

Media Backgrounder

LOWER MAINLAND FLOOD MANAGEMENT STRATEGY: PHASE 1 RESULTS & NEXT STEPS

May 30, 2016

About the Strategy

The Lower Mainland Flood Management Strategy (LMFMS) is a collaborative regional initiative aimed at better protecting the Lower Mainland from Fraser River and coastal flood risks. There are 43 funding partners in the LMFMS, including the federal government, provincial government (three ministries), 27 local governments and 12 other organizations with interests in flood mitigation.

The Strategy consists of three phases:

- **Phase 1 (2014-2016):** A review of flood scenarios that may threaten the Lower Mainland and a regional analysis of flood vulnerabilities.
- **Phase 2 (2016-2018):** Development of an action agenda that outlines agreement among partner organizations about flood mitigation priorities for the Lower Mainland, actions that need to be undertaken, associated costs and a cost-sharing model.
- **Phase 3 (2018-):** Implementation of the Strategy.

Phase 1 Results

Phase 1 consists of three projects:

- **Project 1:** analysis of current and future flood scenarios in the Lower Mainland under climate change as the basis for flood mitigation planning
- **Project 2:** a vulnerability assessment to estimate key flood-related losses in the region, particularly with respect to buildings, critical facilities, infrastructure and agriculture
- **Project 3:** a review of current levels of protection across the region, including Lower Mainland dikes and flood management policies and practices.

Project 1: Analysis of Flood Scenarios

See pages 6-9 of Phase 1 Summary Report for more detail

- The BC Lower Mainland is vulnerable to major, catastrophic floods from the Fraser River freshet (spring) and from coastal flooding (winter). In 2014 the Province of BC published a study that described the modelled results of 140 different Fraser River flood scenarios for the Lower Mainland over the next 200 years, reflecting different variables for climate, peak river flows and sea level rise.
- In 2015 technical consultants for the Lower Mainland Flood Management Strategy (Kerr Wood Leidal) analyzed information from this report and other provincial and municipal flood hazard studies, reports and models relevant to the region. Four flood scenarios and related floodwater levels were selected for comparative purposes and as the basis for the regional flood vulnerability assessment (see Project 2 below).
- These scenarios are:
 - **Two Coastal Storm Surge Flood Scenarios:**
(A) Present Day and (B) Year 2100 (accounting for 1 m of sea level rise)
 - **Two Fraser River Spring Freshet Flood Scenarios:**
(C) Present Day and (D) Year 2100 (accounting for 1 m of sea level rise and moderate climate change).
- Under climate change, major floods in the Lower Mainland are expected to increase in magnitude and frequency. This is so because of projections for sea level rise and for larger peak flows on the Fraser River. Flood mitigation planning for the Lower Mainland must account for the changing face of flood hazards.

Project 2: Regional Assessment of Flood Vulnerabilities

See pages 10-24 of Phase 1 Summary Report for more detail

- The Lower Mainland Flood Management Strategy partners retained Northwest Hydraulic Consultants to carry out a flood vulnerability assessment in 2015-2016. The assessment sets out projections for damages and losses related to buildings in Lower Mainland floodplain areas – and the related direct and indirect economic losses – under different flood scenarios. The assessment was based on the two coastal and two Fraser River flood scenarios, set out in Project 1.
- Flood risks in the Lower Mainland are very serious and are projected to worsen over the next 85 years, both in terms of flood frequency and severity. Any one of the four major Lower Mainland flood scenarios analyzed would be expected to trigger the most costly natural disaster in Canadian history to date, creating severe strain on the regional, provincial and national economies.
- The study estimated flood-related direct losses and some indirect economic losses related to residential, commercial, industrial and public/institutional buildings, some infrastructure, cargo shipping delays and agriculture. Almost all Lower Mainland municipalities have some level of vulnerability under river or coastal flood scenarios, or both, and disruptions would be widespread. First Nations communities are also vulnerable, with two-thirds of reserves at risk of flood, affecting 26 First Nations.
- The two present day flood scenarios are expected to result in losses estimated at \$19.3 billion (coastal flood) and \$22.9 billion (Fraser River flood). Year 2100 flood scenarios are estimated to be higher, totalling \$24.7 billion (coastal flood) and \$32.7 billion (Fraser River flood). For a breakdown of the loss categories and projections under each flood scenario, see Table 8 in the Phase 1 Summary Report.

Project 3: Assessment of Flood Infrastructure, Policies & Practices

Dike Assessment (Project 3A)

See pages 25-29 of Phase 1 Summary Report for more detail

- In 2015 the Inspector of Dikes oversaw an assessment of Lower Mainland dikes as part of Phase 1 of the Lower Mainland Flood Management Strategy. The assessment, carried out by Northwest Hydraulic Consultants, shows that 71% of the assessed dikes are vulnerable to failure by overtopping during either a major Fraser River or coastal flood.
- The design flood in the Lower Mainland is the greater of either the 1894 Fraser River flood of record (peak flow of 17,000 cubic metres per second at Hope) or a winter coastal storm surge flood event of approximately 1:200 annual exceedance probability.
- In all, 74 dikes were assessed based on current records, and these were divided into 118 segments for the purpose of the project. These dikes — stretching 500 km and managed by 35 diking authorities — represent about 50% of all dikes in BC. Based on average rankings across multiple criteria, the majority of assessed dikes in the Lower Mainland (69%) were scored as Poor to Fair, 18% as Unacceptable to Poor, and 13% as Fair to Good. Few of the dike segments assessed meet current provincial standards, and no dikes fully meet provincial standards. Only 4% of assessed dike segments meet current provincial standards for dike crest height, which includes 0.6 m of freeboard above the water surface elevation of the design flood event.
- Dikes can fail for different reasons. The assessment covered, not only dike crest height, but also geometry, geotechnical stability during floods and earthquakes, erosion protection, control of vegetation/animal encroachments, appurtenant structures on the dikes and administrative arrangements, including secured rights of way and inspection practices.
- A key reason that Lower Mainland dikes are considered vulnerable to failure is because most were reconstructed in the 1970s and 1980s according to the standard of the day, which has since been recognized as too low. The standard has been updated through more accurate flood modelling. Among the dike assessment report recommendations are to prioritize dike upgrades, and where it is not feasible to upgrade dikes sufficiently, to consider a range of structural and non-structural flood management strategies.

Review of Flood Management Policies and Practices (Project 3B)

See pages 30-34 of Phase 1 Summary Report for more detail

- Many communities rely on flood protection dikes and associated works such as pumps, floodgates and erosion protection works, but often lack dedicated funding for major upgrades and rehabilitation. Moreover, some communities, including many First Nations, are not presently protected by diking systems at all.
- In a 2015-2016 review of local flood management policies and practices, most communities identified flood protection works as a top priority. In addition to diking, some also identified riverbed sediment management as an important tool in the suite of management options to alleviate flooding, erosion and seepage problems.
- Most communities use land use planning and policies to limit community vulnerability to flooding. The two primary approaches are flood construction levels and horizontal setbacks. These are typically implemented through bylaws, development permit areas and other policies and practices related to zoning, subdivision approvals and building permits. Growth can be guided away from flood-prone areas, and habitable living space can be built above predicted flood levels with floodproofing practices.

- Challenges for local governments include: a lack of funding for major repairs and upgrades to flood protection works, lack of a consistent policy framework to guide communities across the Lower Mainland, challenges associated with historic settlements, and challenges associated with changing flood hazards over time, particularly due to sea level rise and other climate change impacts.

Phase 2: Overview and Next Steps

Phase 2 will focus on development of the regional flood strategy and action plan. There will be six main components in developing the plan between 2016 and 2018:

- Establish and facilitate a **Leadership Committee** to provide senior-level strategic advice and oversight on the Action Agenda.
- Evaluate and recommend national, provincial, regional and local **Priorities for Flood Mitigation** across the Lower Mainland.
- Evaluate and recommend optimal **Flood Management Options** to address the priorities including a diversity of local circumstances across the Lower Mainland.
- **Engage Decision-makers, Stakeholders and the Public** to raise awareness and to inform the Action Agenda
- Evaluate and recommend one or more **Funding and Governance Models** for implementation.
- **Confirm Commitments** for implementation of the Strategy.

More Details @ www.floodstrategy.ca

All reports, maps and other material related to Phase 1 studies are available on the FBC website at www.floodstrategy.ca:

- FBC Media Release and Backgrounder (May 30, 2016)
- Phase 1 Summary report
- Coastal and Fraser River Flood Scenarios Maps (showing flood extents)
- Sample Subregional Maps (showing location of some essential facilities in communities)
- Full Phase 1 Reports for Projects 1, 2 and 3

Also see Province of British Columbia media release of May 30, 2016: Province invests \$1 million in development of Lower Mainland flood action plan. Visit: www.news.gov.bc.ca.

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