



# Provincial Government Update

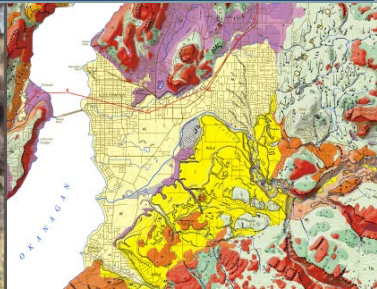
Michele Lepitre, M.Sc., P.Geo.

BCGWA Regional Meeting, Langley, BC

November 3, 2018



Ministry of  
Forests, Lands, Natural  
Resource Operations  
and Rural Development





## Outline

- Groundwater Science Update
- Groundwater Data and Information Update
- Groundwater Compliance Update
- Groundwater Licensing Update
- Annual Regional Update for the South Coast Region





# Completed Groundwater Science Projects

- Water Budgets
- Aquifer Characterization and Mapping
- Groundwater-Surface Water Interaction Studies
- Aquifer Stress Tool
- Water Science Series, available online:

<https://www2.gov.bc.ca/gov/content/environment/air-land-water/water/water-science-data/water-science-series>

WATER SCIENCE SERIES

## Determining the Likelihood of Hydraulic Connection

Guidance for Determining the Effect of Diversion of Groundwater on Specific Streams



Version 1.0





# Ongoing & Future Groundwater Science Projects



- Further Water Budgets
- Further Aquifer Characterization & Mapping
- Further Groundwater-Surface Water Interaction Studies
- Analytical models and lag times for groundwater pumping impacts on Environmental Flow Needs (with UVic)
- Artesian risk mapping and mitigation project (with SFU)



# Groundwater Data and Information Update

- GWELLS
- Groundwater level interactive map (Provincial Groundwater Observation Well Network-PGOWN)
- Real-time Water Data (Aquarius)
- State of Environment Reporting – Long-term Trends in Groundwater Levels
- Drought Portal
- Well drilling advisories



# GWELLS

- Search by WTN or WID, address
- Link to original records

Under development:



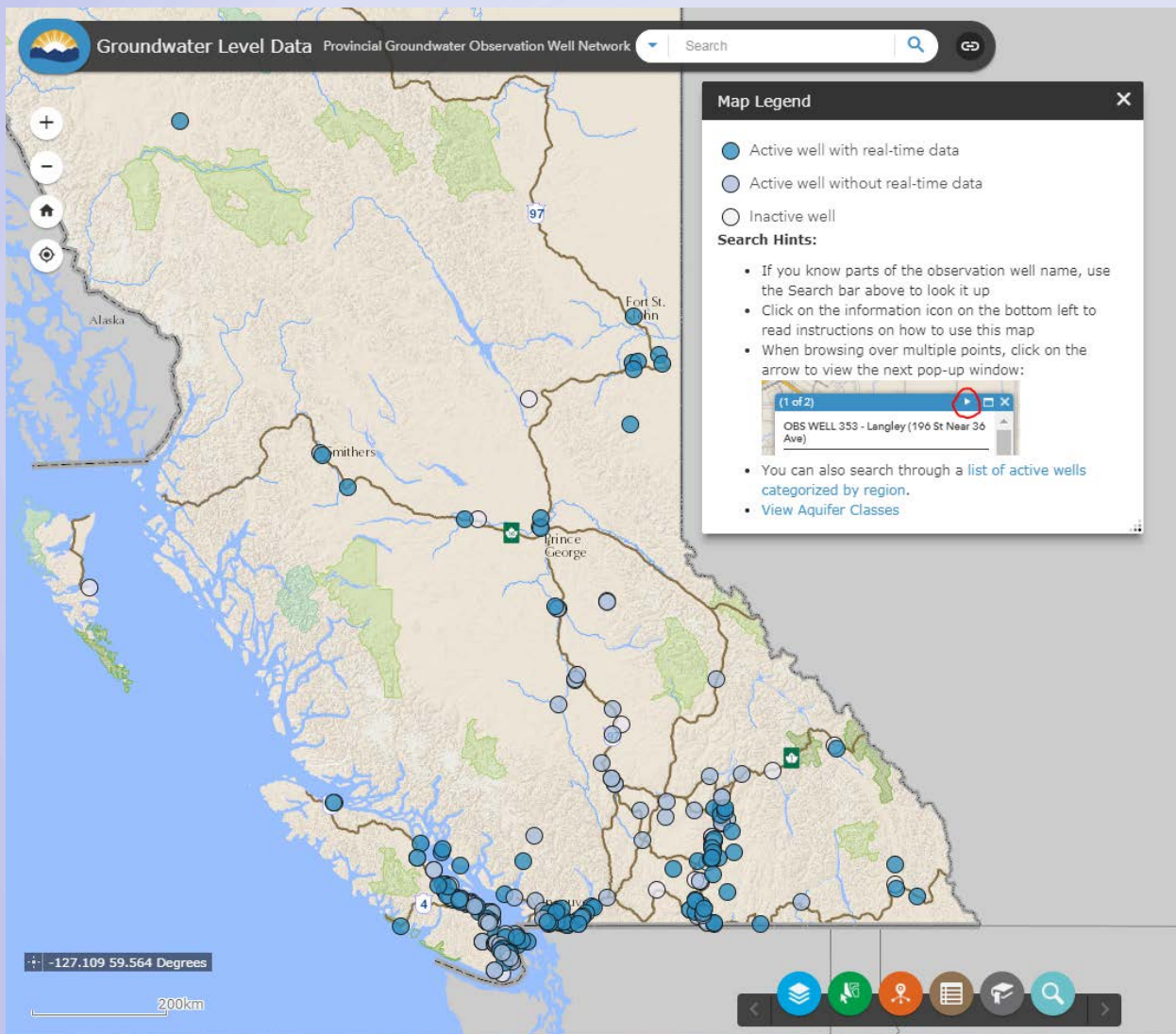
- Submission of Well Records
- Edit-ability of Well Records
- Aquifer Data and Information
- Register of Well Drillers and Well Pump Installers
- Integration with other groundwater related applications e.g. Aquifer dashboard



[Link](#)



# Groundwater Level Data Interactive Map

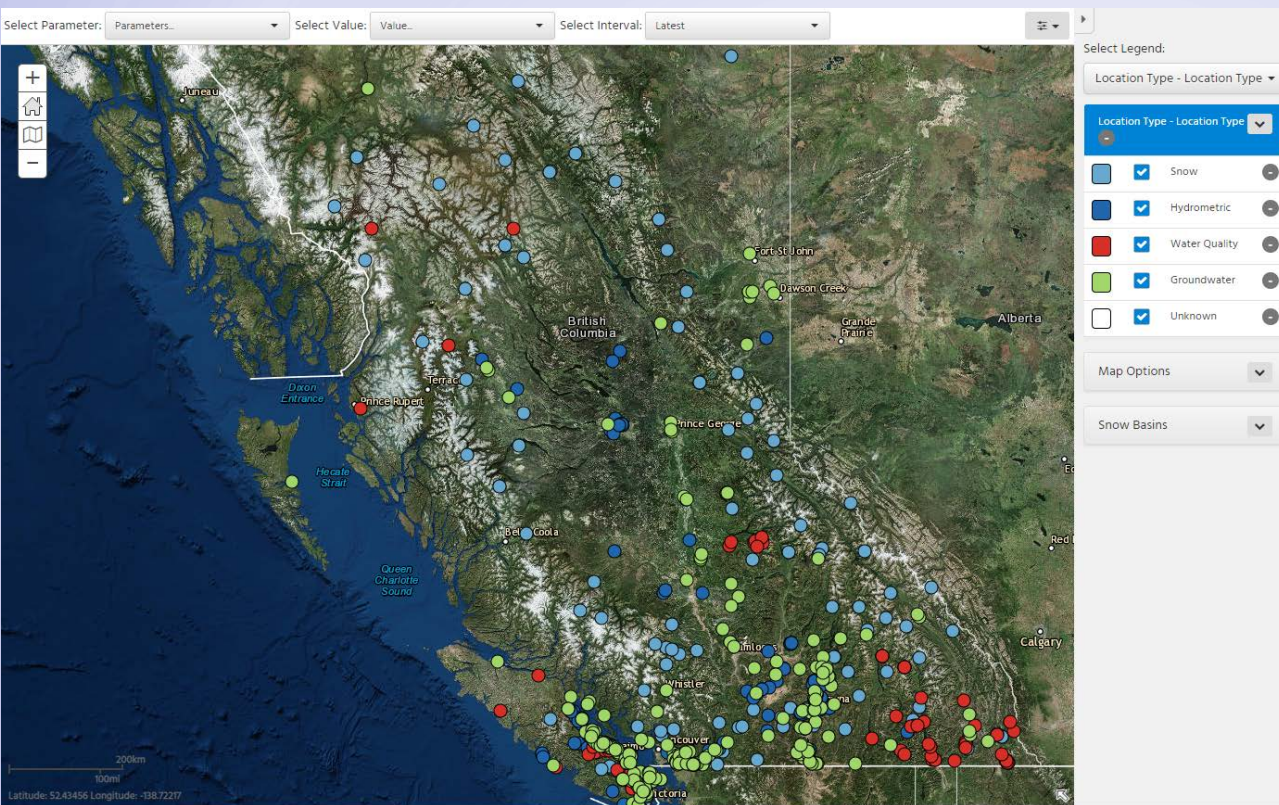


- View hydrographs
- Compare to long-term record (min, max, average)
- Download data

[Link](#)



# Real Time Water Data (Aquarius)



- View and download data from groundwater and surface monitoring sites
- Statistical analysis and display options

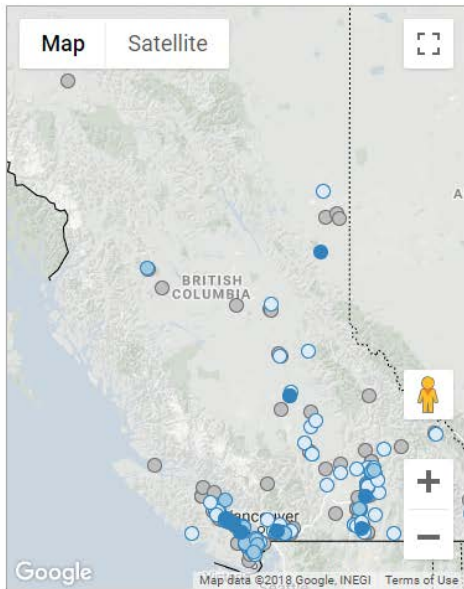
[Link](#)



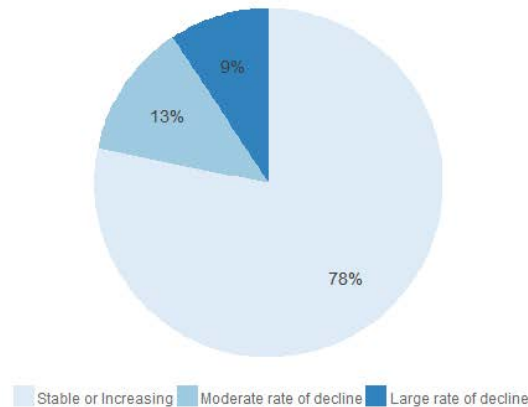


# State of Environment Reporting

- Evaluation of long-term Trends in groundwater levels-completed 2014
- Evaluation of long-term trends - updated analysis to be completed shortly (in 2018)

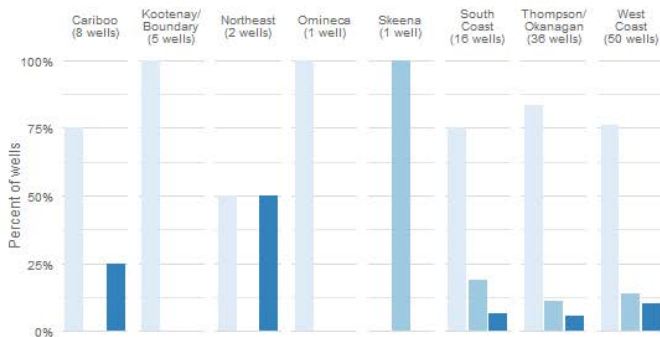


Percentage of observation wells in three different categories of long-term trends in water levels

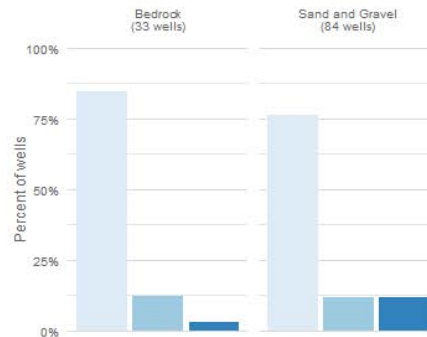


○ Stable or Increasing ○ Moderate declines ○ Large declines  
● Not enough data to date for trend analysis

Trends in groundwater levels by region



Trends in groundwater levels by aquifer type



[Link](#)



# Ministry of Forests, Lands, Natural Resource Operations and Rural Development

British Columbia Drought Information Portal

Last Drought Level Update - September 20, 2018



BRITISH COLUMBIA

Drought in BC BC Drought Map West Coast Stream Watch BC Angling Closure Map Historical BC Drought Information 7-Day Average Streamflow Map

**British Columbia Drought Information Portal**

A geographic drought level information system for the Province of British Columbia

Drought is a recurrent feature of climate involving a deficiency of precipitation over an extended period of time, resulting in a water shortage. The British Columbia Drought Information Portal (DIP) was created as a single source geographic drought level information system for British Columbians. The application uses multiple embedded maps to provide information on provincial drought levels, angling closures, historical drought time-lapse information and other drought information. Drought levels and other data are updated regularly as it becomes available.

[Drought Information Bulletins](#)

[Angling Closure Information Bulletins](#)

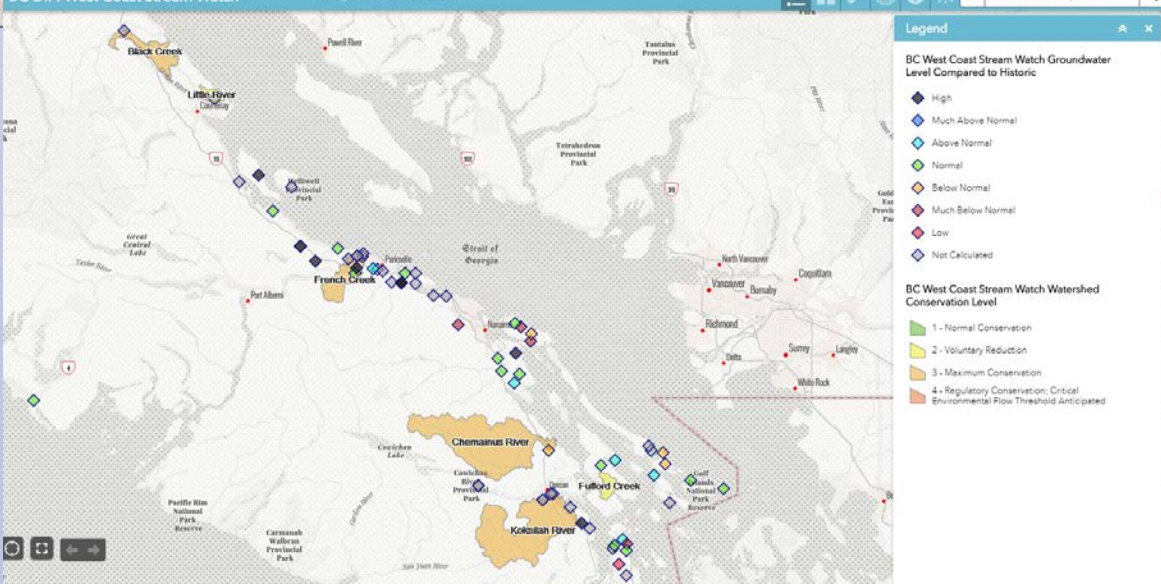
2018 DROUGHT LEVELS AT A GLANCE

Watershed	High	Much Above Normal	Above Normal	Normal	Below Normal	Much Below Normal	Low	Not Calculated
Black Creek								
Little River								
French Creek								
Chemainus River								
Kokoiatan River								
Fulford Creek								
... (many more rows) ...								



BC DIP: West Coast Stream Watch

Drought Information Website



## Drought Portal

- Provincial Drought Map and updates during dry season
- West Coast Stream Watch:
  - Current state of drought in priority watersheds (Koksilah R., Chemainus R., French Ck, Black Ck, Little R.)

[Link](#)



# Well drilling advisories

- See [Information for Well Drillers & Well Pump Installers > Well Drilling Advisories](#)
- Check advisories for artesian conditions in BC, currently completed for:
  - [Coldstream](#)
  - [Westwold](#)
  - [Surrey and Langley](#)
  - [Lower Mission Creek, Kelowna](#)
  - [Vancouver, Burnaby and New Westminster](#)
  - [Chetwynd](#)



Flowing artesian conditions exist in low elevation valleys in Chetwynd, BC. Well drillers and home owners should be aware of potential complications and costs of flowing artesian wells.



#### Where do flowing artesian conditions occur?

The District of Chetwynd is an area of known flowing artesian conditions. The potential areas under artesian pressure are located in Centurion Creek valley stretching from northeast to southwest across Highway 97 and the Pine River valley from Chetwynd towards the southeast (Figure 1).

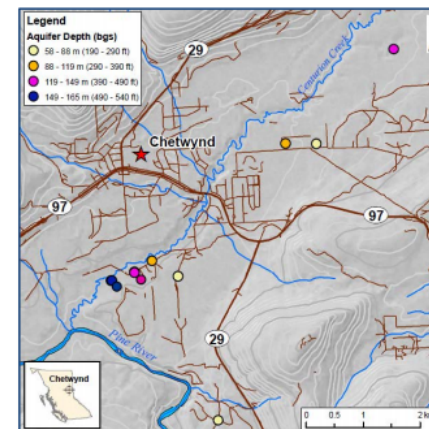


Figure 1: Chetwynd flowing artesian wells (bgs: below ground surface). Aquifer depth is inferred from well depth.

#### What is a flowing artesian well?

Flowing artesian wells occur when a well is drilled into an aquifer under pressure that is high enough to force the water level in the well to rise above the ground surface and flow over the top of the well casing.

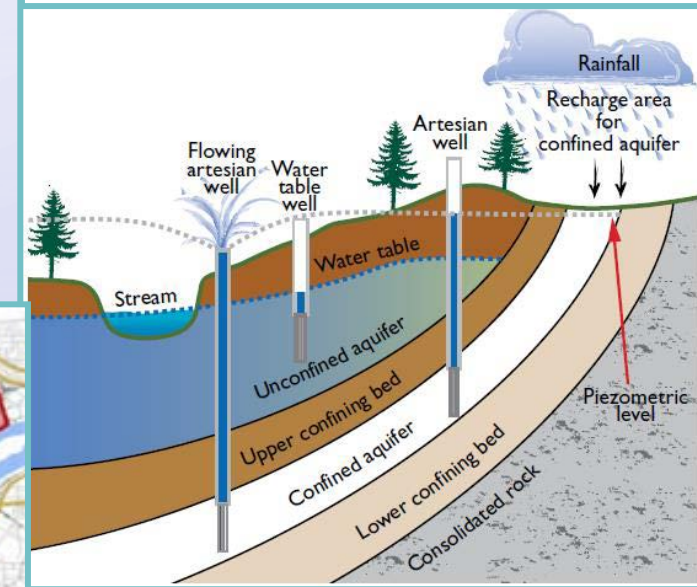
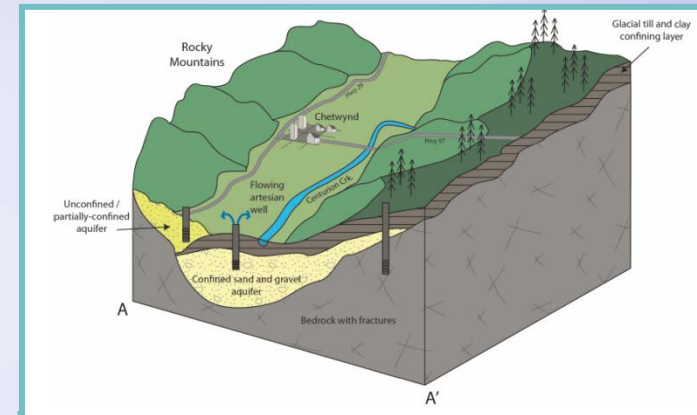
It is important to properly construct the well to control this flow. Controlling artesian flow conserves groundwater resources, preserves the pressure within the aquifer, and prevents damage to the natural environment (i.e., property damage, flooding, erosion and impacts to surface water). A flowing artesian well can cause substantial damage and incur significant and unexpected costs if not carefully planned and constructed. Well drillers and well owners should be prepared in advance in case flowing artesian conditions are encountered.



# Artesian Flowing Wells

## Prevention

- Well Drilling Advisories
- Mapping
  - iMapBC
  - BC Water Resources Atlas
- Other resources (e.g. Qualified Professionals)
- [Link](#)





# Legislated Requirements

## “Under Control”

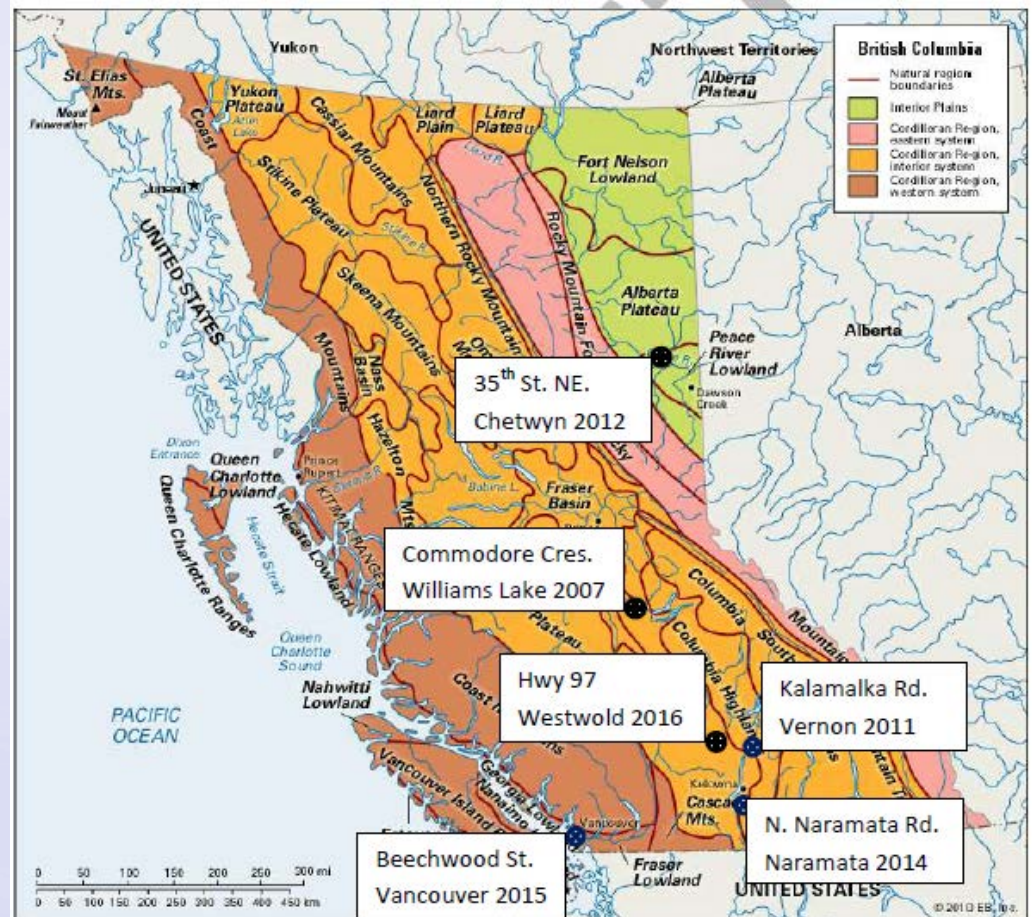
- Clear of sediment
- Entirely conveyed through casing (if applicable)
- Can be turned off indefinitely
- Does not pose a threat to property, public safety or the environment





# Major Flowing Artesian Wells

- The Province is looking at known flowing artesian wells to identify commonalities, lessons learned and opportunities for improved policy and practice.





## Flowing Artesian Wells

Improvements since 2016 (WSA) include:

- GX drilling requires qualified GX well drillers
- Definition of 'under control' has been clarified
- Submission of well records mandatory, including all artesian wells
- New flowing artesian advisories have been developed

Opportunities include:

- Reviewing artesian conditions
- Improved drilling practices
- Submission of artesian well condition reports
- Continue to work collaboratively with BCGWA



# Ministry of Forests, Lands, Natural Resource Operations and Rural Development

## Well Record Submission

The person responsible for drilling, altering, or decommissioning a well must provide a completed well construction report to the comptroller and the well owner within 90 days:

- water supply
- permanent monitoring, dewatering, or remediation wells
- recharge or injection wells made by drilling or boring
- closed-loop geexchange
- geotechnical
- any class of well with artesian flow

Ministry of Environment

Well Construction Report  
 Well Closure Report  
 Well Alteration Report

Stamp company name/address/ phone/fax/street here, if desired.

Ministry Well ID Plate Number: \_\_\_\_\_  
 Ministry Well Tag Number: \_\_\_\_\_  
 Confirm alternative space attached  
 Original well construction report attached

**Red lettering indicates minimum mandatory information. See reverse for notes & definitions of abbreviations.**

Owner name: \_\_\_\_\_ Town \_\_\_\_\_ Prov. \_\_\_\_\_ Postal Code \_\_\_\_\_

Mailing address: \_\_\_\_\_  
 \_\_\_\_\_

Well Location (see note 2): Address: Street no. \_\_\_\_\_ Street name \_\_\_\_\_ Town \_\_\_\_\_

Legal description: Lot \_\_\_\_\_ Plan \_\_\_\_\_ D.L. \_\_\_\_\_ Block \_\_\_\_\_ Sec. \_\_\_\_\_ Twp. \_\_\_\_\_ Pg. \_\_\_\_\_ Land District \_\_\_\_\_

PID: \_\_\_\_\_ and Description of well location (attach sketch, if nec.): \_\_\_\_\_

NAD 83: Zone: \_\_\_\_\_ UTM Easting: \_\_\_\_\_ m and Latitude (see note 4): \_\_\_\_\_  
 (see note 3) UTM Northing: \_\_\_\_\_ m and Longitude: \_\_\_\_\_

Method of drilling:  air rotary  dual rotary  cable tool  mud rotary  auger  driving  jetting  other (specify): \_\_\_\_\_  
 Orientation of well:  vertical  horizontal Ground elevation: \_\_\_\_\_ ft (asl) Method (see note 5): \_\_\_\_\_  
 Class of well (see note 6): \_\_\_\_\_ Sub-class of well: \_\_\_\_\_

Water supply wells: indicate intended water use:  private domestic  water supply system  irrigation  commercial or industrial  other (specify): \_\_\_\_\_

Lithologic description (see notes 8-13) or closure description (see notes 14 and 15)

From ft (bgl)	To ft (bgl)	Surficial Material													Bedrock Material		Colour		Hardness		Water Content			Observations (e.g. other geological materials (e.g. boulders), est. water bearing flow (USgpm), or closure details)
		Gravel	Sand	Silt	Clay with silt/clay sand	Sand with silt/clay	Silt with sand/clay	Clay with sand/silt	Sandstone	Siltstone	Claystone	Shale	Other (specify)	Other (specify)	Other (specify)	Other (specify)	Other (specify)	Other (specify)	Other (specify)	Other (specify)				

**Casing details**

From ft (bgl)	To ft (bgl)	Dia in	Casing Material (see note 17)	Open Hole	Wall Thickness in	Drive Shoe

**Screen details**

From ft (bgl)	To ft (bgl)	Dia in	Type (see note 18)	Slot Size

Surface seal Type: \_\_\_\_\_ ft  
 Depth: \_\_\_\_\_ ft  
 Method of installation:  Poured  Pumped Thickness: \_\_\_\_\_ in  
 Backfill Type: \_\_\_\_\_ Depth: \_\_\_\_\_ ft  
 Liner:  PVC  Other (specify): \_\_\_\_\_  
 Diameter: \_\_\_\_\_ in Thickness: \_\_\_\_\_ in  
 From: \_\_\_\_\_ ft (bgl) To: \_\_\_\_\_ ft (bgl) Perforated: From: \_\_\_\_\_ ft (bgl) To: \_\_\_\_\_ ft (bgl)

Intake:  Screen  Open bottom  Uncased hole  
 Screen type:  Telescope  Pipe size  
 Screen material:  Stainless steel  Plastic  Other (specify): \_\_\_\_\_  
 Screen opening:  Continuous slot  Slotted  Perforated pipe  
 Screen bottom:  Ball  Plug  Plate  Other (specify): \_\_\_\_\_  
 Filter pack: From: \_\_\_\_\_ ft To: \_\_\_\_\_ ft Thickness: \_\_\_\_\_ in  
 Type and size of material: \_\_\_\_\_

Developed by:  
 Air lifting  Surging  Jetting  Pumping  Bailing  
 Other (specify): \_\_\_\_\_ Total duration: \_\_\_\_\_ hrs  
 Notes: \_\_\_\_\_

Well yield estimated by:  
 Pumping  Air lifting  Bailing  Other (specify): \_\_\_\_\_  
 Rate: \_\_\_\_\_ USgpm Duration: \_\_\_\_\_ hrs  
 SWL before test: \_\_\_\_\_ ft (btoc) Pumping water level: \_\_\_\_\_ ft (btoc)

Obvious water quality characteristics:  
 Fresh  Salty  Clear  Cloudy  Sediment  Gas  
 Colour/odour: \_\_\_\_\_ Water sample collected:  \_\_\_\_\_

Well driller (print clearly):  
 Name (first, last) (see note 10): \_\_\_\_\_  
 Registration no. (see note 20): \_\_\_\_\_  
 Consultant (if applicable, name and company): \_\_\_\_\_

Final well completion data:  
 Total depth drilled: \_\_\_\_\_ ft Finished well depth: \_\_\_\_\_ ft (bgl)  
 Final stick up: \_\_\_\_\_ in Depth to bedrock: \_\_\_\_\_ ft (bgl)  
 SWL: \_\_\_\_\_ ft (btoc) Estimated well yield: \_\_\_\_\_ USgpm  
 Artesian flow: \_\_\_\_\_ USgpm, or Artesian pressure: \_\_\_\_\_ ft  
 Type of well cap: \_\_\_\_\_ Well disinfected  Yes  No

Well closure information:  
 Reason for closure: \_\_\_\_\_  
 Method of closure:  Poured  Pumped  
 Sealant material: \_\_\_\_\_ Backfill material: \_\_\_\_\_  
 Details of closure (see note 16): \_\_\_\_\_

Date of work (YYYY/MM/DD):  
 Started: \_\_\_\_\_ Completed: \_\_\_\_\_  
 Comments: \_\_\_\_\_

DECLARATION: Well construction, well alteration or well closure, as the case may be, has been done in accordance with the requirements in the Water Act and the Ground Water Protection Regulation.

Signature of Driller Responsible: \_\_\_\_\_

PLEASE NOTE: The information recorded in this well report describes the works and hydrogeologic conditions at the time of construction, alteration or closure, as the case may be. Well yield, well performance and water quality are not guaranteed as they are influenced by a number of factors, including natural variability, human activities and condition of the works, which may change over time.

while: Customer copy  
 during: Driller copy  
 post: Ministry copy





## Well Record Submissions

- Its an important reminder that since the WSA came into force, most Well Completion Reports need to be submitted.

Well Completion/Alteration/Decommissioning Report submission is mandatory for most wells under the *Water Sustainability Act*

- Its important to clarify that it's the responsibility of the driller (not the well drilling company) to submit the well record.
- Failure to submit a well record is a ticketable offense (**\$230 per instance**).
- The province will be reviewing the QWD registry and well submissions to verify compliance.



# Groundwater Licensing

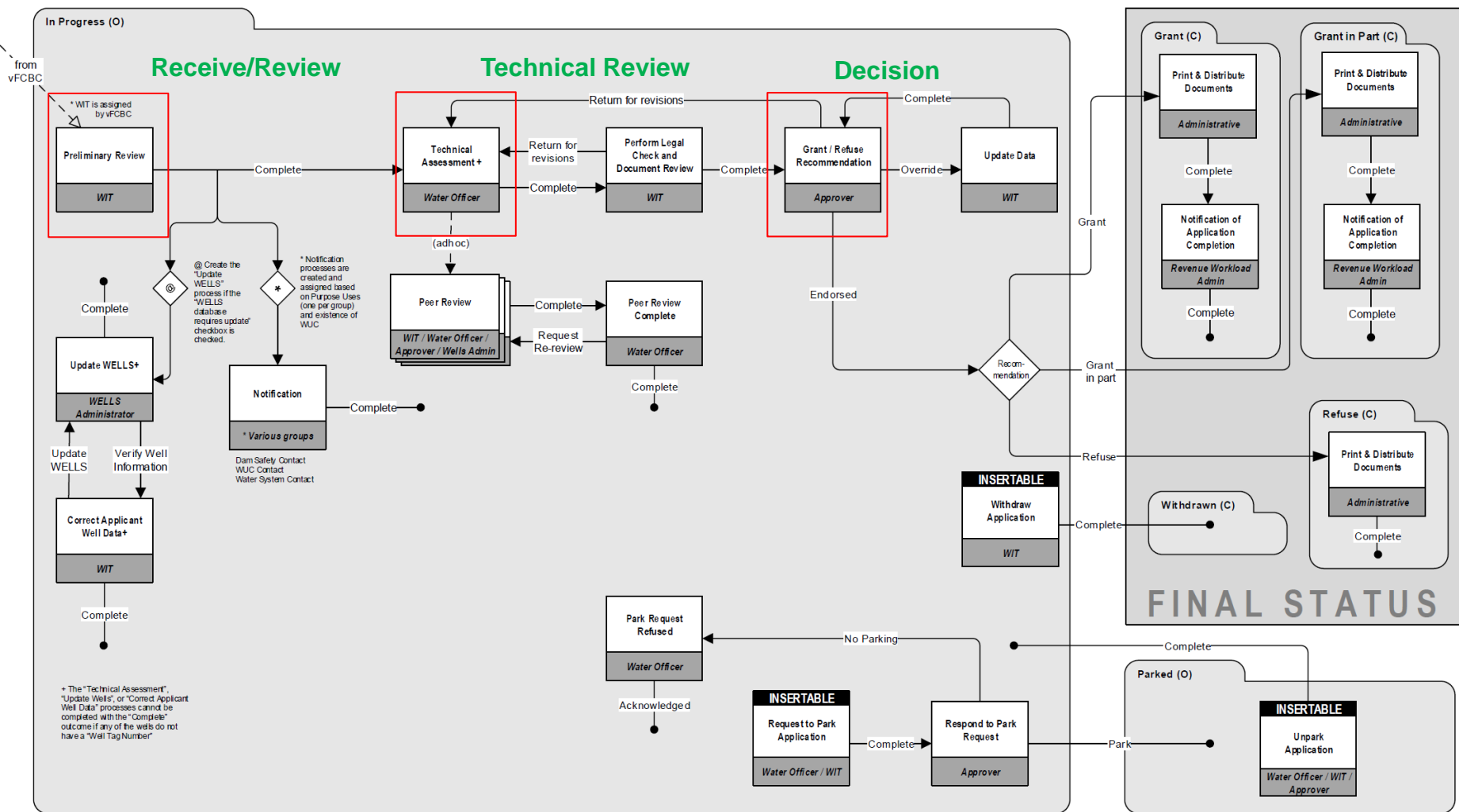
- The WSA requires a licence for all non-domestic groundwater use (e.g., irrigation, industrial, commercial, etc.)
- Existing groundwater use (before Feb 29/16): 3-year transition period. Rentals accrue from Feb 29/16 regardless of when the application is submitted.
- New groundwater use (starting Feb 29/16): must not use water until after licence is granted
- Surface water and groundwater to be managed under the same regulatory regime





# Ministry of Forests, Lands, Natural Resource Operations and Rural Development

## How do we process a licence?





# How do we assess the application?

- Adequacy of supply
- Likelihood of hydraulic connection to streams and other aquifers
- Potential impact on nearby groundwater users
- Other relevant issues

WATER SCIENCE SERIES

Guidance for Technical Assessment Requirements in Support  
of an Application for Groundwater Use in British Columbia

Jenn Todd, P. Geo., Mike Wei, P. Eng., Michele Lepitre, P. Geo.

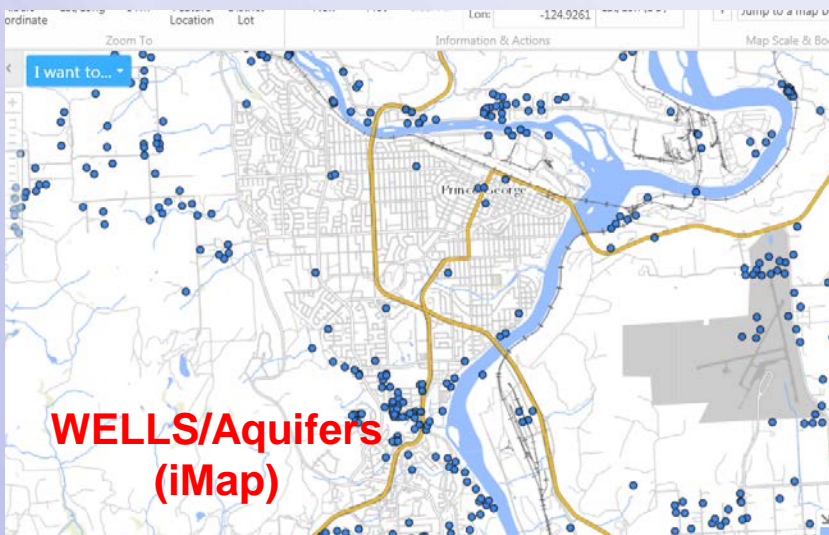
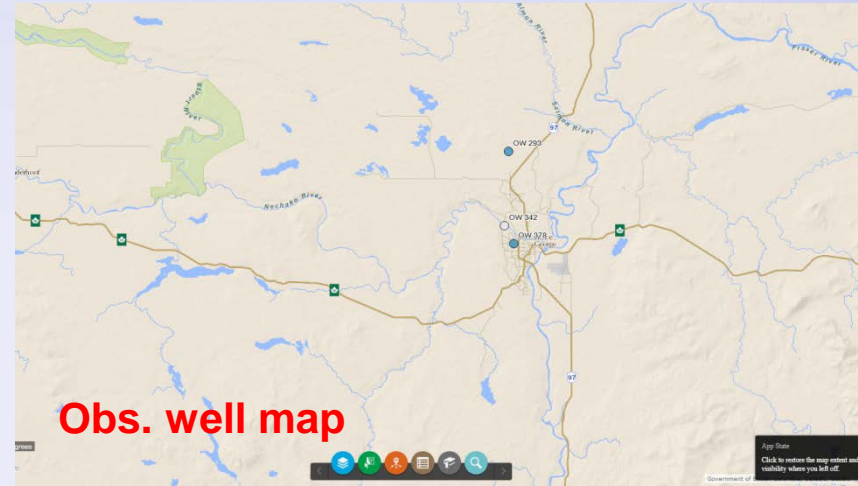
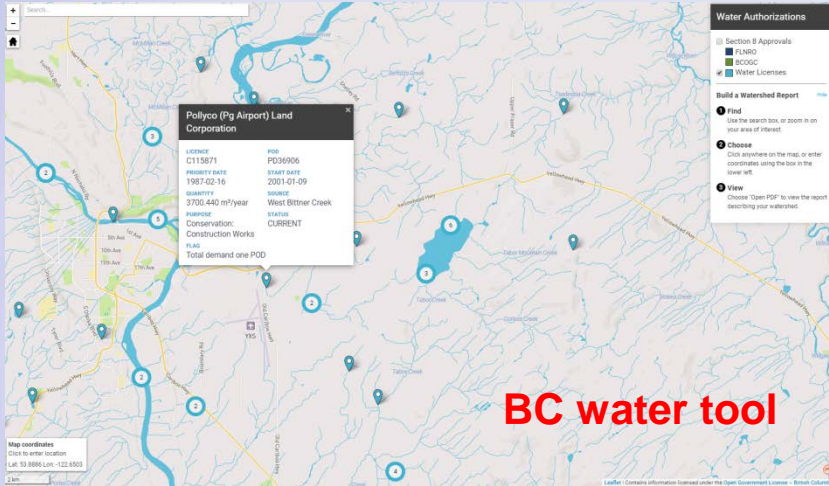


Version 1.0





## Tools to help prepare the technical report





# Provincial Summary – Licensing for Existing Use Groundwater Users

Received-Existing Use				Granted-Existing Use			
South Coast	West Coast	North Area	South Area	South Coast	West Coast	North Area	South Area
376	517	543	685	55	60	103	79



Ministry of **F**orests, **L**ands, **N**atural Resource **O**perations  
and **R**ural **D**evelopment

# Annual Regional Update

## South Coast Region



# South Coast Region Groundwater Science Update

- Recently updated aquifer characterization and mapping:
  - Langley
  - Chilliwack
  - Abbotsford
  - Hope
- Groundwater-Surface Water Interaction Studies
  - Phase 1 (Steele Park) – complete
  - Phase 2 (Otter Park) – ongoing

WATER SCIENCE SERIES

## Assessment of Aquifer-Stream Connectivity Related to Groundwater Abstraction in the Lower Fraser Valley

Phase 1 Field Investigation

Glenn Hall, Diana M. Allen, Mike Simpson, Habtamu Tolera,  
Bryan Jackson, Mary Ann Middleton, and Michele Lepitre







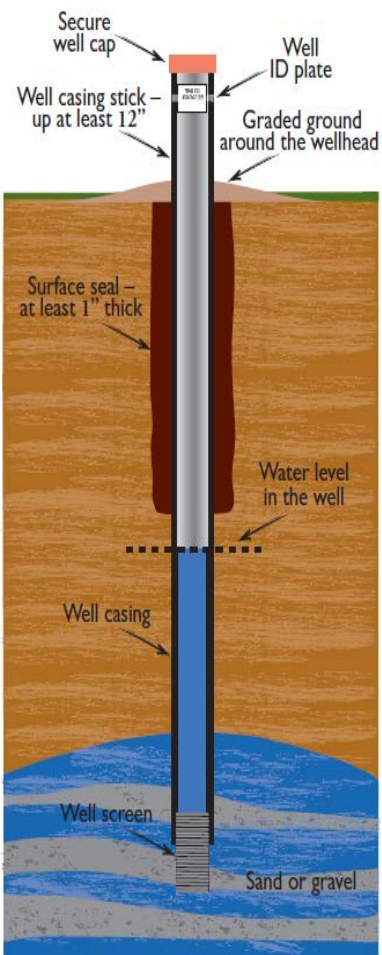
## South Coast Region PGOWN Update

- Drilled 8 new PGOWN wells over the past year
- Adopted 8 new PGOWN wells from local governments
- 51 active PGOWN wells in the South Coast Region
- Actively monitoring almost 20% of mapped aquifers in the South Coast Region
- More expansion planned over the coming months/years





# South Coast Region Groundwater Compliance Summary



**Licensing  
Inspection  
Audits**

16

**Complaint  
Driven  
Inspections**

6

**Total Wells  
Inspected**

22

**Total  
Number of  
Compliance  
Issues**

11



# South Coast Region Groundwater Licensing Summary

## GROUNDWATER APPLICATION SUMMARY

	FrontCounter BC	Groundwater Authorizations	Abandoned	Parked	Licences Granted	Total
Existing Use	171	148	2	0	55	376
New Use	9	10	1	5	13	38
STU	0	4	1	2	14	21
Amendments	0	1	0	0	4	5
<b>Total</b>	<b>180</b>	<b>163</b>	<b>4</b>	<b>7</b>	<b>86</b>	<b>440</b>



# Thank You!

## More information:

Regional Hydrogeologist

Michele Lepitre, P.Geo.

Email: [Michele.Lepitre@gov.bc.ca](mailto:Michele.Lepitre@gov.bc.ca)

Phone: 604-586-2821



**WSA and GWPR**

<http://engage.gov.bc.ca/watersustainabilityact>

[http://www.env.gov.bc.ca/wsd/plan\\_protect\\_sustain/groundwater](http://www.env.gov.bc.ca/wsd/plan_protect_sustain/groundwater)



# Ministry of Forests, Lands, Natural Resource Operations and Rural Development

