BC Hydro - Vancouver Island Generation
Dam Safety Presentation for Jordan River

December 12, 2014

BC hydro
FOR GENERATIONS

BC HYDRO DAM SAFETY PROGRAM

- 41 dam facilities province-wide in 23 watersheds
- Ongoing dam safety studies and modelling, maintenance and upgrades
- Near real-time dam safety monitoring, including 24/7 monitoring, and weekly visual inspections by crews
- Semi-annual inspections; independent reviews (7 – 10 years)
- 2013 Independent Dam Safety Audit

Go to **www.bchydro.com/damsafety**

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NEW SEISMIC HAZARD MODEL

- Updated model provided better understanding of ground motion and hazard for all BC Hydro dams. Previous models outdated.

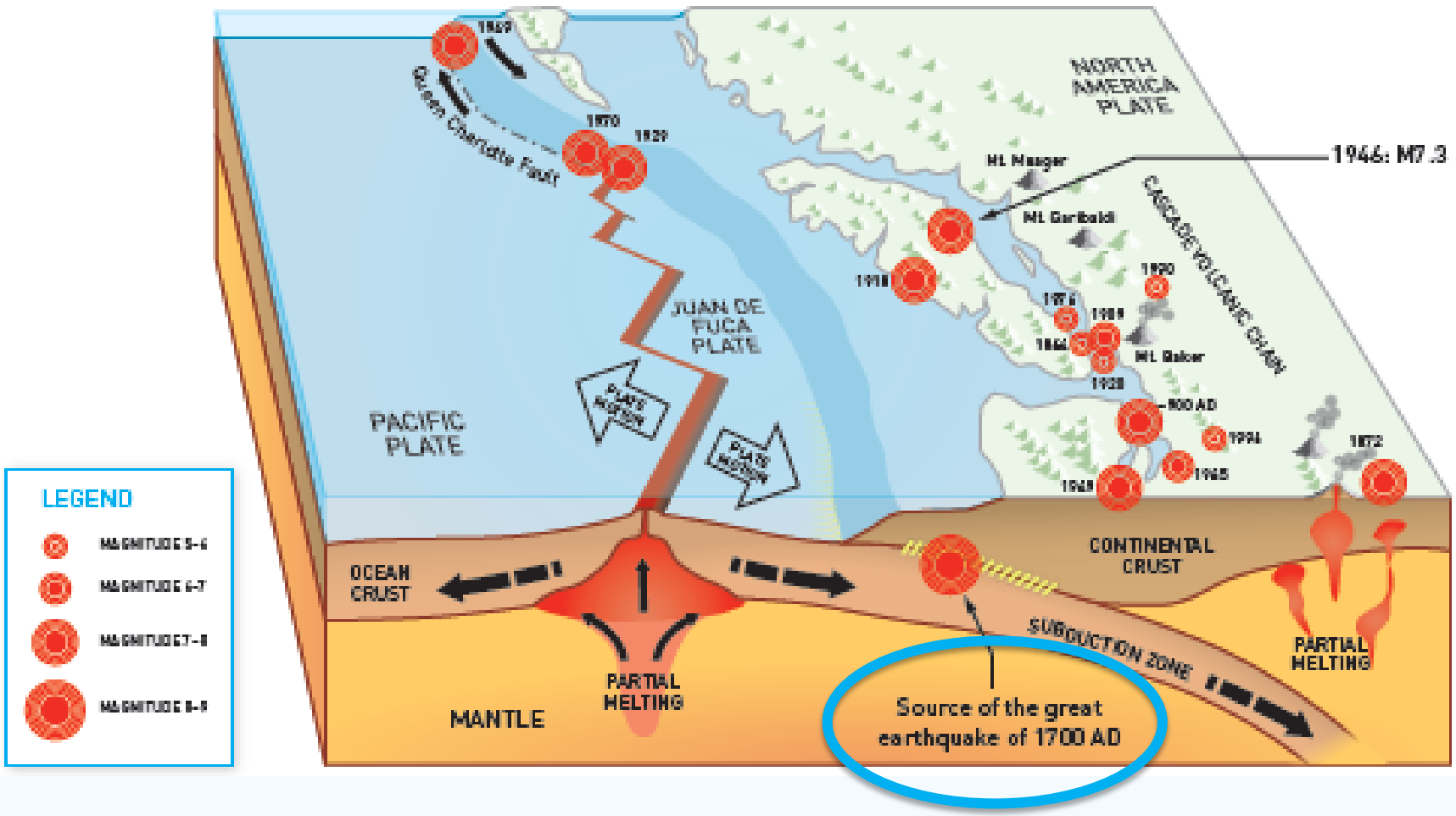
- First hydroelectric utility in North America to develop the rigorous, best-in-class seismic hazard model. Comparable to process used by nuclear industry.

- Six years of research by BC Hydro and international experts

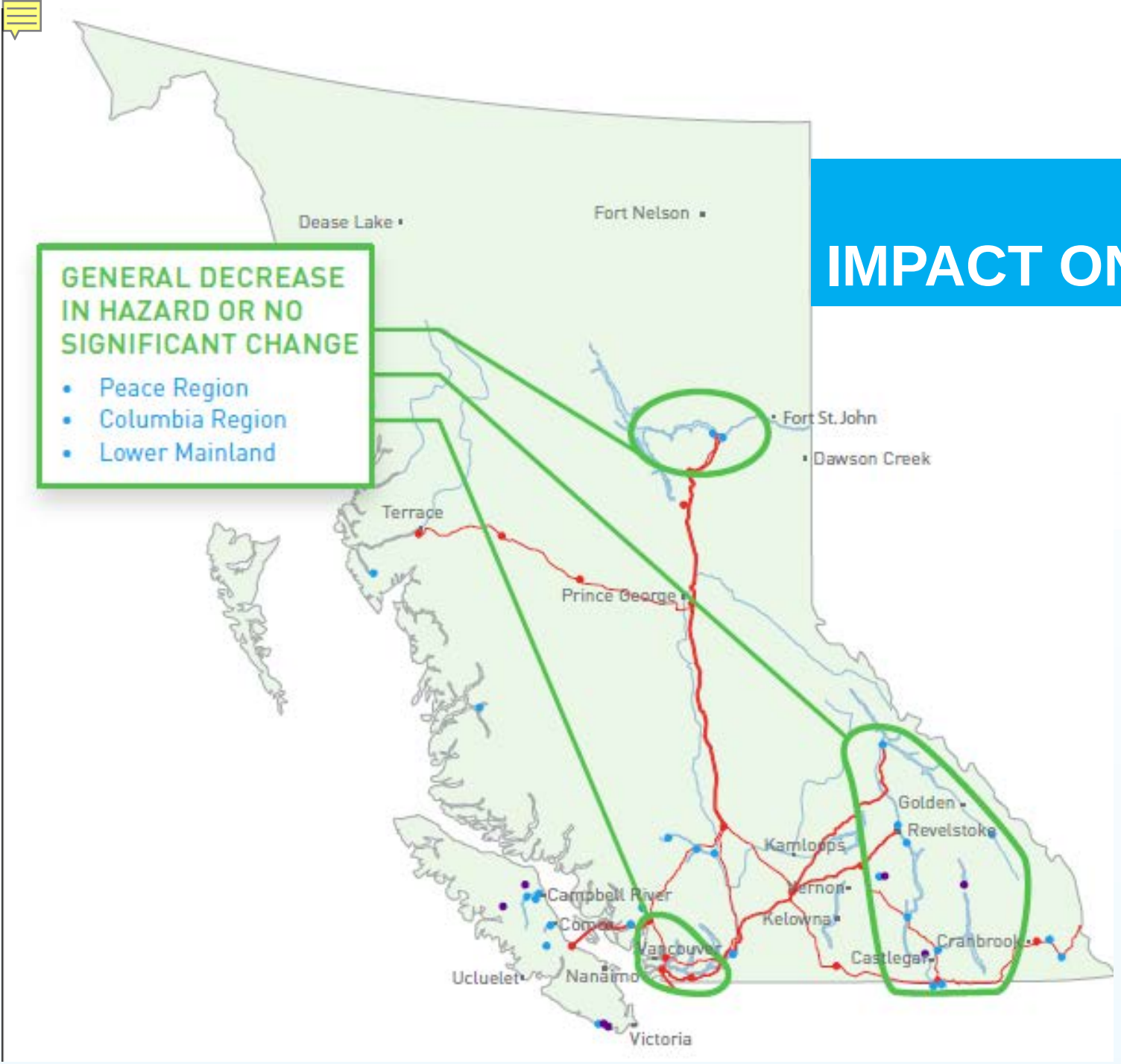
WHY NEW RESEARCH?

- What has changed since then?
    - More data
    - Improved understanding of B.C. seismotectonics
    - Ground motion models

THE CASCADIA SUBDUCTION ZONE



IMPACT ON SYSTEM



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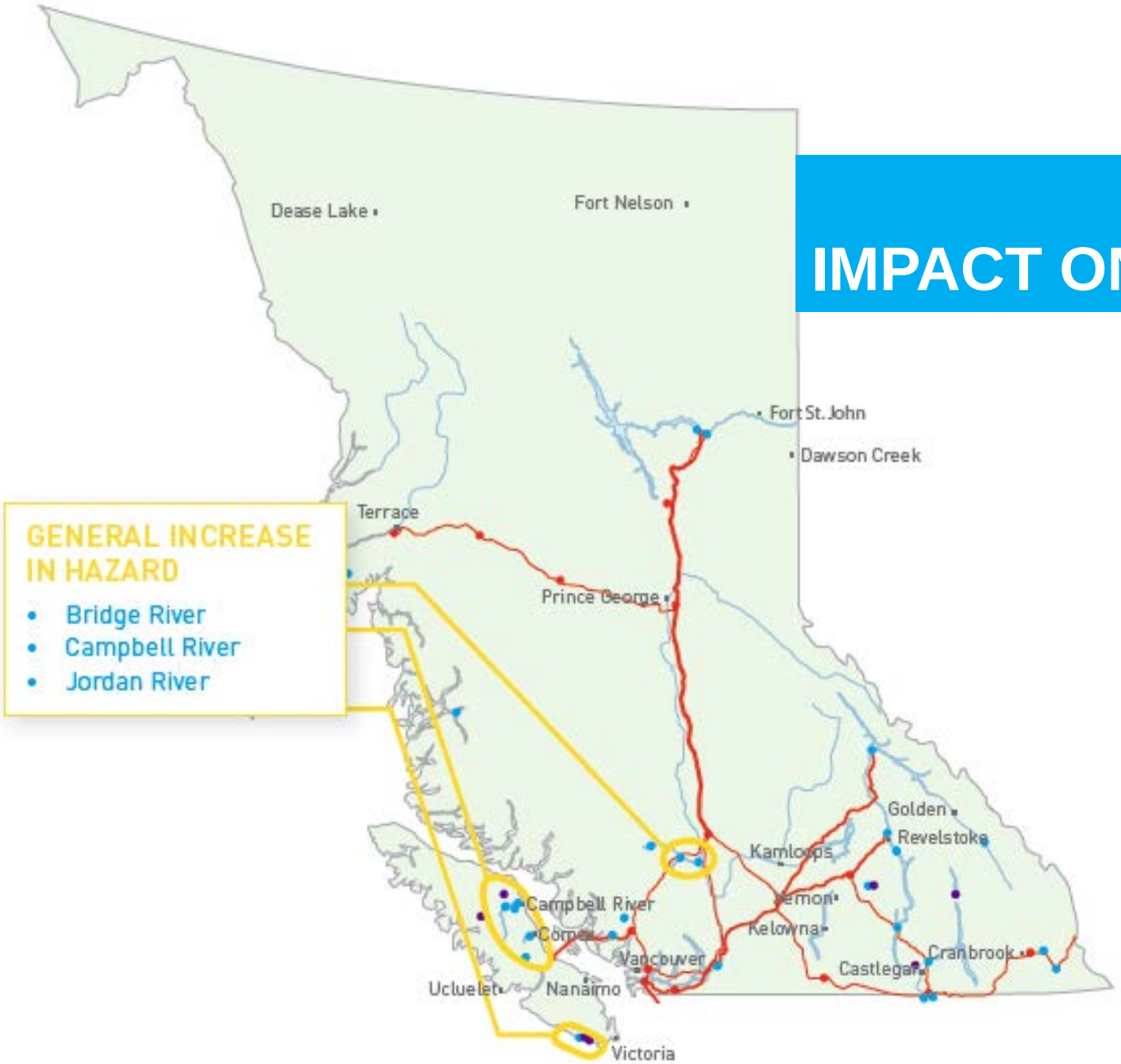
IMPACT ON SYSTEM



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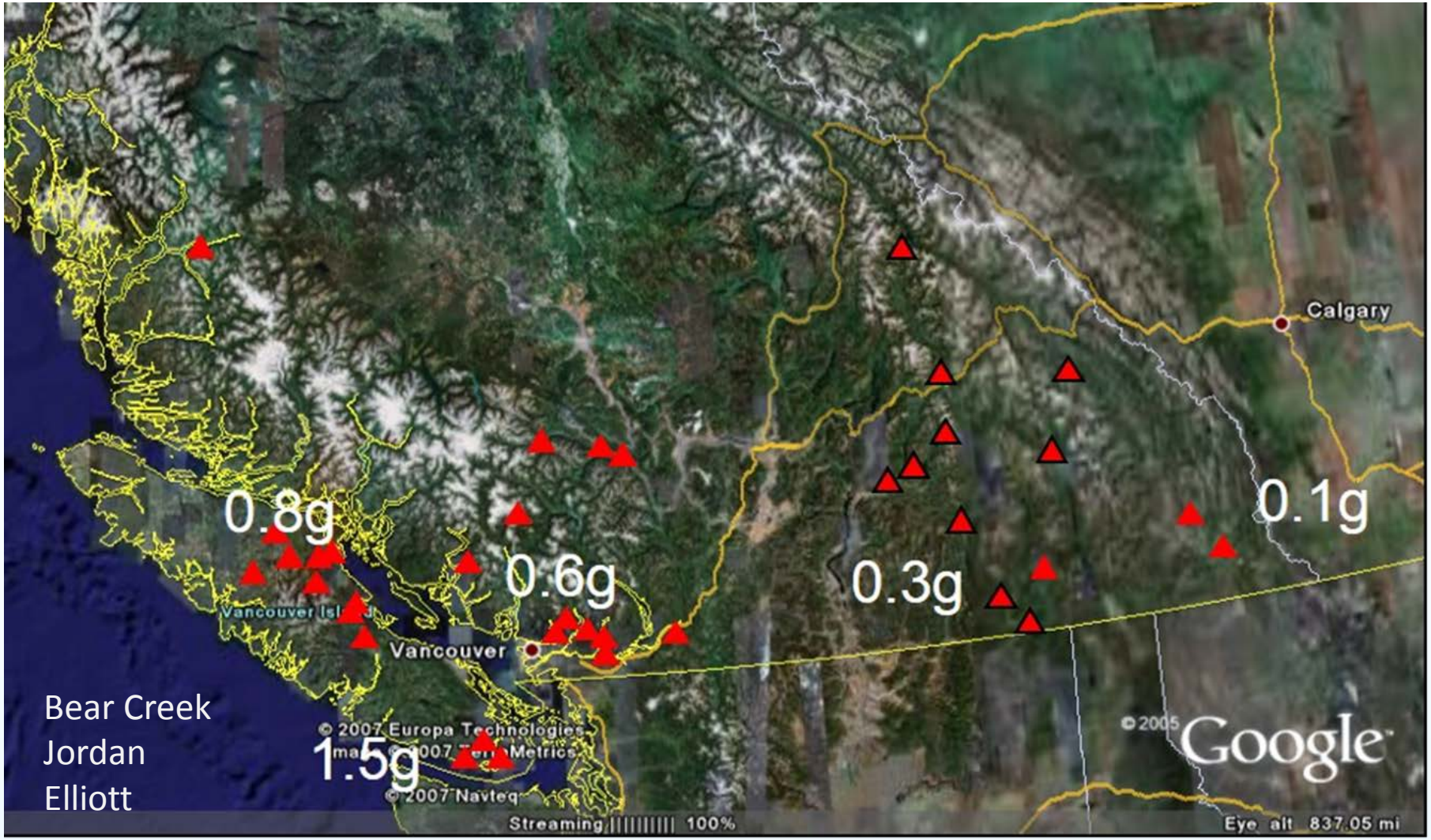
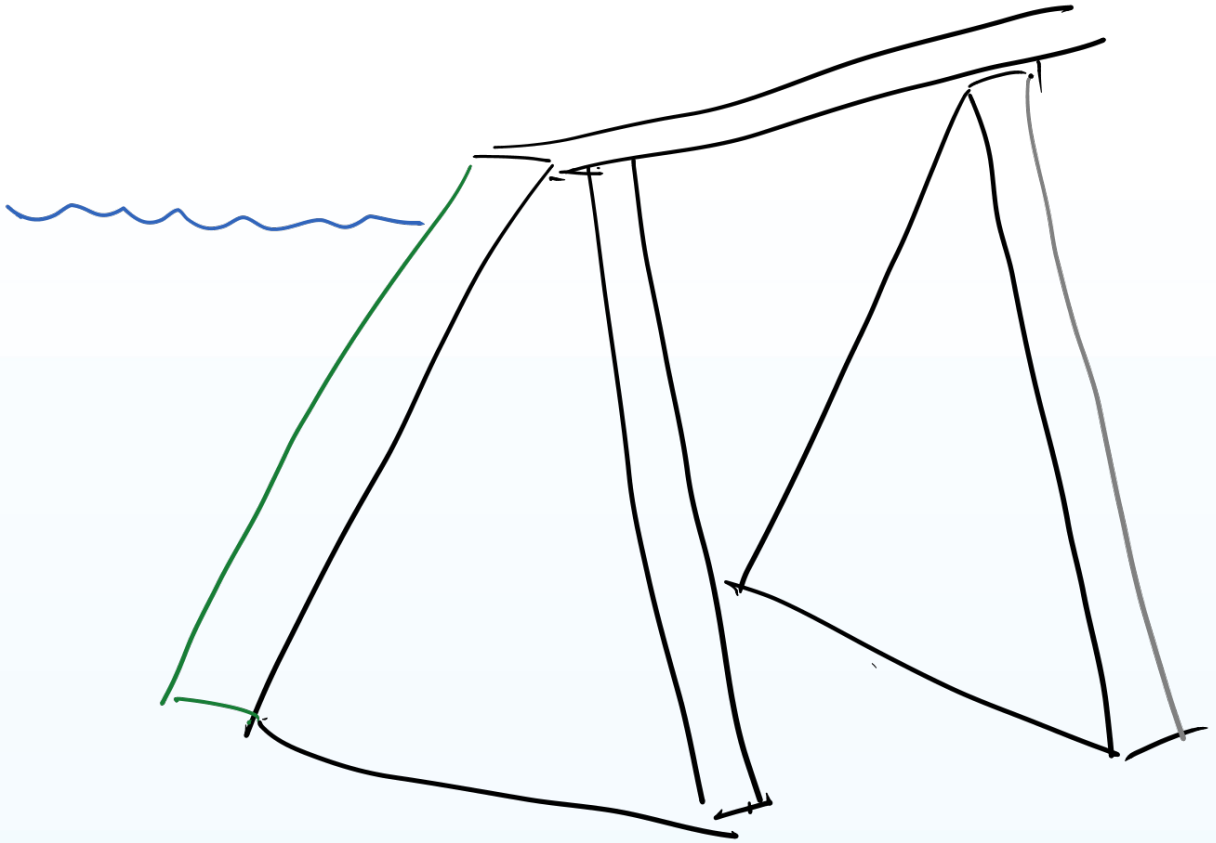
IMPACT ON SYSTEM – ALL EARTHQUAKES

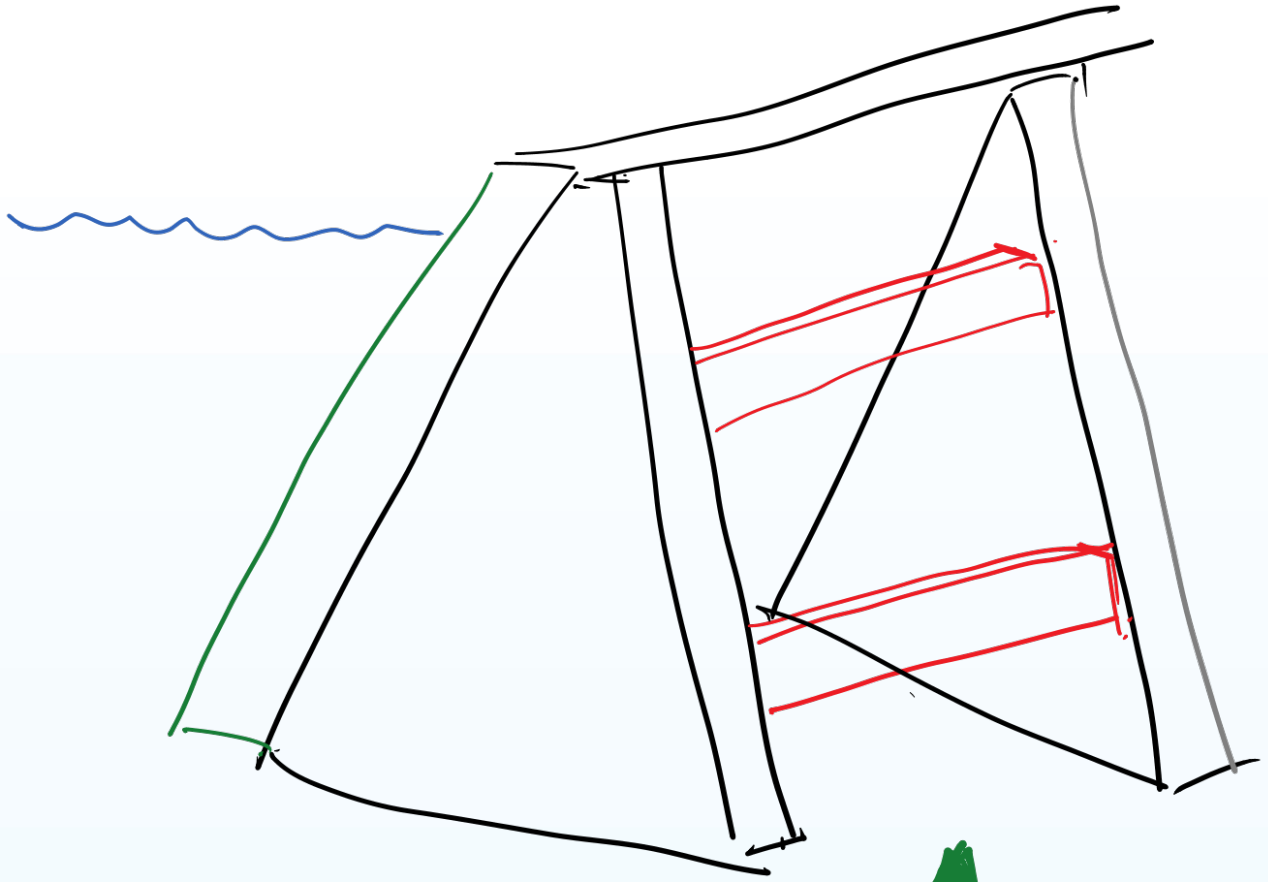


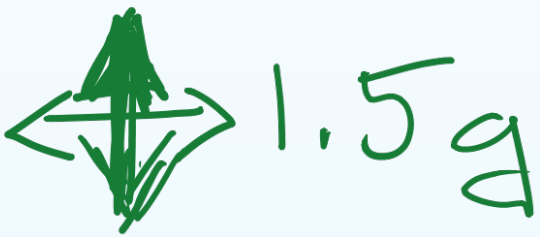
JORDAN DIVERSION DAM

CONCRETE BUTTRESS DAM



1990’S UPGRADES





CASCADIA EARTHQUAKE EVENTS

ASSESSMENT / CONSIDERATIONS

1. Upgrade Further or Replace

2. Lower the reservoir or Decommission

DAM DESIGN LEVELS

Chance per year	Ground Motion (g)
1 in ten thousand	1.5
1 in a thousand	0.9
1 in 500	0.37

CDA Guideline

Feasible Upgrade

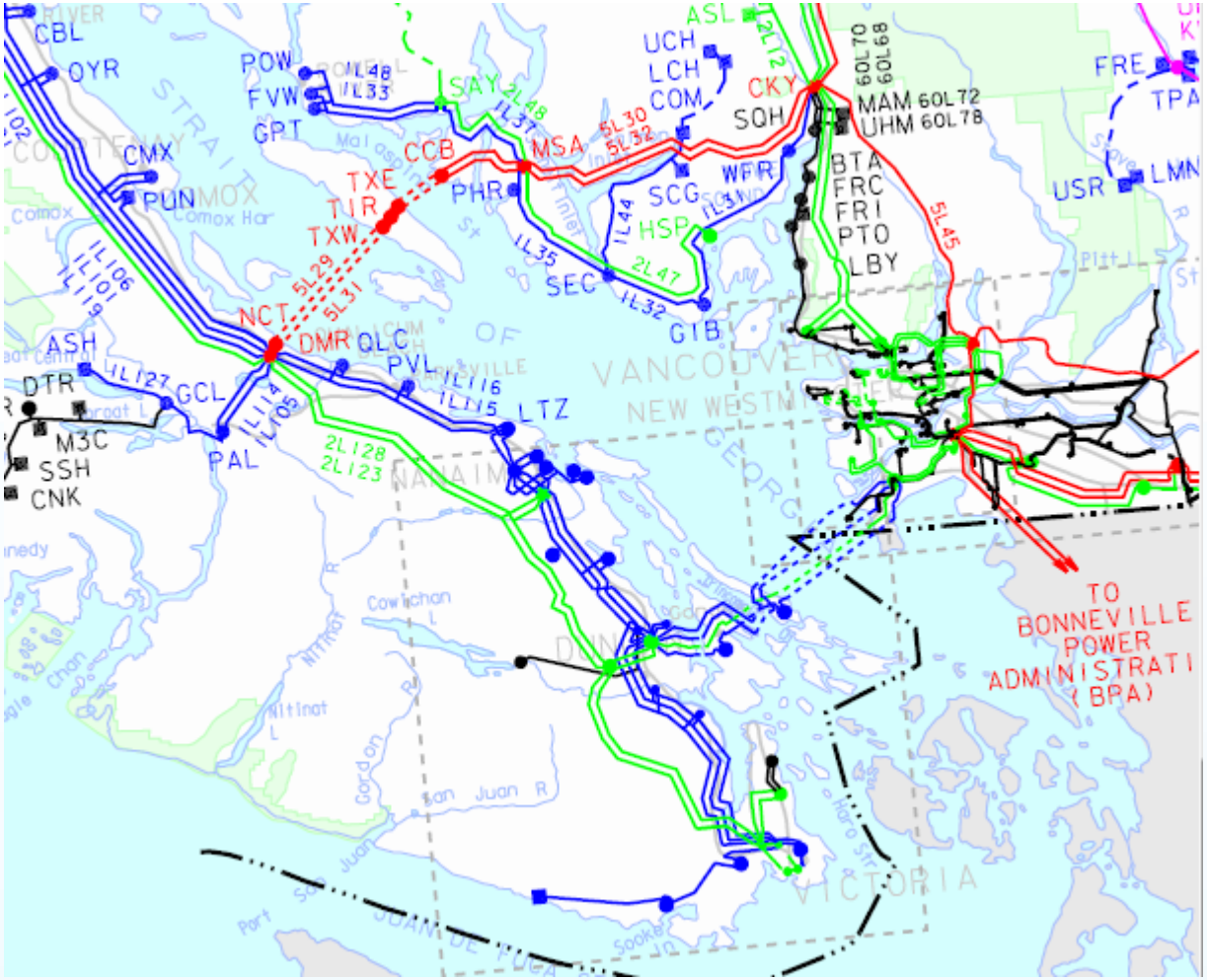
Current Withstand about 0.45g

JORDAN RIVER ELECTRIC SYSTEM

- Bear Creek Dam (1912)
  - Upgrades in the 1970s/1990, including seismic
- Jordan River Diversion Dam (1913)
  - New powerhouse (1971), extensive upgrades in 1958,1971 and 1991, including seismic
- Elliot Dam (1970)

- Used as needed to provide electricity during peak use hours for Southern Vancouver Island and to support transmission line outages.
- System supplies about 10% of the Island's needs.

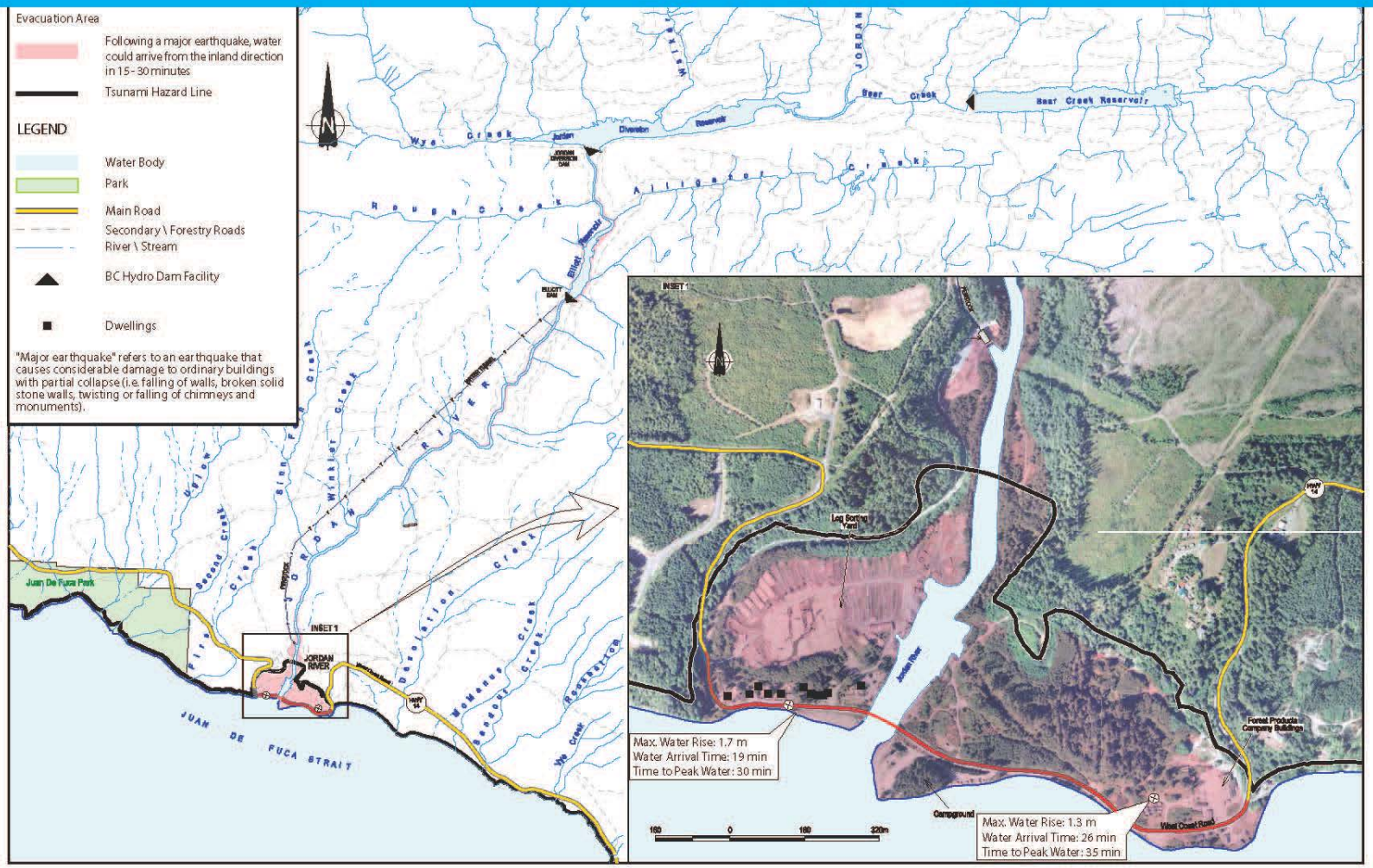
VANCOUVER ISLAND TRANSMISSION



JORDAN RIVER FINDINGS

- In a major earthquake resulting in structural damage to buildings, immediate downstream evacuation will be critical.
- In a worst-case scenario where the dam is jeopardized or fails, water could arrive into the inundation zone as quickly as 20 minutes; a tsunami could arrive in 45 minutes.

JORDAN RIVER EARTHQUAKE EVACUATION MAP



Note: The flood areas show the worst case scenario of the Jordan River dam failing. Also indicated is the fastest time of potential water arrival.

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NEXT STEPS

- Work with local residents, businesses, First Nations and local authorities to:
  - Improve local emergency planning/awareness
  - Ensure businesses and recreational interests can continue to operate
  - Limit future development within evacuation area
  - Offer to purchase homes