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Planning To Avoid Disaster:

Action Plan to Update Floodplain Maps in British Columbia





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Action Plan to Update Floodplain Maps in British Columbia

On March 8, 2013, with financial support from the Real Estate Foundation of British Columbia, the British Columbia Real Estate Association (BCREA) hosted a workshop in Vancouver, to examine the state of floodplain maps in BC.

Nearly 70 decision makers and practitioners involved with flood management, land use and emergency management expressed their shared concerns for BC communities and energetically explored concrete steps that can be taken to update existing floodplain maps and keep them current. Participants discussed technical, financial and political perspectives in terms of challenges and opportunities.

The key output of the workshop is this Action Plan, designed to advance progress to update existing floodplain maps. This Action Plan was first published in April 2013, and then updated in September 2013.



Why take action?

Flooding poses catastrophic risks to BC's economic vitality, infrastructure, environment, safety, property owners and communities. While this is a complex issue, many are concerned that, due to changes in flood risk over time (e.g., changes in forest cover, watershed hydrology, riverbed geomorphology), existing floodplain maps are outdated and provide an unreliable basis for decisions regarding flood management. There are also changes to flood vulnerability over time through development and growth in floodplains, leading to more extensive and severe consequences when a flood occurs.

A provincial mapping program began in 1974, and was accelerated by the 1987 Canada-BC Floodplain Mapping Agreement, which ended in 2003. Several floodplain maps have been created since 2003 at the initiative of local governments, but many more communities lack current maps.

The BC Ministry of Environment website includes links to 87 existing floodplain maps in BC. Of those, 69% are 20-25 years old, and the remaining maps are 14-19 years old—despite the recommendation of experts that floodplain maps should be updated every ten years. >



What is a floodplain map and how is it used?

A floodplain map is a tool that shows areas that are subject to high flood hazard.

Floodplain maps also show the location of the normal channel of a watercourse, surrounding features or developments, ground elevation contours, flood levels and floodplain limits (i.e., the elevation and horizontal extent of the high water mark of a 200-year flood). Floodplain maps can be used as administrative tools to depict minimum building elevations for flood proofing and to restrict land uses. Minimum flood proofing requirements can then be incorporated into building bylaws, subdivision approvals and local government planning and regulations.

Floodplain maps and other technical studies form the foundation upon which many decisions are made about how and where communities grow. If the basis for this element of decision-making is unreliable, then the ability of decision makers to effectively assess and manage flood risks is limited.

High-Level Actions

Workshop participants generally agreed that a substantial number of existing floodplain maps in British Columbia are out of date, and that decision makers can no longer count on them to make informed decisions with respect to flood hazard management.

Although technological advances have made possible some more flexible technical studies that provide opportunities for analysis of various scenarios, participants believe that floodplain mapping is still a viable administrative tool in the assessment and management of flood risks. Therefore, there is some urgency in renewing efforts to update current floodplain maps and establishing the need for floodplain mapping as an essential component of flood hazard management.

Stakeholders recognize that key factors, such as those related to liabilities, stand in the way of continued use of floodplain maps. Nonetheless, other considerations, such as an increasing frequency of flood events from a changing climate and continued development in floodplains, justify a renewed emphasis on floodplain mapping.

An important first step in this renewal is to make the case for and acquire political support provincially and locally with respect to the importance and urgency of floodplain mapping. This should free up sufficient resources to update and maintain existing floodplain maps and reinstitute floodplain mapping as an invaluable administrative tool in flood management.

Elected officials and senior executives within federal, provincial and local governments will need to be approached to obtain this political and institutional support in a timely fashion. A coordinated effort that involves professional associations, foundations, the business and consulting community, academia and non-governmental organizations will be essential in delivering a collective and coordinated call for action. Included in the messaging will be the cost implications in the long term of taking limited or no action. Floodplain maps, and preventative flood management policies and practices can save significant future costs, with a relatively modest investment.

High-Level Actions

Actions	Potential Partners	Proposed Timeline
1. Establish a Working Group to implement and refine the Action Plan, suggest project leads, identify priorities and strategic opportunities.	BCREA	Working Group established in June 2013 and meets quarterly
2. Engage key organizations and associations to help with coordinated communications and awareness raising among decision makers. Specific organizations identified for further follow up: <ul style="list-style-type: none"> • Canadian Water Resources Association (CWRA) – BC Branch and National (June Board meeting) • Association of Professional Engineers and Geoscientists BC (APEGBC) • Urban Development Institute (UDI) • Canadian Home Builders Association of BC (CHBA BC) • Provincial government staff (e.g., Ministry of Forests, Lands and Natural Resource Operations, Ministry of Environment, Ministry of Justice and Attorney General, Ministry of Transportation, Ministry of Community, Sport and Cultural Development) • Planning Institute of BC (PIBC) and Canadian Institute of Planners (CIP) (including Climate Change group) • Union of BC Municipalities (UBCM) – 2013 Convention in Vancouver • Fraser Basin Council (FBC) • Okanagan Basin Water Board (OBWB) • Adaptation to Climate Change Team (ACT), Simon Fraser University • First Nations See also actions 13, 14, 15 and 16.	Working Group to lead	begun in June 2013, and ongoing
3. Assess current technical and financial capacity of local governments to develop floodplain maps and seek provincial and federal government resources (financial, technical expertise, standardized data) to address gaps and priorities by strengthening the capacity of local governments to develop floodplain maps and implement flood management.	Working Group to lead	begin by January 2014
4. Leverage funds to create a province-wide plan to complete floodplain mapping.	Multiple partners	by 2015
5. Explore opportunities to advance flood hazard mapping through the proposed Regional Flood Management Strategy for the Lower Mainland.	Fraser Basin Council and others	begin by November 2013
6. Submit an expression of interest to conduct a workshop on updating floodplain maps at the 2013 UBCM Convention in Vancouver.	BCREA and Fraser Basin Council	proposal submitted in June 2013, but was not successful; instead, BCREA focused on floodplain maps in its UBCM Convention tradeshow booth

Technical Actions

The workshop's technical sub-group identified the following challenges that must be overcome to enable more progressive and effective floodplain mapping tools and techniques:

- significant gaps currently exist with hydrometric, topographic and oceanographic data,
- emerging techniques, such as scenario analysis and risk assessment tools, are not being effectively used in floodplain mapping, and
- current data collection initiatives are being conducted in isolation with few opportunities for efficient, effective data sharing.

Actions	Potential Partners	Proposed Timeline
7. Facilitate a GIS pilot project to explore how to improve data-sharing protocols and procedures, and to resolve related technical and institutional issues, including proprietary interests and data management requirements.	Working Group to lead	as of fall 2013, projects underway or proposed by other organizations may fulfill this action; revisit in February 2014
8. Assess best available flood hazard information and other data inputs necessary to develop flood hazard maps, identify data gaps, propose a plan to fill data gaps (e.g., LiDAR topography, hydrometric data, oceanographic data, inventory of natural hazards) and suggest ways to integrate climate change into planning and hydraulic analysis during floodplain mapping.	Working Group to lead	deliver by June 2014
9. Establish resources and mechanisms to fill data gaps and improve data sharing.	Working Group to lead	begin after June 2014
10. Recommend the provincial government develop, and update every five years, guidelines and specifications to reflect current technologies and realities, improve consistency, build technical capacity to support utilization of a broader suite of technical tools (e.g., floodplain mapping, scenario analysis, risk assessment, etc.) and stress the need to integrate climate change into planning. Mandating the guidelines would likely increase their effectiveness and consistent application. Any new guidelines would complement existing guidelines.	Working Group	begin after June 2014
11. Develop a rough overview flood risk assessment—with vivid visuals, if possible—to raise public and political awareness of the issue (especially the social and economic implications of flooding), and to promote the need for more detailed flood hazard information to inform management decisions. Provide to identified stakeholders and release publicly.	Working Group	begin after June 2014

The workshop's political sub-group identified the following challenges that must be overcome to enable more political buy-in and support for floodplain mapping as a viable tool for managing flood risk:

- political leaders do not receive adequate information on a timely basis to understand the significance and importance of flood hazard management,
- there is an implicit conflict between implementing flood risk mapping and management versus approving development and economic growth in flood-prone areas; people are willing to assume risk for short-term economic benefits, with an expectation that disaster assistance will be available when a flood disaster occurs,
- local government leaders are reluctant to inform property owners living within floodplains that their property values may decrease because they may be susceptible to flood damages, and
- there are concerns from some local governments that designating a floodplain will result in or incur local government liability, if they are unwilling or unable to implement provincial guidelines regarding floodplain management.

Actions	Potential Partners	Proposed Timeline
12. Prepare and issue a news release and an op-ed piece regarding the importance of floodplain mapping / management, as well as the stakeholder workshop and Action Plan.	BCREA	done in April 2013; progress reports published quarterly
13. Identify and work with champions, including non-traditional groups such as BCREA, the insurance industry, academic institutions, non-governmental organizations and others, to help raise the profile and strengthen political support.	see action 2	ongoing since June 2013
14. Educate elected decision makers (local and provincial governments) to raise awareness and understanding about the importance of floodplain mapping / flood hazard management, and to support the allocation of the necessary resources. Key messages and approaches could include: <ul style="list-style-type: none"> • there are significant costs of inaction, • there are economic benefits of good flood management, especially by investing in mitigation and reducing the need for disaster assistance, • floodplain / flood hazard maps can save money by informing sound decisions to reduce vulnerability to flood impacts, and • use visualization tools and profile case studies on the experience of a flood event from a human point of view to help communicate the significance of the issue. 	see action 2	begin in September 2013
15. Facilitate opportunities to bring together municipalities for peer-to-peer discussions. Consider presentations / meetings with local government associations to share recommended actions to advance floodplain mapping.	BCREA, FBC, local governments	begin by September 2013
16. Consider ways to engage the business community (e.g., Chambers of Commerce) to strengthen and diversify the voices that are recommending action on floodplain mapping / management.	BC Chamber of Commerce and others	begin by November 2013
17. Consider public education and outreach to help strengthen political support (e.g., local media, displays in malls, posters, banners, etc.).	Working Group	begin by December 2013
18. Ask the provincial government to clarify liability and access to emergency funds, with respect to local governments and residents, in designated floodplains.	BCREA	October 2013

Financial Actions

The workshop's financial sub-group identified the following challenges that must be overcome to enable more financial support for floodplain mapping as a viable tool for managing flood risk:

- lack of local government financial capacity and interest in exploring more innovative and creative funding mechanisms,
- lack of regional collaboration and information sharing on effective financial mechanisms,
- current funding mechanisms, such as Disaster Financial Assistance (DFA), are not structured to establish the need for rebuilding to new standards or, in less vulnerable locations, nor is the DFA structured to save costs by investing in flood damage prevention,
- the Flood Protection Program, administered by Emergency Management BC, is oversubscribed and only funds infrastructure, not technical studies (such as floodplain maps), and
- the federal contribution to emergency preparedness and critical infrastructure projects through the Joint Emergency Preparedness Program was discontinued on March 31, 2013.

Actions	Potential Partners	Proposed Timeline
<p>19. Conduct/commission research on:</p> <ul style="list-style-type: none"> • opportunities for new, innovative sources of funding to develop floodplain maps, for example: <ul style="list-style-type: none"> ○ implement fees for development in areas of high flood risk to raise revenue for floodplain mapping / management and to provide incentives for development in low-risk areas, ○ consider expanding the application of development cost charges and other municipal financial instruments, ○ expand the terms of reference of the Flood Protection Program to fund technical studies, ○ consider the use of flood insurance to more closely align the interests of property owners, local and senior governments, and ○ implement levies on transportation / shipping and other sectors. • opportunities to incentivize floodplain mapping and management, for example: <ul style="list-style-type: none"> ○ create incentives by linking Disaster Financial Assistance with floodplain mapping (e.g., require mapping and mitigation to be eligible for DFA, utilize general revenue to develop floodplain maps in order to save future DFA costs, ○ require floodplain mapping in relation to infrastructure grants, and ○ explain how a residential flood insurance program would create a strong impetus for floodplain mapping. 	BCREA, FBC, Insurance Bureau of Canada, Okanagan Basin Water Board, Real Estate Foundation of BC	begin by January 2014
<p>20. Provide research results/recommendations to local, provincial and federal governments, ports, rail lines and others.</p>	Working Group	by April 2014
<p>21. Undertake research on the former Flood Damage Reduction Program (1987), and its relationship to the Canada-BC Floodplain Mapping Agreement, to learn what led to this program and to articulate that there is a compelling case to reinstate something similar.</p>	Working Group	begin by January 2014

Related Concerns

While the March 8 workshop focused on existing floodplain maps in BC, there are other gaps in flood risk management that put the province and its citizens at risk. For example, coastal floodplains are vulnerable to sea level rise and storm surges, and the influence of marine high waters extends upstream into rivers, often for a significant distance.

BCREA believes that a coordinated stakeholder approach to update existing floodplain maps will help to raise awareness of the risks, and could lead to improvements in other areas of flood management.

Immediate Next Steps

The multi-agency Working Group described in action 1 will be essential in refining and implementing this Action Plan. Once established, the Working Group will determine how often it will report changes to the Action Plan and progress in achieving movement toward updating existing floodplain maps in BC.

This Action Plan, plus progress reports and research reports that result will be available on the BCREA website at www.bcrea.bc.ca.

Acknowledgements

BCREA thanks its planning partners, including the Real Estate Foundation of British Columbia, Adaptation to Climate Change Team at Simon Fraser University, Fraser Basin Council, Pembina Institute, Emergency Management BC, BC Ministry of Forests, Lands and Natural Resource Operations, Okanagan Basin Water Board, organizers of the 2013 Canadian Water Resources Association – BC Chapter conference and The Arlington Group for their insights and input in planning this event.

ABOUT BCREA (www.bcrea.bc.ca)

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Program

Planning To Avoid Disaster—Floodplain Maps Stakeholder Workshop

When: Friday, March 8, 2013, 8:30 am – 4:00 pm

Where: 1400-1420 Segal Centre, Simon Fraser University, Harbour Centre (515 West Hastings St.), Vancouver

8:30 am – 9:00 am	Networking Breakfast and Registration
9:00 am – 9:10 am	Welcome <ul style="list-style-type: none"> Damian Stathonikos, Director of Communications and Public Affairs, British Columbia Real Estate Association Kelly Lerigny, Chair, Real Estate Foundation of British Columbia
9:10 am – 9:15 am	Overview <ul style="list-style-type: none"> David Marshall, Executive Director, Fraser Basin Council
9:15 am – 10:00 am	Floodplain Mapping—Who Needs It? <ul style="list-style-type: none"> David Sellars, P.Eng. <p>From a recognized expert in the field, a primer on floodplain mapping in BC, including history, technical, political and financial aspects, plus who uses floodplain maps and why.</p>
10:00 am – 10:45 am	Panel Presentation: What's Being Done? <ul style="list-style-type: none"> Technical: Andrew Wiens, P.Eng., Water Resources Engineer, Associated Engineering Financial: Hugh Fraser, Deputy Director of Engineering, Corporation of Delta Political: Jason Lum, Councillor, City of Chilliwack; Chair, Lower Mainland Government Association's River Management Committee <p>Sharing information on the current practices associated with the development, updating and application of floodplain maps.</p>
10:45 am – 11:00 am	Refreshment Break
11:00 am – 11:45 am	Group Discussions: Why haven't most floodplain maps been updated? Facilitators: <ul style="list-style-type: none"> Technical (Room 1400): Steve Litke, Senior Program Manager, Watersheds and Water Resources, Sustainability Indicators, Fraser Basin Council Financial (Room 2050, Alan & Margaret Eyre Boardroom): Deborah Harford, Executive Director, Adaptation to Climate Change Team, Simon Fraser University Political (Room 2250, Westcoast Energy Executive Meeting Room): Damian Stathonikos, Director of Communications and Public Affairs, British Columbia Real Estate Association



Appendix A – Workshop Program and Background Paper

11:45 am – 12:15 pm	Group Discussion Reports
12:15 pm – 1:00 pm	Networking Lunch
1:00 pm – 1:45 pm	<p>Panel Presentation: What Else Needs to be Done?</p> <ul style="list-style-type: none"> • Technical: Mike Currie, P.Eng., President, Kerr Wood Leidal • Financial: Carol Loski, Director, Flood Protection Program, Emergency Management BC, Ministry of Justice and Attorney General • Political: Graham Farstad, MCIP, Principal, Planner, The Arlington Group <p>Developing actions to address the challenges and capitalize on the opportunities with respect to the technical, financial and political dimensions.</p>
1:45 pm – 2:30 pm	<p>Group Discussions: How can the barriers be overcome so that floodplain maps can be updated?</p> <p>Facilitators:</p> <ul style="list-style-type: none"> • Technical (Room 1400): Steve Litke, Senior Program Manager, Watersheds and Water Resources, Sustainability Indicators, Fraser Basin Council • Financial (Room 2050, Alan & Margaret Eyre Boardroom): Deborah Harford, Executive Director, Adaptation to Climate Change Team, Simon Fraser University • Political (Room 2250, Westcoast Energy Executive Meeting Room): Damian Stathonikos, Director of Communications and Public Affairs, British Columbia Real Estate Association
2:30 pm – 2:45 pm	Group Discussion Reports
2:45 pm – 3:00 pm	Refreshment Break
3:00 pm – 3:30 pm	<p>Planning Ahead</p> <p>Formulation of an action plan to update existing floodplain maps in British Columbia</p>
3:30 pm – 4:00 pm	<p>Wrap Up</p> <p>What are you prepared to do to update existing floodplain maps in British Columbia?</p>



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Planning To Avoid Disaster: Floodplain Maps Stakeholder Workshop

March 8, 2013

What problem needs to be solved?

Flooding poses catastrophic risks to BC's economic vitality, infrastructure, environment, safety, property owners and communities. This is a problem that is expected to be made worse by climate change, and one that doesn't respect jurisdictional boundaries.

While this is a complex issue with many aspects, the British Columbia Real Estate Association (BCREA) and other stakeholders are concerned that existing floodplain maps are outdated and may be unreliable, due to changes in flood risk over time (e.g., changes in forest cover, watershed hydrology, riverbed geomorphology).

Floodplain maps and other technical studies form the foundation upon which many decisions are made about how and where communities grow. If the basis for decision making is unreliable, then the ability of decision makers to effectively manage flood risks is limited.

What's the connection to the real estate community?

Every day, REALTORS® around the province help British Columbians make decisions about where to live, work and build their lives. REALTORS® believe the people who invest in real estate, and who help drive the BC economy, need solid information so they can make the best—and safest—decisions possible.

What's the purpose of this workshop and why should you participate?

With generous funding from the Real Estate Foundation of British Columbia, BCREA will host this one-day workshop for decision makers and stakeholders involved with flood management, land use and emergency response and recovery to explore concrete steps that can be taken to update existing floodplain maps and keep them current.

Participants will discuss political, financial and technical perspectives in terms of both challenges and opportunities. This will help inform priority next steps with the experiences and interests of decision makers and stakeholders.

Your participation is needed to ensure that practical and effective actions are identified to help update floodplain maps for the benefit of communities throughout BC. At the end of the day, a high-level, achievable plan to update existing floodplain maps should be possible. After all, it's less expensive—in many ways—to avoid or mitigate flood risk than to respond to an emergency.

Risk = Hazard x Vulnerability
updated floodplain maps can
improve knowledge
about both factors

What's a floodplain map?

From the BC Ministry of Environment website (www.env.gov.bc.ca/wsd/data_searches/fpm/map.html):

A floodplain map delineates the area that can be expected to flood, on average, once every 200 years. This is called the 200-year flood. A 200-year flood can occur at any time in any given year; the indicated flood level may be exceeded; and portions of the floodplain can flood more frequently.

Floodplain maps show the location of the normal channel of a water course, surrounding features or developments, ground elevation contours, flood levels and floodplain limits (the elevation and horizontal extent of the high water marks of a 200-year flood).

Floodplain maps can be used as administrative tools to depict minimum elevations for floodproofing. Minimum floodproofing requirements can then be incorporated into building bylaws, subdivision approvals and local government planning and regulations.

Unfortunately, the language used by the province can easily be misunderstood. The term "200-year flood" can easily be taken to mean one flood every 200 years, when it actually means a 0.5% chance of flooding in any year.

The BC Ministry of Environment website lists 105 designated floodplain areas throughout the province and offers links to 87 existing floodplain maps associated with those designated floodplain areas. Of those, 69% are 20-25 years old, and the remaining maps are 14-19 years old—despite the recommendation of experts that floodplain maps should be updated every 10 years.

A provincial mapping program began in 1974, and was accelerated by the 1987 Canada-BC Floodplain Mapping Agreement, which ended in 2003. Several floodplain maps have been created since 2003, at the initiative of local governments.

Appendix A – Workshop Program and Background Paper

Background

There are three pillars of integrated flood hazard management: land use planning and approvals in floodplain areas, managing flood protection works and managing emergencies. This workshop is focused on the first pillar.

Provincial legislative changes in 2003-2004 shifted more responsibilities for flood hazard management to local governments (e.g., Ministry of Environment used to approve subdivisions or floodplain bylaws; now rests with local government approving officers, or with the Ministry of Transportation in the case of regional district electoral areas).

There are significant differences in the expertise and resources available to local governments to manage flood risks. In 2008, the Fraser Basin Council conducted a survey of local government planners and engineers, geoscientists, building inspectors and approving officers, and the results indicated widespread problems and concerns:

- 90% of respondents indicated flood hazard management was an issue in their geographical area and had been so for more than five years,
- less than half indicated that existing legislative requirements, including roles and responsibilities were clearly defined, and
- only 15% indicated the 2003-2004 legislative changes had improved the effectiveness of flood hazard management.

The report that resulted from this survey, entitled *Flood Hazard Area Land Use Management*, included a key recommendation articulating the need for senior government support to improve flood hazard information, including floodplain maps.

Flood hazard management is further complicated by climate change. Warming associated with climate change—which can present in the form of extreme weather events—is partly responsible for a loss of stationarity, or predictability, in the hydrologic cycle. The term “stationarity” refers to the coping range that people have developed based on historic climate conditions, and is the basis for all engineering, building and planning standards. In other words, past climate conditions have shaped current infrastructure; unfortunately, future climate conditions are not fully known, which means worst-case scenarios are difficult to define and avoid.

This loss of stationarity creates the need to significantly overhaul design standards, floodplain maps and policies, and coping mechanisms, or face losses and damage on previously-unimagined levels. These adaptations and their rationales will need to be periodically updated as climate change progresses.

More information

- Existing floodplain maps, BC Ministry of Forests, Lands and Natural Resource Operations: www.env.gov.bc.ca/wsd/public_safety/flood/fhm-2012/landuse_floodplain_maps.html
- Flood hazard land use management, BC Ministry of Forests, Lands and Natural Resource Operations: www.env.gov.bc.ca/wsd/public_safety/flood/fhm-2012/landuse_index.html
- *Flood Hazard Area Land Use Management: Review of Flood Hazard Area Land Use Management in BC*, Fraser Basin Council and Arlington Group Planning + Architecture Inc. (2008): www.fraserbasin.bc.ca/publications/documents/o8_Flood.pdf
- *Telling the Weather Story*, Institute for Catastrophic Loss Reduction (commissioned by the Insurance Bureau of Canada) (2012): www.ibc.ca/en/natural_disasters/documents/mcbean_report.pdf

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Appendix B – Workshop Participants

Pomme Arros	Simon Fraser University
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Valerie Cameron	BC Ministry of Forests, Lands and Natural Resource Operations
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Susan Davidson	Sea Science Inc.
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Hugh Fraser	Corporation of Delta
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Appendix B – Workshop Participants

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Nathan Vadeboncoeur	The University of British Columbia; Natural Resources Canada
John van der Eerden	Associated Engineering
Ken Vance	Union of BC Municipalities
David Ward	Intermap
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