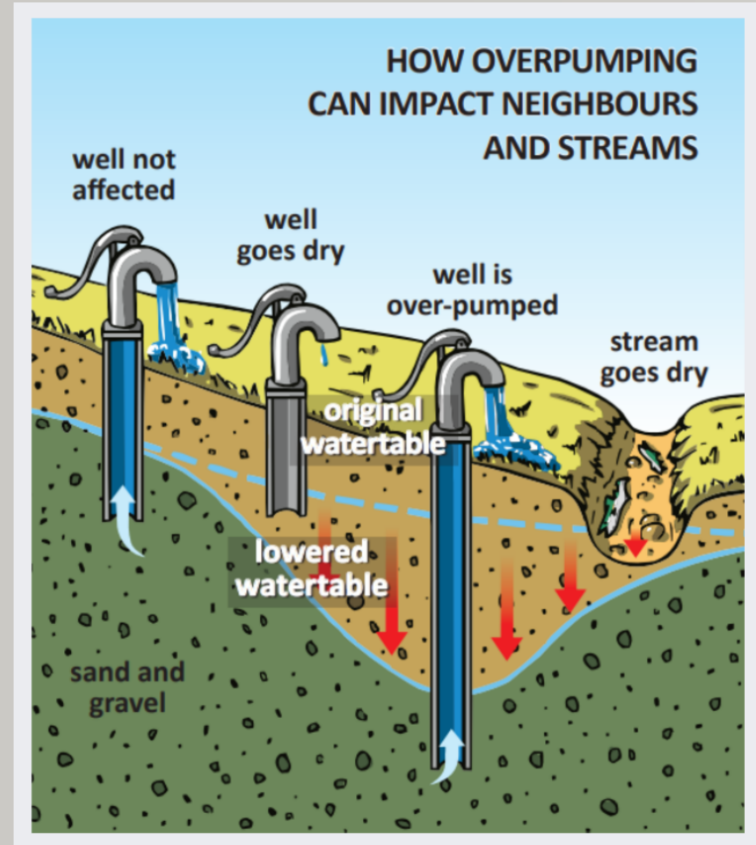
Sites shown on map were included in 2022 analysis

- 30 VOW
- 9 BC OW



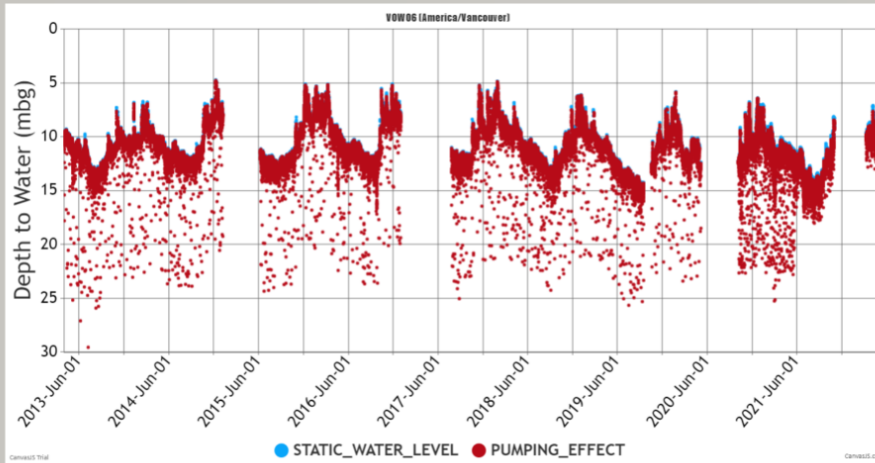
Benefits of Volunteering

- Annual reports on your water source
- Courtesy water chemistry analysis at installation and whenever work completed on monitoring set-up
- Assistance understanding your water quality results
- At request, information shared after each download
- Well owners can track their own water usage to see conservation measures / usage in action
- Building the understanding of water resources by local decision makers



Future of the VOW

- Currently at capacity for number of sites within the VOW
- Improve and streamline data processing to increase capacity
- Add data interface unique to each volunteer so they can review hydrographs after each download



- Re-visit data gaps and align priorities with future projects
- Continuation of annual analysis
- Explore options for
 - Quality monitoring and analysis
 - Telemetry sites
 - Upgrading monitoring equipment

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WellSmart



Annual workshops, bringing industry professionals together with local well owners to discuss

- Well maintenance and operation
- Protecting your water source
- Water testing and treatment
- Water treatment options
- Drought management

2022 WellSmart Workshop

- November 9th 5:00 to 7:00 pm
- Errington War Memorial Hall, 1390 Errington Road
- This workshop is FREE and open to all residents
- Register online or by calling 250-248-3252



help protect the groundwater we share

www.rdn.bc.ca/wellsmart

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RDN DWWP Rebates

- Incentive programs to decrease barriers
- Goal to protect shared groundwater resources and raise awareness
- Residents must be pre-approved for rebates
- One rebate per well



Well Water Testing

Rebates of 50% off (up to \$175) for full spectrum well water quality tests

Caveats:

- Analysis completed by approved lab
- Lab invoices RDN for rebate portion



www.rdnrebates.ca

Wellhead Upgrades

Rebates for upgrading private domestic wells to bring well construction up to current Provincial Best Practices

CATEGORY	MAXIMUM REBATE
Secure Well Cap	\$50 (drilled well); \$150 (dug well)
Well Casing Stick-up	\$200
Surface Seal	\$300
Well Closure	\$500

Work must be completed by registered professionals

Resources:

- Water well stewardship checklist
- Link to registered well professionals

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Drinking Water & Watershed Protection Program Contacts

Erica Forssman

Drinking Water and Watershed Protection Program Coordinator
T: 250-390-6568 | Email: eforssman@rdn.bc.ca

*For all reports completed by the RDN's
DWWP visit www.rdn.bc.ca/dwwp-reports*

Lauren Fegan

Monitoring Network Coordinator
T: 250-390-6764 | C: 250-741-7795 | Email: lfegan@rdn.bc.ca

*Volunteer Observation Well Network
Well Water Testing Rebate*

Capri Brugge

Stewardship Coordinator
T: 250-390-6560 | C: 250-616-8235 | Email: cbrugge@rdn.bc.ca

*Wellhead Upgrades Rebate
Information on all rebates available at
www.rdnrebates.ca*

Melissa Tomlinson

Outreach Coordinator
T: 250-390-6560 | C: 250-268-5104 | Email: mtomlinson@rdn.bc.ca

*WellSmart Workshops
www.rdn.bc.ca/wellsmart*