

# Regional Groundwater Monitoring

**Groundwater  
Monitoring**

**VOW  
Background**

**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?

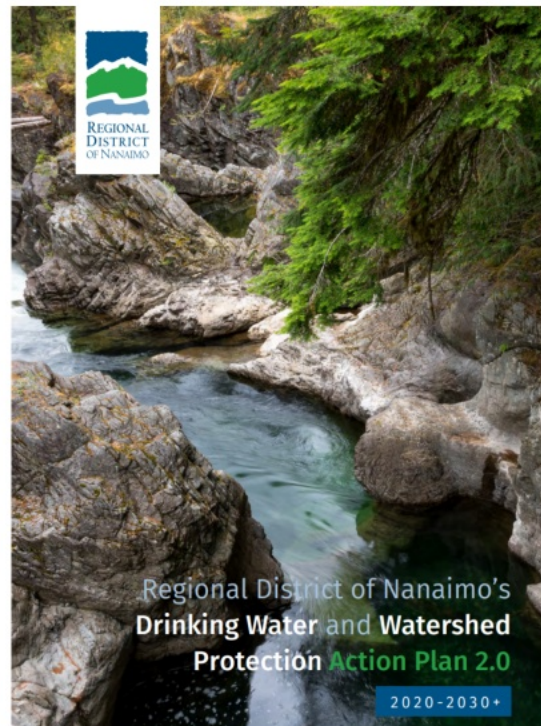
Why?

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) modeled 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

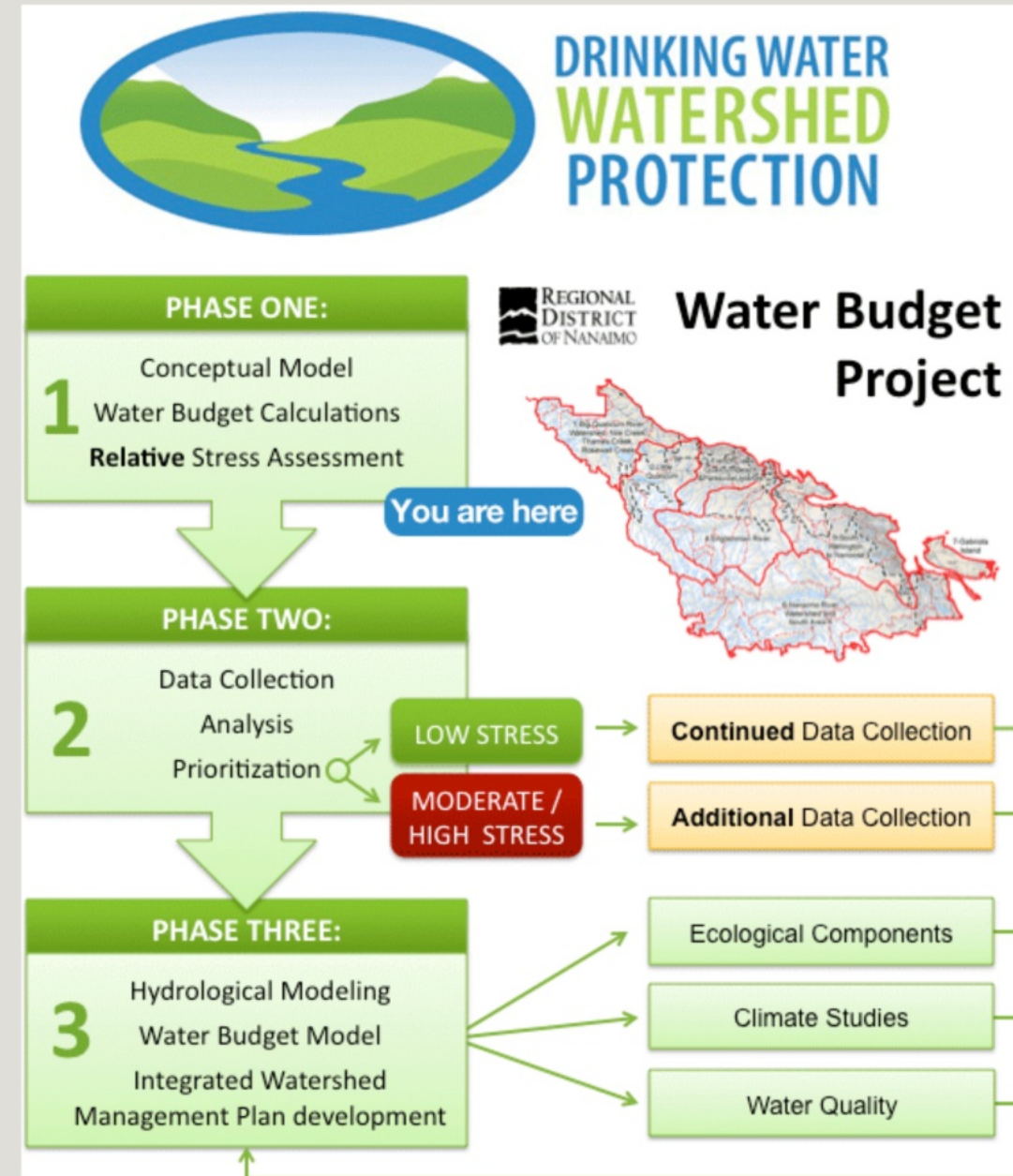
- Regional study completed Jan - Dec 2012
- **Highlighted where more data was needed**

## 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)

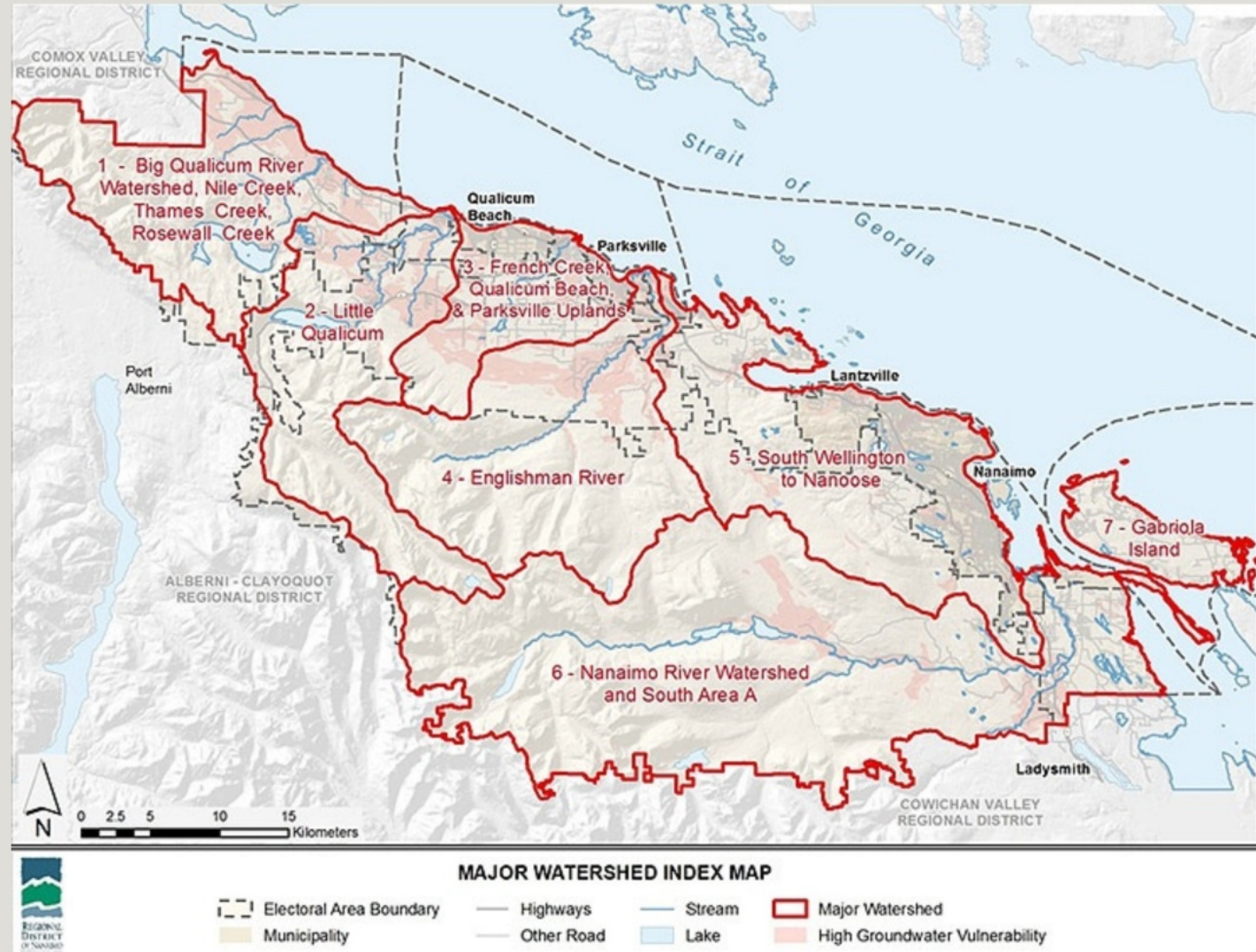




# Filling Data Gaps

- 1 Collaboration with the province increased BC Observation Wells within the RDN from 19 to 35 (2011 - 2013)
- 2 Water Budget Project identified priorities 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

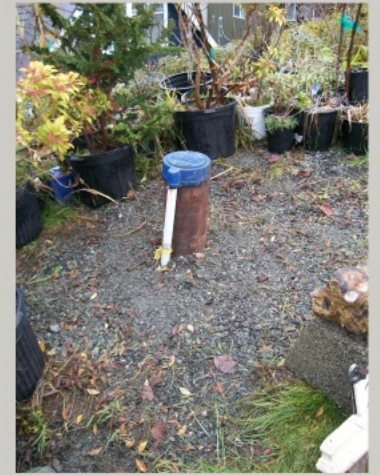
## TIMELINE

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



# 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





# Monitoring Site Set-up

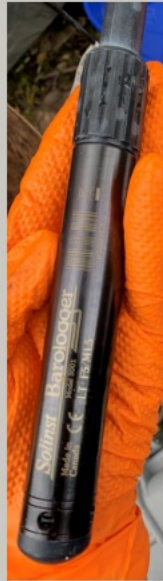
- Installation completed by Registered Well Water Drillers
- 1", de-contaminated, flush joint PVC (threaded sounder tube), 5 - 10' lengths
- Larger cap, threaded and glued
- Perforated threaded sounder tube, 5 - 10' depending on estimated well yield
- Threaded end plug with drilled hole
- Custom saddle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



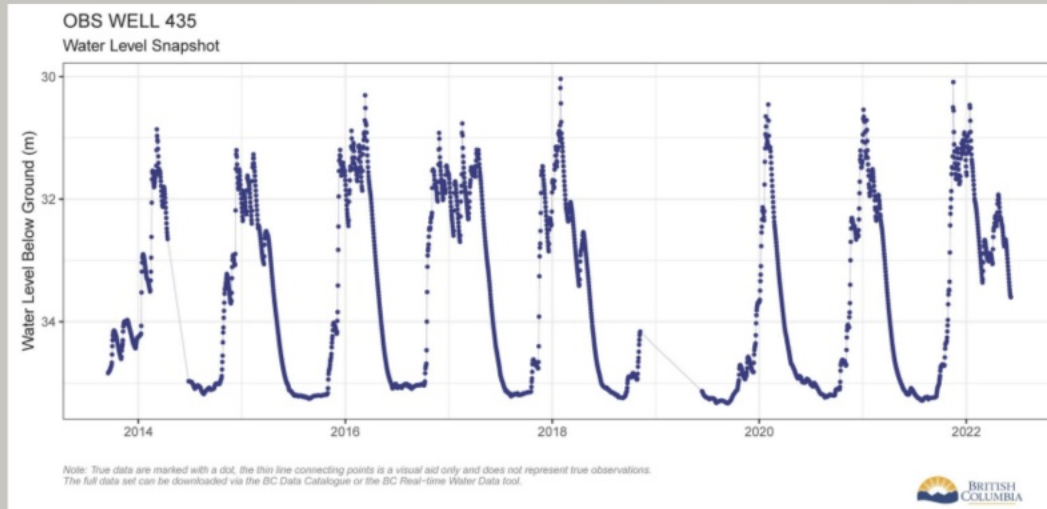
- Using laptop or bluetooth data is downloaded via direct read cable
- While at site, a manual water level (MWL) reading is taken
- MWL reading coincides with logger reading for data verification
- Downloads are completed quarterly, every 3 - 4 months
- If conductivity logger, calibration completed every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



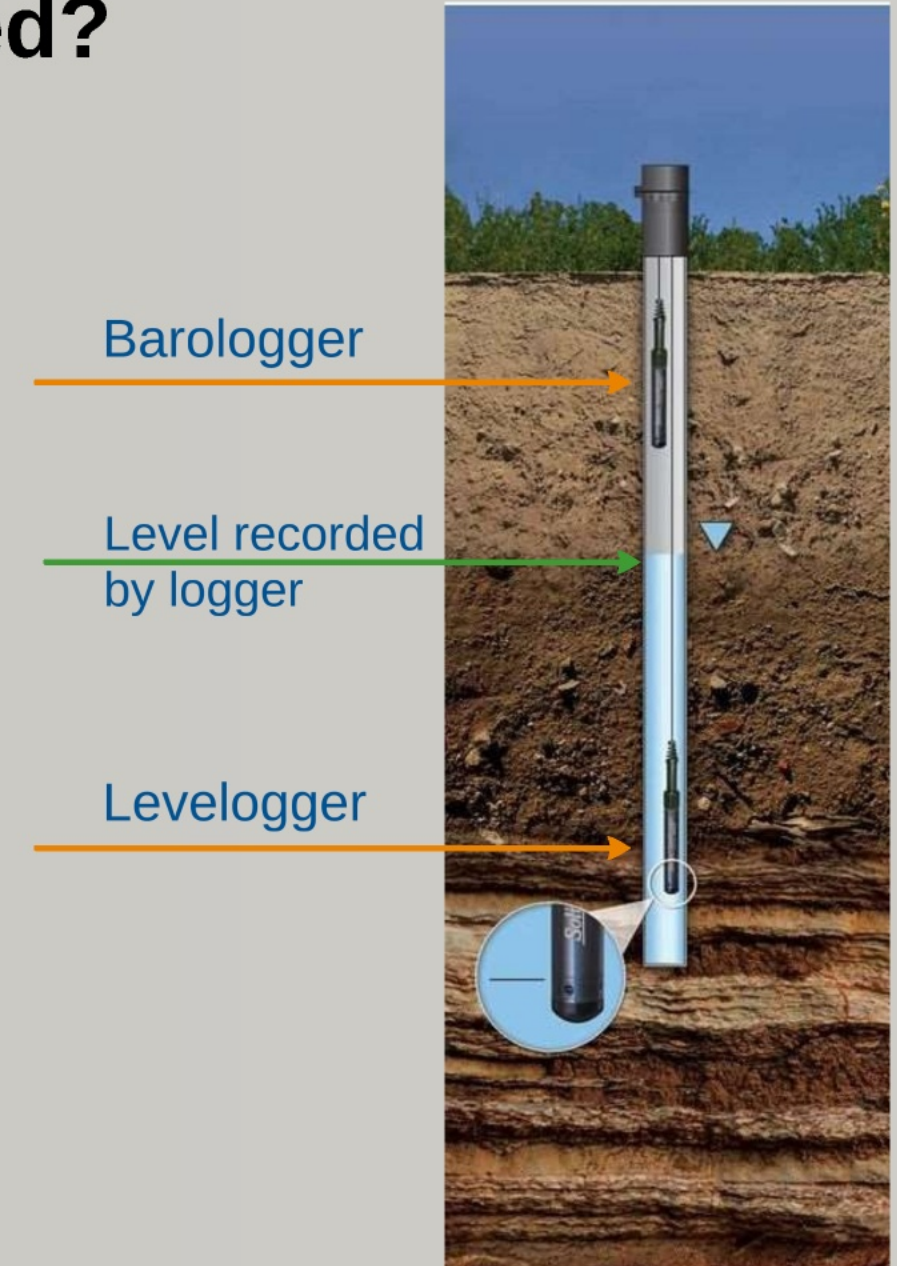


# What's recorded?

- 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



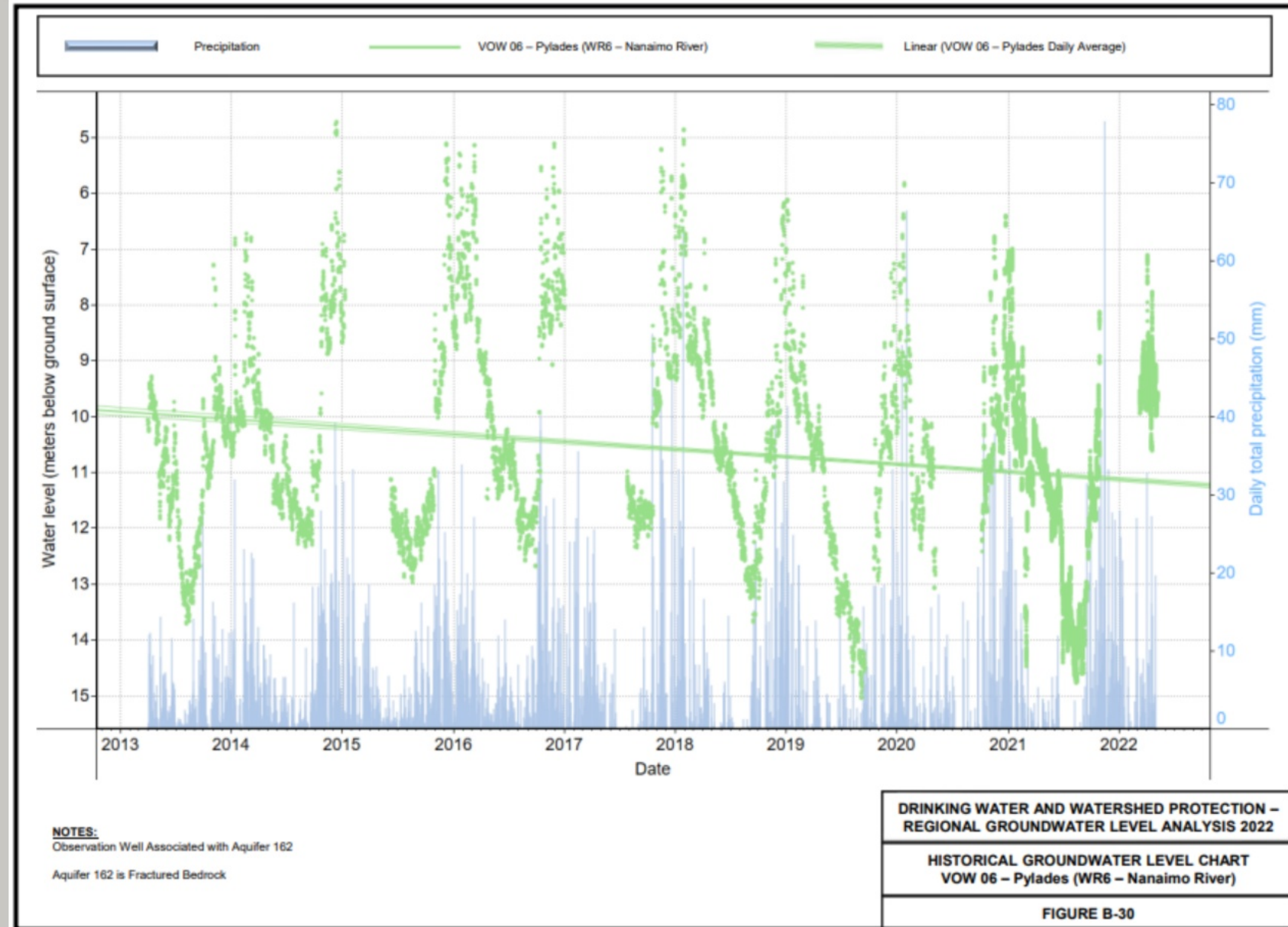
*Example hydrograph associated with bedrock aquifer 165*





# Data Analysis - Historical Data

- Since 2020, data collected through the RDN VOW has been reported out 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

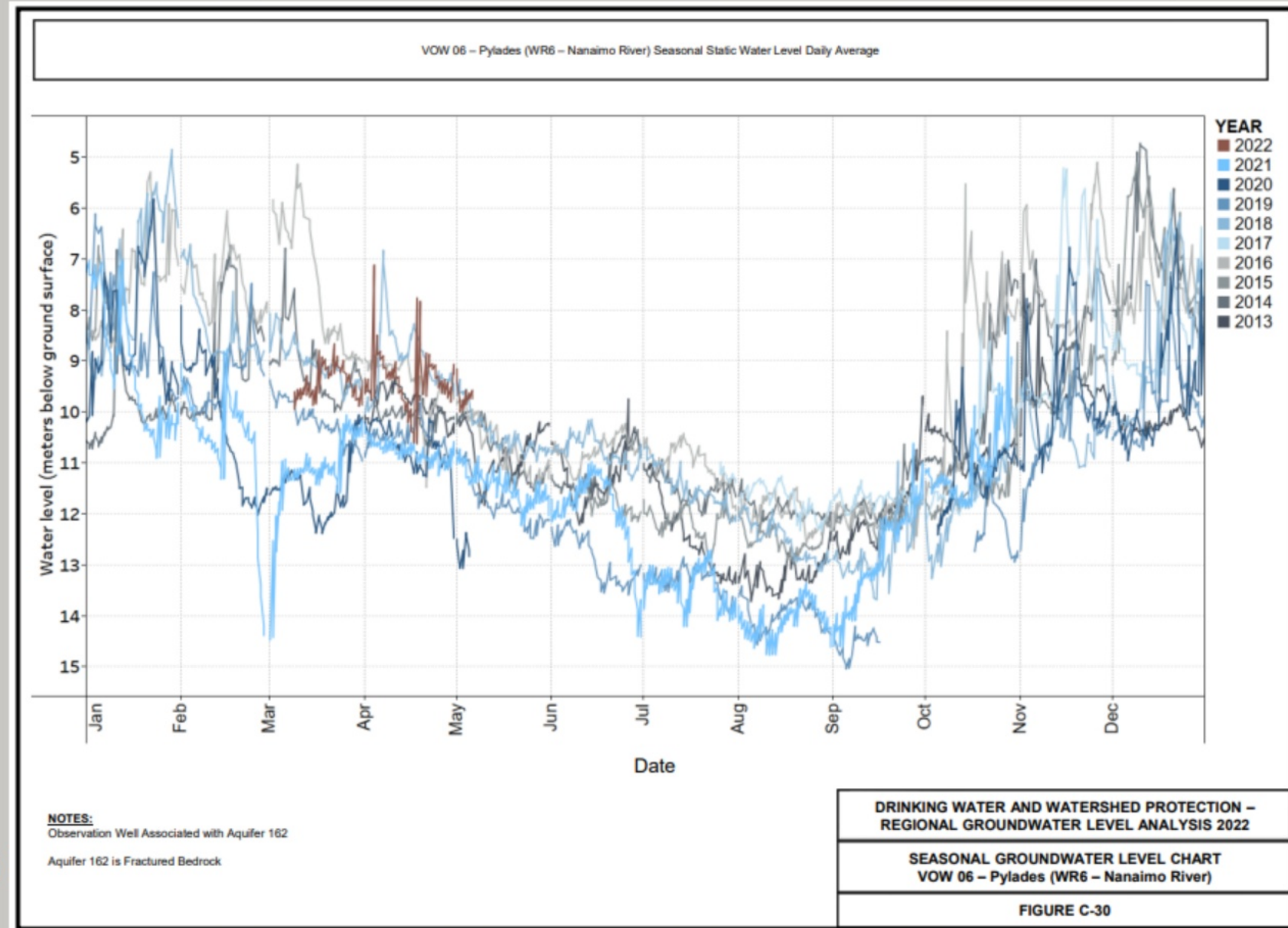




# Data Analysis - Seasonal Data

- 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 data sets are included

**2020, 2021, and 2022 reports  
are available at  
[www.rdn.bc.ca/dwwp-reports](http://www.rdn.bc.ca/dwwp-reports)**





**Volunteer Observation Well Locations**

▲ Volunteer Observation Wells  
 ▲ Provincial Observation Wells  
 [Red Outline] Water Regions  
 [Dotted Pattern] Sand and Gravel  
 [Hatched Pattern] Bedrock

Aquifers:

[Dotted Pattern] Sand and Gravel  
 [Hatched Pattern] Bedrock

0 4 8 Kilometers August 2022

Basemap Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), swisstopo, © OpenStreetMap contributors, and the GIS User Community

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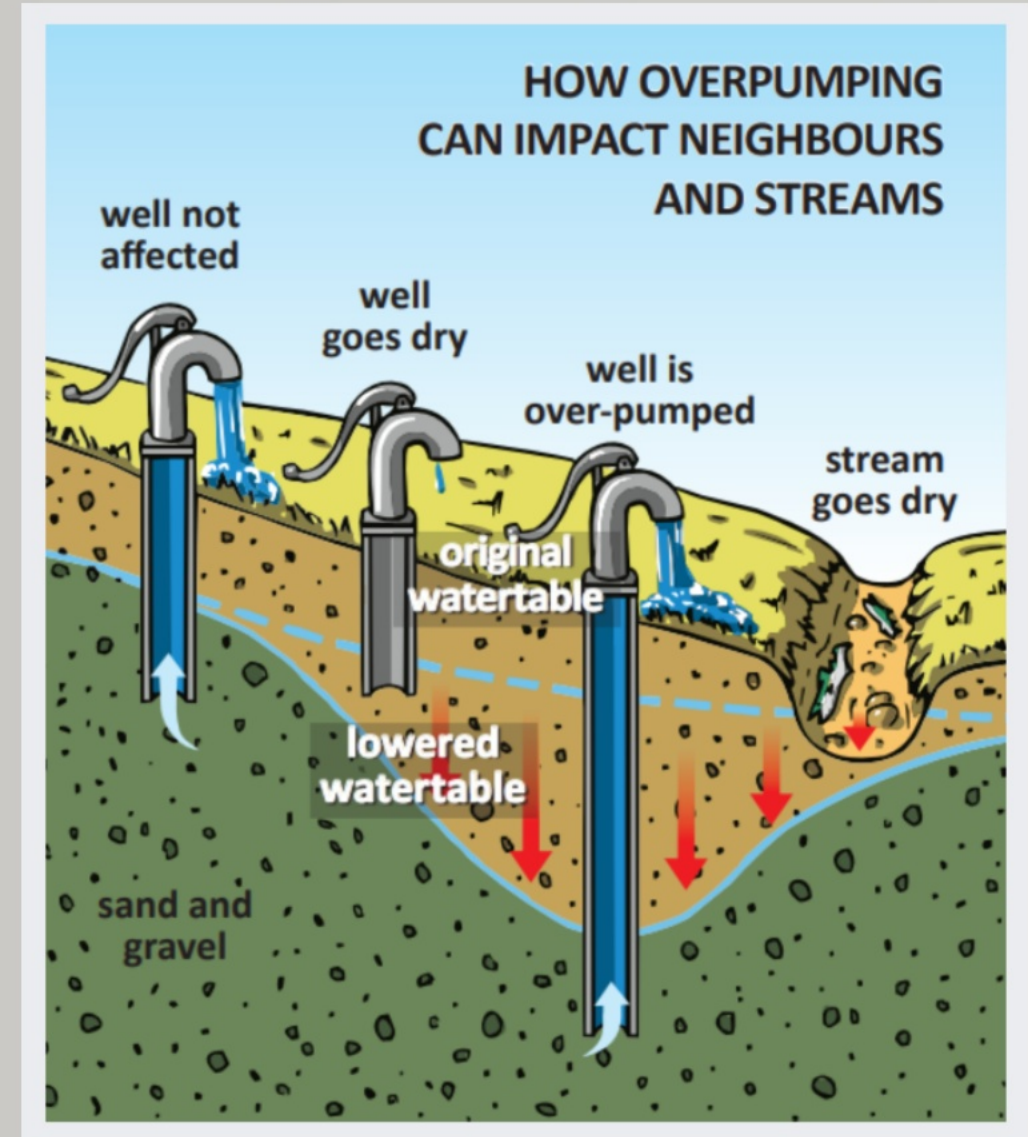
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# Benefits of Volunteering

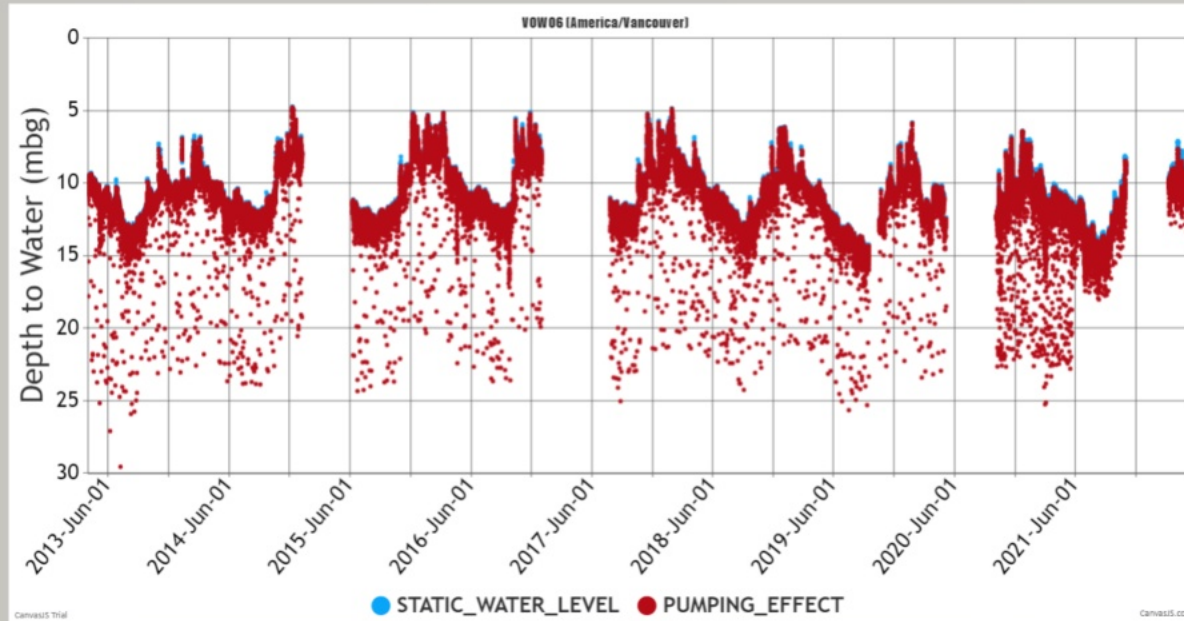
- Annual reports on your water source
- Courtesy water chemistry analysis at installation and whenever work completed on monitoring set-up
- Assistance understanding your water quality results
- At request, information shared after each download
- Well owners can track their own water usage to see conservation 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



# 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](http://www.rdn.bc.ca/wellsmart)**



# 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](http://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





# Drinking Water & Watershed Protection Program Contacts

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Drinking Water and Watershed Protection Program Coordinator

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*For all reports completed by the RDN's  
DWWP visit [www.rdn.bc.ca/dwwp-reports](http://www.rdn.bc.ca/dwwp-reports)*

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*Volunteer Observation Well Network  
Well Water Testing Rebate*

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*Wellhead Upgrades Rebate  
Information on all rebates available at  
[www.rdnrebates.ca](http://www.rdnrebates.ca)*

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**Melissa Tomlinson**

Outreach Coordinator

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*WellSmart Workshops  
[www.rdn.bc.ca/wellsmart](http://www.rdn.bc.ca/wellsmart)*