

Water – Energy Nexus: Energy perspective

Panel Presentation to Canadian Water Summit

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FOR GENERATIONS

Water – Energy Nexus

- Context for Electricity Generation in Canada
- Hydro Power in British Columbia
- Water – Energy Governance in BC
 - Example: Water Use Planning



230kV line undercut by high river

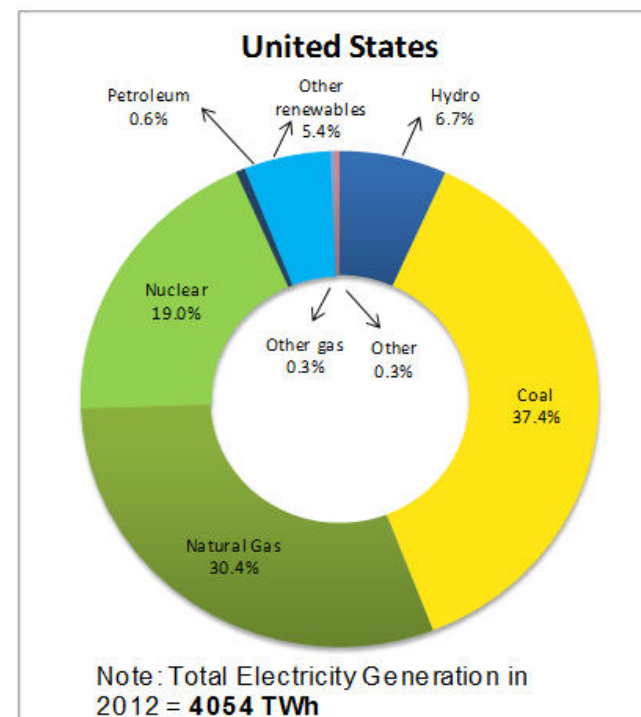
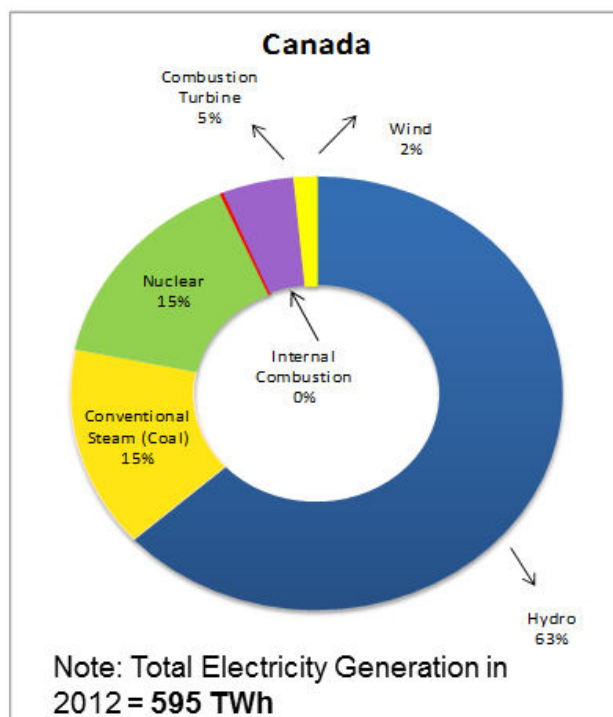
Electricity Fuel Sources Canada : US



Canadian
Electricity
Association

Association
canadienne
de l'électricité

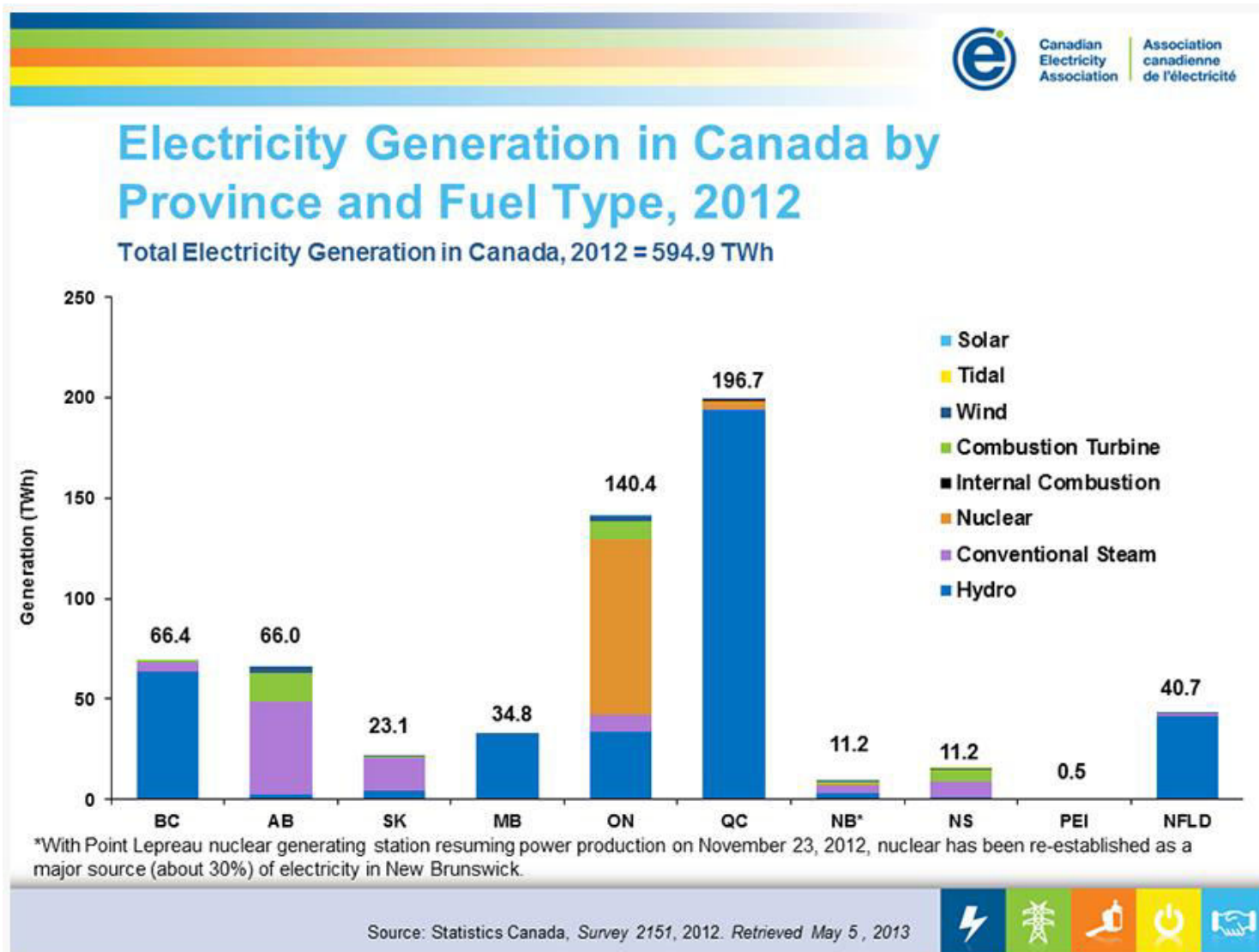
Electricity Generation in the US and Canada by Fuel Type,¹ 2012



¹Numbers may not sum to 100 percent due to rounding.
Source: US Energy Information Administration, *Electric Power Monthly* and Statistics Canada, *Survey 2151*, 2012,
Retrieved June 13, 2013

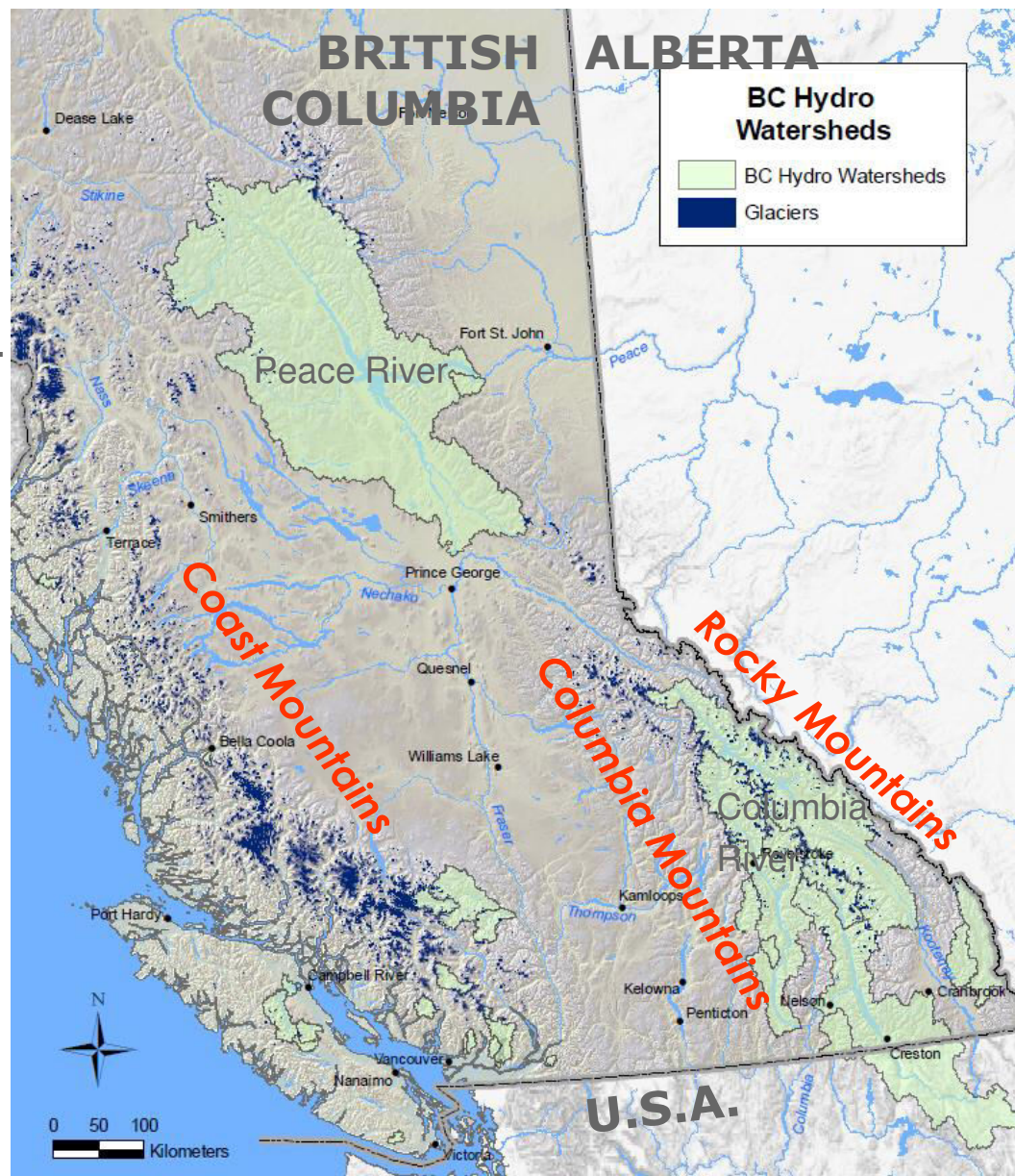


Electricity Fuel Type by Province



BC Hydro

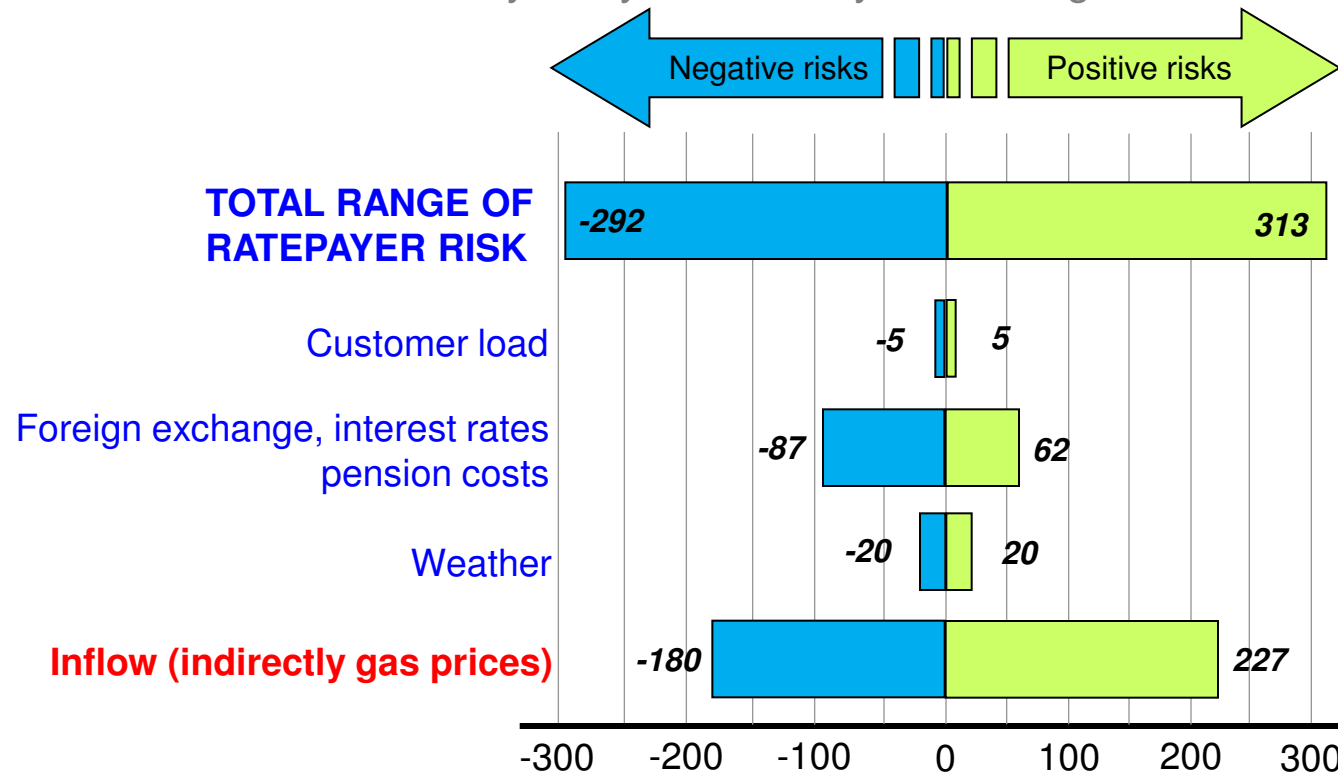
- 90% Hydro-electric
- 31 generating stations
- Crown Corporation
- Regulated by BC Utilities Comm.
- 80% of BCH Generation from large hydropower
- Energy varies from 43,000 to 54,000 GWh, dependent on the weather
- Increasing supply from Independent Power Producers (20% in 2011)
 - Small & large hydro, wind, thermal, biomass



Hydro Power Operations: A Risky Business

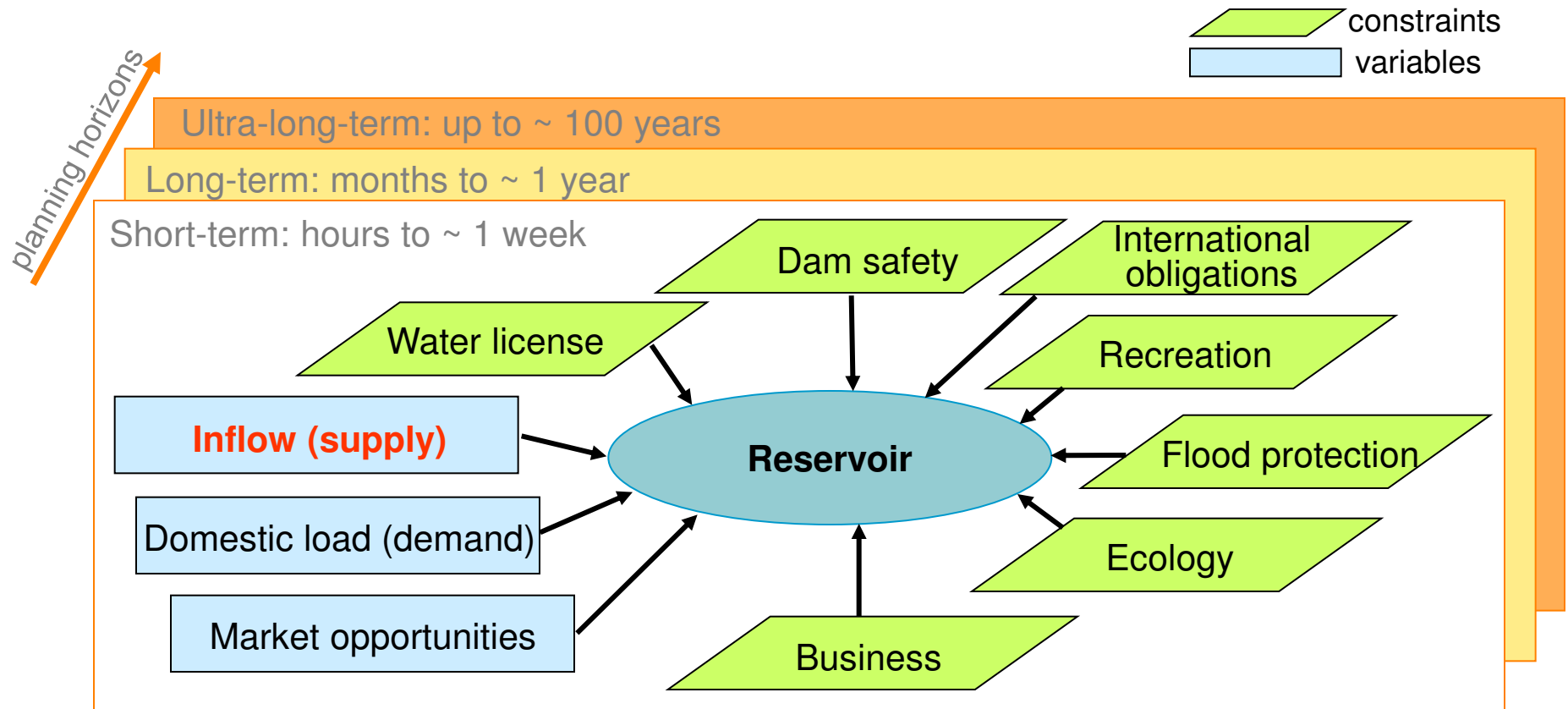
INFLOWS ARE THE LARGEST SOURCE OF UNCERTAINTY

Sensitivity analysis of BC Hydro earnings for FY11-13 in \$millions



Source:
BC Hydro Services Plan
2010/11 – 2012/13

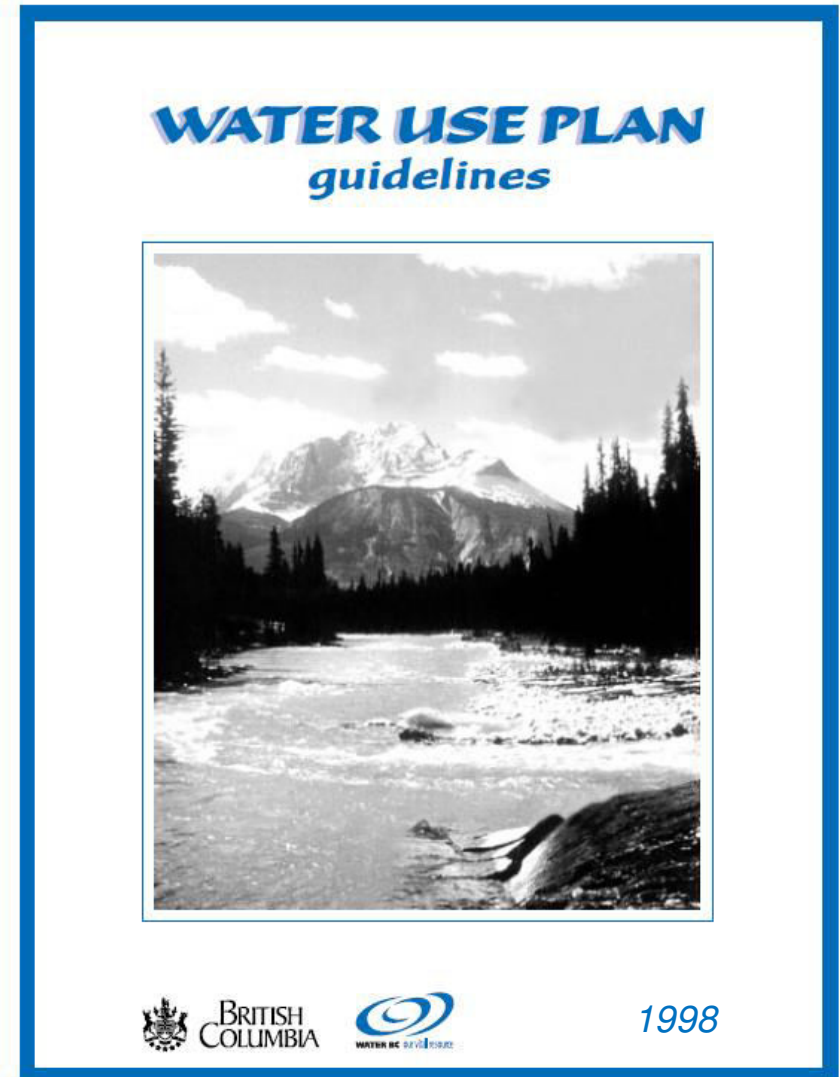
Hydro Power Operations



Water – Energy Governance

Water Use Plans

- Goal to find a better balance of water use
- BC Hydro developed 23 plans for 31 facilities
- Multi-stakeholder and First Nations engagement
- Clarified operating parameters for BC Hydro water licenses



Water Use Plan Outcomes to Date

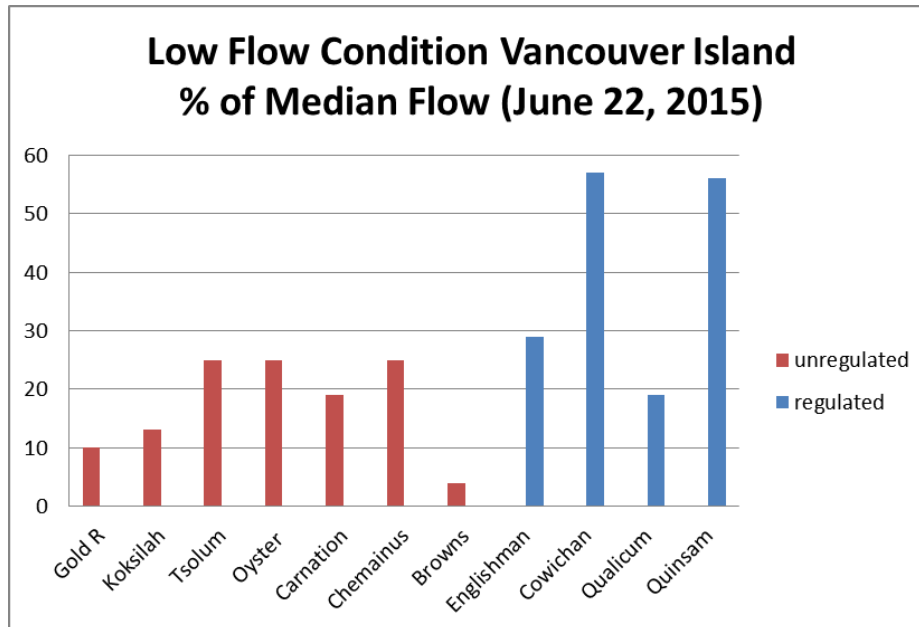
- 750 operating constraints
 - Water flows
 - Ramp rates
 - Reservoir ranges
- 300 projects
 - Monitoring
 - Boat ramps
 - Fisheries / habitat
 - Recreation



Burton Boat Ramp

Reservoirs and Adaptation

- Low flow support
- Flood control
- *To a limit*



Water – Energy Nexus

Plan for the long term

Long-term acquisition plans will be developed and resources secured

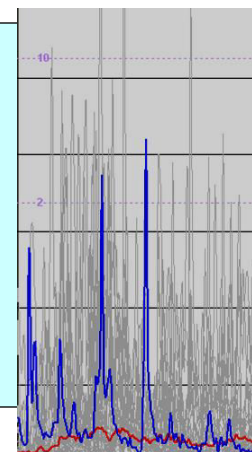


Manage many drivers, constraints and competing objectives



Operate in the face of variability and uncertainty

$$\sigma = \sqrt{\frac{\sum (x_i - \bar{x})^2}{n-1}}$$



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