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2018 Salish Sea Ecosystem Conference (Seattle, Wash.)

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Flood modelling and mitigation planning in BC's Lower Fraser River and Southcoast

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Flood Modelling and Mitigation Planning in BC's Lower Fraser River and South Coast

Salish Sea Ecosystem Conference – April 6, 2018

Presented by: Steve Litke, Fraser Basin Council
BC’s Fraser River Basin
Lower Mainland Flood Management Strategy – Why & Where?

Aims to reduce flood vulnerability and increase resilience for communities along the Lower Fraser River and south coast.
Lower Mainland Flood Management Strategy: Who?

Fraser Basin Council

- Facilitator, coordinator, administrator

Partners – all orders of government, the private sector and civil society (50+ bosses)

- Funding, data, advice and expertise

- Other key work in parallel
Value and Benefit of a Regional Flood Strategy?

- Sharing information and lessons learned among peers, practitioners and professionals
- Enhancing communications, coordination and collaboration
- Implementing projects of regional benefit, strategically filling knowledge gaps
- Communicating a strong business case for action and improvements across the region
- Leveraging a cost-shared approach for planning and implementation
Phased approach:

- Phase 1 (2014-2016)
  - Improving Knowledge Base
- Phase 2 (2017 – 2019)
  - Building the Strategy
- Phase 3 (2020 and beyond)
  - Implementation
Phase 1 of the Strategy (2014-2016) – What?

Building a better understanding:

• Flood hazards
• Flood vulnerabilities
• Flood protection infrastructure, policies and practices
Phase 2 of the Strategy (2016-2019) – What?

Developing a regional action plan:

- National, provincial, regional, local priorities
- Recommended management options for diverse local circumstances
- Recommendations for secure, sustainable funding
- Through technical analysis in parallel with engagement, dialogue, consultation, and consensus building

Phase 3 – Implementation
Climate change anticipated to significantly change flood risk:

**Coastal**

- Sea level is projected to rise on average by 0.5 m by 2050, by one metre by 2100, two metres by 2200 . . .
- Increased intensity and frequency of storm surges

**Fraser River**

- Hydrological changes in the Fraser River Basin related to snowpack, rate of snowmelt and incidence of rainfall
- Larger and more frequent Fraser floods are projected for the Fraser for the year 2100
Results – Analysis of Flood Scenarios (approx. 1:500 or 0.2% AEP)

- Two Coastal Flood Scenarios (still water level)
  - Scenario A – Present Day (3.4 m)
  - Scenario B – Year 2100 (4.4m)

- Two Fraser River Flood Scenarios
  - Scenario C – Present Day (17,000 cms) – 1894 flood of record
  - Scenario D – Year 2100 (19,900 cms) – moderate CC effects
4 major flood scenarios assessed:
- 2 coastal & 2 Fraser River – Present Day & 2100

Flood-related direct losses & indirect economic losses related to:
- People and communities
- Residential, commercial and public/institutional buildings
- Select infrastructure
- Cargo shipping delays
- Agriculture
Lower Mainland Flood Management Strategy

Coastal Flood Scenarios Map

A Map Showing Estimated Flood Extents for:

- Scenario A (Present Day)
- Scenario B (Year 2100) – Further Extent of Flooding

For more detail, including some essential facilities located in floodplain areas, see regional and subregional maps in the report Regional Assessment of Flood Vulnerability. These maps may also be posted separately at floodstrategy.ca.

Note on Maps: All maps generated for this project are for general illustration purposes only. They are not developed to any accuracy or scale and should not be used for site-specific flood management planning. See the full vulnerability assessment report for more detailed maps and explanation of use.

Fraser Basin Council
Lower Mainland Flood Management Strategy

Fraser River Flood Scenarios Map

A Map Showing Estimated Flood Extents for:
- Scenario C (Present Day)
- Scenario D (Year 2100)
  - Further Extent of Flooding

For more detail, including some essential facilities located in floodplain areas, see regional and subregional maps in the report Regional Assessment of Flood Vulnerability. These maps will also be posted separately at floodstrategy.ca.

Note on Map: All maps prepared for this project are for general illustration purposes at a regional scale. They are not floodplain maps and do not have official designation of floodplains. For this reason, they should not be used for site-specific flood management planning. See the full vulnerability assessment report for more detailed maps and explanation on use.

Fraser Basin Council
Flood Extent and Depth Mapping
Results – Flood Extent Maps

Includes locations of critical facilities such as:

- Fire, police and EOCs
- Hydroelectric Substations
- Airport & port facilities
- Hospitals
- Schools
Regional and Local Coastal Flood Modeling

- BC Storm Surge Forecast System
  [http://www.stormsurgebc.ca](http://www.stormsurgebc.ca)
- Examples of local coastal flood modeling:
  - Vancouver
  - Surrey
  - Richmond, Delta, Squamish, West Vancouver / North Vancouver
For further consideration:

- Local storm surge hazards (wind and wave effects, shoreline geometry, land subsidence and uplift / RSLR)
- Coastal and riverine sediment transport processes
- Uncertainty – pick a number and start, monitor actual CC impacts, continual improvement of science and planning
- Flood protection works, land use decisions, and other policies and practices will need to evolve to keep pace with changes in flood hazards
For further consideration:

- Transition from the status quo to climate adaptation and resilience (e.g. redevelopment cycles, infrastructure renewal cycles)
- Institutional / societal inertia (e.g. updating regulations and capacity to enable innovative solutions that are presently outside the box)
- Low risk pilot projects?
- Talk about risk tolerance
- Talk about land use change or retreat (over time)
Floodplain Modelling and Mapping Project

• More accurate flood extent and depth estimates

Assess dike resilience under scenarios and the likely sequence of dike breaches

Evaluate effectiveness of management options and cascading impacts

Assess water levels under different flood frequencies and dike breach scenarios

Inform emergency planning, preparedness and response

Education tool for decision-makers, stakeholders and the public
Thank You! For more information:
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