

# **Evolving Water Use Regulations British Columbia Shale Gas**

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# B.C. Presentation Overview

- GW vs. SW
- Shale gas industry
- Water regulations – current
- Drivers for new regulations
- Evolving regulations relevant to O&G
- GW management *Best Practices*
- Current work in Horn River Basin
- Closure (Q&A)

# B.C. Groundwater Regulation

*WaterTech (2010) → “The only jurisdiction in Canada that does not regulate groundwater use.”*

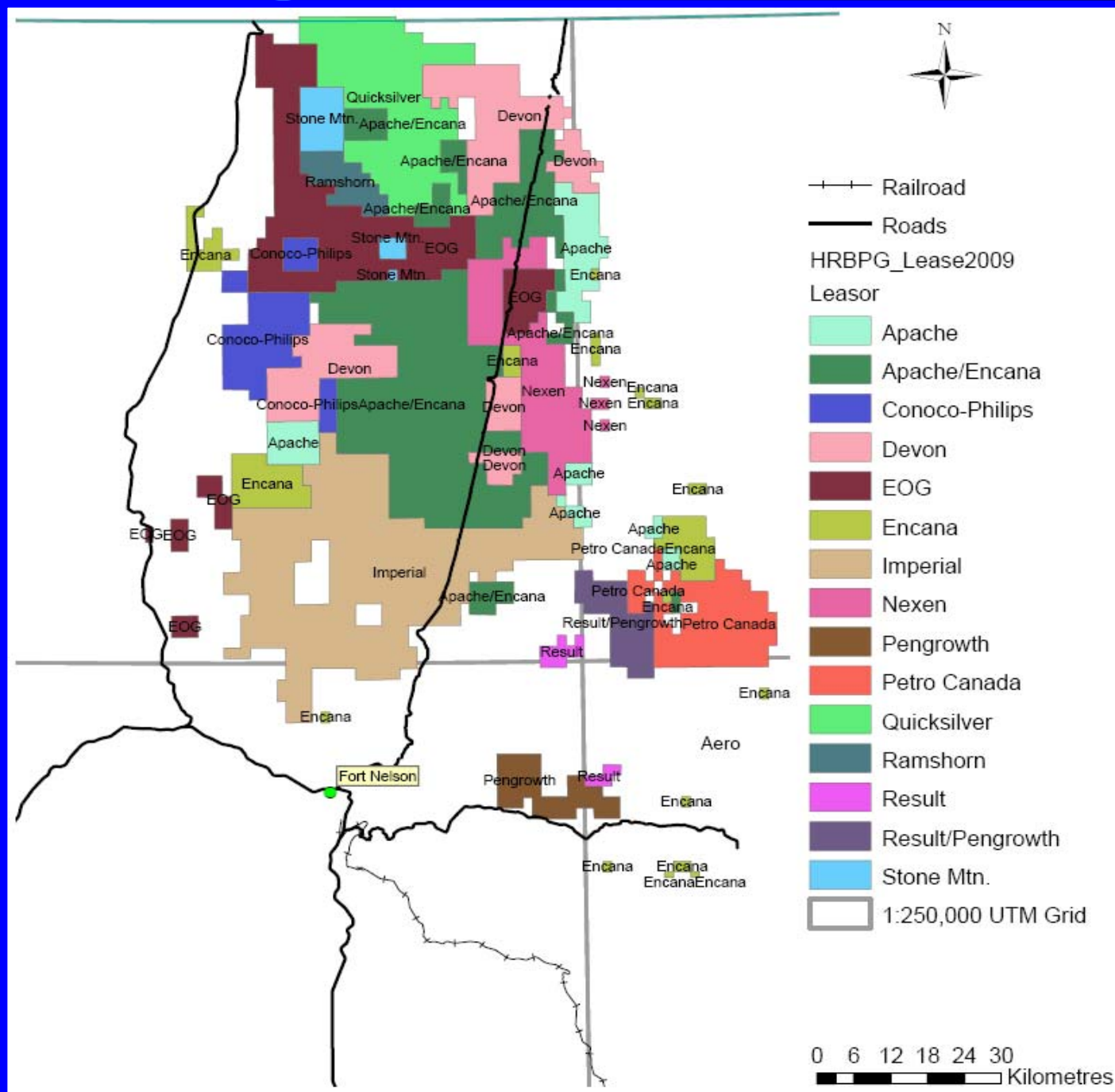
*WaterTech (2011) → well, not exactly, but...*

# Groundwater vs. Surface Water

- B.C. water regulations historically focussed on surface water (SW)
- Groundwater (GW) extraction currently does not require licensing in B.C.
- GW use increasing in B.C.

# B.C. Shale Gas Evolution

- Key areas:
  - Horn River Basin
  - Cordova Embayment
  - Montney
- New, rapidly developing market
- Remember..., *no water = no gas*



# Horn River Basin Lease Map

# Horn River Basin

- 1.3 million hectares
- 16 companies currently operating
- Huge water needs:
  - Camps: 200-400 people
  - 40-80 Igpm (1,200 L/person/day)
- Drilling and Fracturing
  - 40,000 m<sup>3</sup> per well for fracing over several days

**Currently: water use = SW**

# Horn River Basin

- By 2012: 200 gas wells estimated
- Up to 50,000 gas wells may be developed in the Basin
- GW will be required
- Need water mgmn't systems to ensure sustainable development
  - SW and GW



# B.C. Water Regulators

- B.C. MOE (mandated to develop the Water Sustainability Act)
- Forest Lands and Natural Resource Operations (mandated to administer Water Act)
- B.C. Ministry of Health
- OGC – specific to O&G industry

# B.C. Water Act - Surface Water

Diversion and use of all surface water in B.C. must be authorized under *Water Act*

- “first in time first in right” (FITFIR)
  - Priority based on license date not on water use
- “use it or lose it principle”

# B.C. – Fish Protection Act

- Introduced in 1997:
  - Not fully implemented
  - Strengthen fish habitat protection from water allocations
  - Sensitive streams and riparian area regulations
  - Allows minister to temporarily reduce water use during drought

# B.C. – Environmental Assessment Act

- 2002, last amended 2010
- *Reviewable Project Regulation*
- Large Groundwater Extraction Project
  - >1 year AND >75 L/s (1,000 l/gpm/ 6,500 m<sup>3</sup>/day)
  - Full Environmental Assessment required (includes assessment of all GW users, potential cumulative effects, etc)
  - **Applicability to saline water being challenged**

# Drivers for New Regulations

- Regulations mostly apply to SW
- Over 1 million people in B.C. drink GW
  - Expected to increase
- Regulation of SW and GW not integrated
- **Emerging O&G industry in B.C.**

# **B.C. MOE –**

## ***Water Act Modernization***

- *Living Water Smart: B.C.'s Water Plan*
- Four Main Goals (by 2012)
  - Protect stream health and aquatic environments
  - Improve water governance arrangements
  - Introduce more flexibility and efficiency in the water allocation system
  - Regulate ground water use in priority areas and for large withdrawals

**Current: Policy Development Stage**

# B.C. - Oil and Gas Activities Act

- (OGAA) October 2010
- Consolidation of:
  - Oil and Gas Commission Act
  - Pipeline Act
  - **Petroleum and Natural Gas Act**

# B.C. - Oil and Gas Activities Act

- OGC Water Permits (*Water Act*), addressing surface water:
  - Section 8, 9 and 26 permits
  - Routine
  - Non-routine
- Relevant to GW:
  - Drilling and Production Regulation
  - Water Permitting Process



# OGC Surface Water Permitting Process

- *Water Act* (Section 8) – application for Short Term Use of Water
- *Water Act* (Section 9) – Application for Changes to a Stream
- *Water Act* (Section 26) – Application to transfer water via temporary above-ground lines
- Routine and non-routine applications

# OGC - Groundwater Relevant Regulations: Definitions

## *Water Source Well*

*“Hole in the ground drilled to obtain water for the purpose of injecting water into an underground formation in connection with the production of petroleum or natural gas”*

## *Well*

*“...includes a water source well”*

# OGAA + Regs – Water Source Well

## Cumulative Effects (domestic/agricultural)

- *“A permit holder must not operate a water source well in a manner than injuriously affects the use of the water source for **domestic or agricultural purposes**”*

## Water Use Reporting

- *“A well permit holder must report the **quantity** of water production from a water source well to the commission no later than 25 days after the end of the month in which the production occurred”*

# OGAA – Good Start, But...

- No reference in OGAA to potential interference between non-domestic users
- Absence of monitoring of water levels and on-going assessment of cumulative impacts to aquifers
- No procedures provided to help determine sustainable practices to avoid “injurious effects”
- Defines aquifers in terms of TDS **not yield = ??**

# Well Permit Application Manual

## Permits required for water source wells

- *“A water supply well permit is required before drilling a water supply well”*
- *“A well permit is required for a water source well used to obtain water for injection into an underground formation in connection with the production of petroleum or natural gas”*
- Version 1.7 – March 2011
- Version 1.8 – April 2011

# Groundwater Management Best Practices

- Proactive aquifer mgmn't
- Long-term monitoring (i.e., sustainable vs. mining)
- Regional approach and understanding
- Promotes sustainability

# Groundwater Exploration – Phase 1

- Government maps and reports:
  - GSC and BCGS Maps and reports
  - B.C. Water Well Record Database
  - Government Soil Maps
- Oil company data (well casing reports, geophysics logs)
- Climate data: Fort Nelson Airport
- BC Geoscience Study (Deep Hydrogeol.)

# Groundwater Exploration – Phase 2

- Ground or airborne geophysics
- Drilling and MW installation
- Aquifer testing and GW sampling
- Baseline water chemistry (isotopes)
- Information sharing (ArcGIS)
- Numerical modeling: regional systems



# Water Management Planning

- Cumulative impacts from all projects
  - Aquatic ecosystems
  - Sustainability and growth
  - Conservation measures, temporal use restrictions
- Climate change
- Path forward
  - Monitoring (flows, seasonal levels, use)
  - Water conservation, reuse, recycling
  - Restrictions on use during times of low flow

# Studies in the Horn River Basin

- Horn River Basin Subsurface Aquifer Project – Phase 1
  - Completed in 2008
  - Identification of deep saline aquifers, water supply and disposal
- Horn River Basin Surface Water Modeling Study:
  - Completed in 2010
  - Surface water monitoring stations recommended

# Studies in the Horn River Basin

- Horn River Basin Surface Water Monitoring Study (Pending)
  - To establish baseline conditions for surface water resources in the region
- Horn River Basin Airborne Electromagnetic Survey Pilot Study (Pending)
  - To conduct airborne electromagnetic surveys over 3 test sites over buried channel aquifers and assess usefulness of this tool for further use

# The Path Forward...

- Unique opportunity for industry to lead the way for sustainable water mgmn't
- Regs. in development for GW and SW
- Water mgmn't tools needed now to allow for sustainable development in the shale gas regions of B.C.
- If not, conflicts expected (and soon)

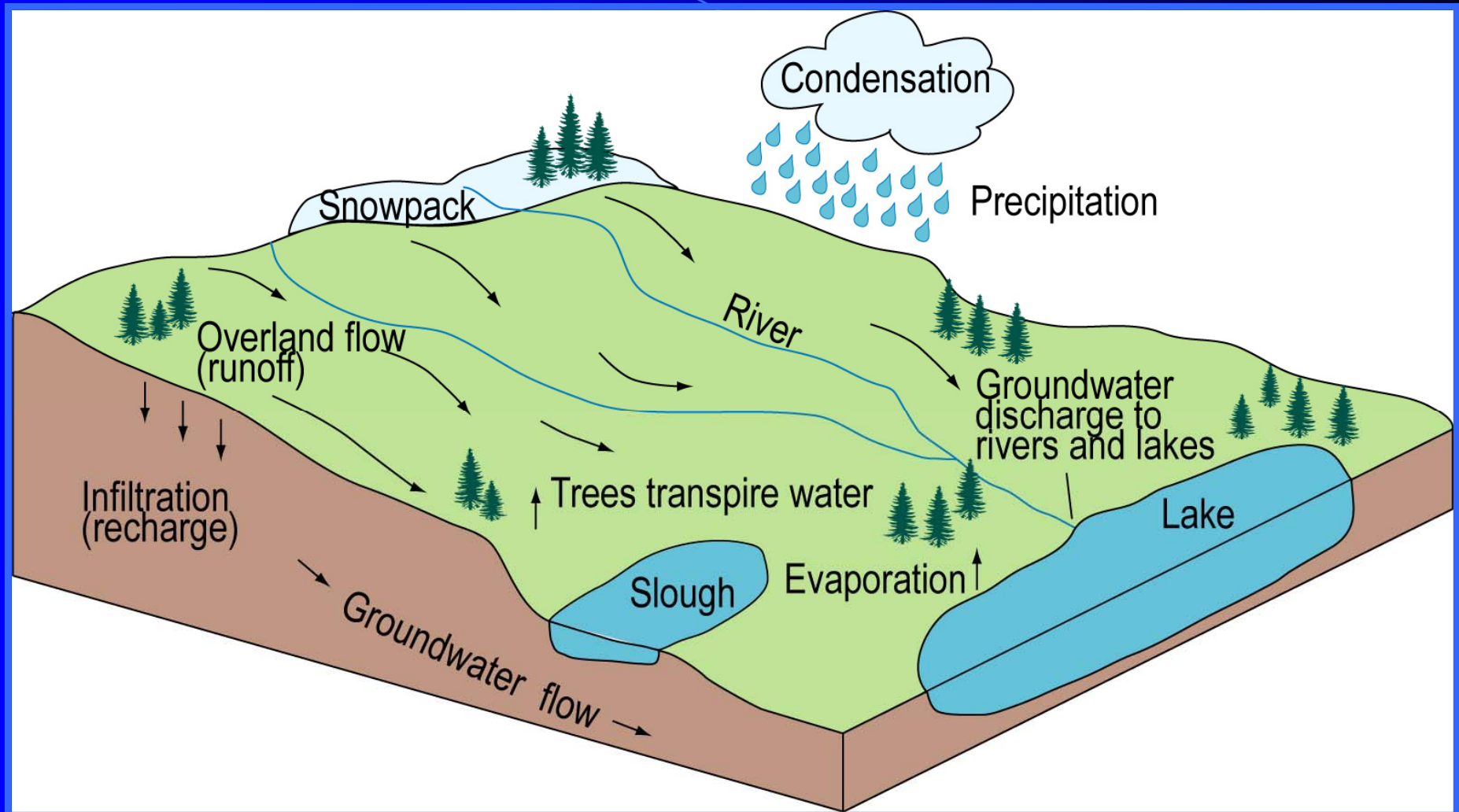
# Closure

- Thank You
- Questions



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# The Water Cycle/Budget



Regulation to date focuses on surface water

# B.C. – Water Protection Act

- 1995
- Sustainable use of B.C.'s water resources for conservation of environment
- Prohibition of bulk export and major inter-basin transfers of water in B.C

# B.C. – Ground Water Protection Regulation

- 2004 – Phase I
- Set standards for drilling, alteration, maintenance and closure of wells
- Well identification tool
- Use of registered qualified well drillers, and pump installers
- Phase II pending modernization of Water Act



# **B.C. - Drinking Water Protection Act and Regulation**

- 2001, updated to March 2011
- Regulates water systems other than single family dwellings:
  - potability of drinking water
  - Treatment, construction, operation and monitoring of water systems
  - Public notification of non-potable water
  - GUDI

# B.C. – Environmental Management Act

- 2004
- *Waste Discharge Regulation*
- Regulates discharge of waste to the environment, including to ground water

# B.C. – Water Utility Act

- Certificate of Public Convenience and Necessity
- Requirements for “Private Utilities”:  
*“Person/business delivering domestic water to 5 or more persons or corporation for compensation”*
- Not applicable to bottled water company...

# B.C. - Oil and Gas Commission

- OGC: Independent Regulator for Oil and Gas Activities in British Columbia
- Works with BC MOE to develop tools for SW and GW use for Oil and Gas
  - Oil and Gas Activities Act
  - Water Permitting Process
  - New Regulations rapidly being developed...

# OGC Directive 2011-02

- March 2, 2011
- Updated requirements for *Water Act* applications:
  - Quarterly reporting of volume extraction
  - Addition of dugouts as requiring permits for use as water source

# British Columbia - Direction

- BC is looking to other jurisdictions for direction on updating their systems of water governance

# B.C. – Water Laws

- Water Act (1909, 1939, 1960, 1979...)
- Water Protection Act (1995)
- Fish Protection Act (1997)
- Drinking Water Protection Act (2001)
- Ground Water Protection Regulation (2004)
- Environmental Management Act (2004)
- Environmental Assessment Act (2002)
- Water Utility Act/Utility Commission Act
- Oil and Gas Activities Act