Red Dragon Consulting

Investigations in Support of Flood Strategy Development in British Columbia

Issue C-3 Report – Flood Recovery

Fraser Basin Council

"In emergency management, we always talk about an all of society approach and yet we do not invest capacity or resources in all of society. We heavily favor response organizations. So, we need to either step up and invest in our non-profits and third sector organizations to be co-managers of recovery. Or we need to stop saying the term because it's just meaningless if we don't build capacity."

Jeremy Stone, Director, Community Economic Development Programs, Simon Fraser University

Version 1.0

First Nations Acknowledgement

We would like to acknowledge that this report was authored on the Unceded and Traditional Territories of the Ktunaxa, Syilx, Okanagan, Coast Salish, and Secwepemc people.

Fraser Basin Council Acknowledgement

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This report was written by Chris Marsh (Principal) of Clear Sky Consulting Ltd. Paul Edmonds (Principal) of Red Dragon Consulting Ltd., Steve Newton, Mike Andrews, and Greg Kanya provided research, engagement, and report review support. The Fraser Basin Council provided the preamble for this report.

Cover photo: Flooding impacts the downtown core and Highway 3 interchange in Grand Forks, BC.
Photo courtesy of the Regional District of Kootenay Boundary.

SUMMARY SHEET

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Purpose	Investigations in Support of Flood Strategy Development in British Columbia Issue C-3 Report – Flood Recovery

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Executive Summary

Flood recovery on a large scale is both an important component of flood management and a relatively new concept in British Columbia. Historically, much more emphasis has been placed on the response phase of flood emergencies, and less emphasis placed on flood recovery, or preparedness and mitigation activities. Flood losses across Canada have increased over the past decade, and effective means of reducing flood recovery timelines, costs, effort required, and standardized methods are needed. Recent severe and high-impact flood events in British Columbia have shown that changes to recovery efforts are necessary to manage climate-related flood challenges.

Disaster recovery is a frequent term in this report and is defined as the phase of emergency management in which steps and processes are taken and implemented to repair communities affected by a disaster; restore conditions to an acceptable level or, when feasible, improve them; and increase resilience in individuals, families, organizations, and communities. (Emergency Management BC, 2019)

The **Investigations in Support of Flood Strategy Development in British Columbia** is a province-wide initiative aimed at developing a comprehensive understanding of current challenges and opportunities relating to flood management across British Columbia. This report forms one of eleven different investigations into flood management issues within British Columbia, a project proposed and funded by the Ministry of Forests, Lands, Natural Resource Development and Rural Development.

This report provides recommendations within the scope of the following areas of flood recovery:

C-3.1 Investigate the current status of coverage of existing overland flood insurance available to homeowners.

C-3.2 Investigate the concept of “build back better” and impediments to implementation.

Following an initial review, the decision was also made to transfer key findings and recommendations about the provincial Disaster Financial Assistance (DFA) program and the federal Disaster Financial Assistance Arrangements (DFAA) from the C-2 – Emergency Response investigation report to this report, in acknowledgement of the close relationship between disaster financial assistance and flood recovery. This information can be found starting in section 4.1 and relates most closely to investigation C-3.1 – the status of existing overland flood insurance.

This project was undertaken during a provincial election and interregnum period, during the COVID-19 pandemic, and over the 2020-2021 seasonal holiday. Many project participants indicated they had reduced availability due to ongoing pandemic response and other capacity constraints. Specific flood recovery data within the Province of British Columbia is relatively scarce. Some project participants were unwilling to share data publicly about programs that were under review, programs under development, where legislation was being revised, or where principles (such as build back better concepts) had not been officially defined by governments.

As such, this report relies heavily upon the lived and occupational experience of a variety of subject matter experts. Over 65 consultations were held to provide feedback for this report. The individuals included local government and First Nations emergency managers, provincial and federal government program staff, academics, government executive staff, critical infrastructure operators, disaster financial assistance experts and overland flood insurance specialists. Several significant flood events over the past five years provided valuable research and consultation data for this report. While many of these recovery operations are still underway, and are now blended with mitigation, preparedness and subsequent response activities, the lessons learned from these events, and the perspectives of the recovery managers working through these issues are incredibly valuable.

The British Columbia DFA program is a provincial program that is seeing increased use as climate-related events continue to increase in frequency and magnitude. Plans are underway to modernize the legislation that forms the foundation for this program to ensure its long-term sustainability. This report provided recommendations that propose enhancements to mitigation and preparedness programs that could be paid for by reduced reliance on the provincial DFA program. At the federal level, the DFAA program is also undergoing a revision – driven largely by accelerating costs related to providing support to provinces who are, in turn, experiencing significant impacts from natural hazards such as flooding. 78% of all disaster assistance payments are related to flood losses (The Geneva Association, 2020).

Of note, during the engagement process, DFA and insurance experts advised the project team that they did not think that the provincial DFA program provided a perverse incentive to develop in hazardous locations, as the DFA program covers only limited losses in the event of a flood. Rather, these representatives reported that the appeal of flat, easily useable land and increased tax revenue from development were greater drivers of this kind of development. However, it was also mentioned that the ability of local governments to allow development, but have these properties assisted during the flood recovery process by various provincial and federal programs was an inequity that requires resolution.

The issues surrounding the status of overland flood insurance in British Columbia are indicative of a program that is still maturing, given that overland flood insurance has only been available in British Columbia since roughly 2015. There is extensive effort being expended at provincial and federal government levels to determine how to manage properties that are at a high risk of flooding – including their potential relocation and subsidized insurance opportunities. Accessibility of flood risk data for flood plain property owners was highlighted by project participants as an area that needs enhancement.

The concept of building back better was explored, and impediments to its implementation were researched. The term is relatively new in British Columbia but will see some form of inclusion in upcoming legislative revisions, such as the update of the Emergency Program Act. While all respondents indicated that they supported the notion of building back better as an important ideal, far fewer knew how to implement the principles during flood recovery. It was noted throughout the engagement process that very few British Columbia municipalities have undertaken significant recovery planning, and many cite lack of capacity and time as reasons for not exploring recovery planning and the implementation of build back better principles. Both the relative newness of the concept and lack of standard guidance were identified as impediments to the implementation of the principles. Questions of responsibility for funding build back better activities were mentioned as a deterrent to implementing the principles as well.

The significant engagement process undertaken to research these issues and provide recommendations showed clearly that British Columbia has a vast network of subject matter experts who work tirelessly to support their communities and organizations in flood management.

Preamble

About This Initiative

Many communities in BC are working to better manage their river and coastal flood risks through a wide range of flood management activities. But current approaches to managing flooding are not always efficient, coordinated, equitable, or cost-effective.

The **Investigations in Support of Flood Strategy Development in British Columbia** is a province-wide initiative aimed at developing a comprehensive understanding of current challenges and opportunities relating to flood management across BC. The focus is primarily on riverine, coastal, and ice jam floods, although other types of flooding are recognized where appropriate. This initiative recognizes that flood management is a multi-faceted, ongoing process requiring the coordination of many organizations, agencies, and orders of government and linked with broader processes, including climate change adaptation and disaster risk reduction, among others.

The BC Ministry of Forests, Lands, Natural Resource Operations and Rural Development retained the Fraser Basin Council to manage and coordinate research and engagement across a broad range of flood management issues relating to governance, hazard and risk management, forecasting, and emergency response and recovery. Consulting teams were retained to undertake research and technical analysis with input from experts, practitioners, and stakeholders from all four orders of government, the private sector, and other organizations. Each investigation produced recommendations to inform flood management program improvements at multiple scales and across many jurisdictions.

Investigations were undertaken across 11 interrelated issues under 4 themes:

Theme A – Governance		
A-1	**Flood Risk Governance**	Review current governance and delivery of flood management activities in BC involving all four orders of government and non-government entities, identify challenges, and recommend changes to improve coordination, collaboration, and overall effectiveness.

Theme B – Flood Hazard and Risk Management		
B-1	**Impacts of Climate Change**	Investigate the state of climate change information and new and existing tools that can support authorities in integrating climate change impacts in flood management.
B-2	**Flood Hazard Information**	Examine the state of flood mapping and dike deficiency information and recommend ways to fill current gaps in flood mapping and manage and maintain information about flood hazards and dike deficiencies.
B-3	**Flood Risk Assessment**	Explore approaches to completing flood risk assessments at various scales, methods for prioritizing risk reduction actions, and standards- versus risk-based approach to flood management.
B-4	**Flood Planning**	Examine the ability of local authorities to undertake integrated flood management planning and opportunities to improve capacity.

B-5	**Structural Flood Management Approaches**	Assess the potential for improvements to dike management, improve the capacity of diking authorities, and implement innovative structural flood risk reduction measures.
B-6	**Non-Structural Flood Management Approaches**	Investigate current and alternative approaches to managing development in floodplains and opportunities for implementing non-structural flood risk reduction actions.

Theme C – Flood Forecasting, Emergency Response and Recovery		
C-1	**Flood Forecasting Services**	Identify gaps and opportunities for improvement in the province's flood forecasting services.
C-2	**Emergency Response**	Investigate roles, plans, and capabilities for flood response and opportunities for improving emergency response.
C-3	**Flood Recovery**	Examine approaches that would support recovery efforts and help reduce future flood risk.

Theme D – Resources and Funding		
D-1	**Resources and Funding**	Investigate resource and funding needs associated with actions to strengthen flood management and evidence in support of proactive flood mitigation.

1.0 Introduction

Disaster recovery within British Columbia is an evolving concept. Flood recovery itself can be characterized even more so as being in the development stages. However, recent major flood events with widespread and significant impacts on communities in British Columbia have shown the need to advance and further develop flood recovery practices, policies, and legislation. With recently elevated risk forecasts for freshet flooding along the Fraser River basin, the need for attention to enhanced flood recovery development, along with enhancements to all flood management in British Columbia has never been more necessary.

Disaster recovery is defined as the phase of emergency management in which steps and processes are taken and implemented to repair communities affected by a disaster; restore conditions to an acceptable level or, when feasible, improve them; and increase resilience in individuals, families, organizations, and communities. (Emergency Management BC, 2019) Recovery is one of the four pillars of emergency management, linked interdependently with response, preparedness, and mitigation. Flood recovery specifically denotes the resulting recovery efforts following a high-water event that somehow affects communities and the landscape.

The Fraser Basin Council has retained Red Dragon Consulting Ltd to examine the issues related to flood recovery. Significant flood recovery events in Cache Creek, the Cariboo region, the Fraser Fort George region, the Boundary region, and other areas of British Columbia have shown that there is an immediate need for additional program and best practice development at all levels of government and within society itself to improve the flood resilience of British Columbia communities.

Specifically, this report will evaluate the status of overland flood insurance available to British Columbia residents and impediments to implementing “build back better” concepts following flood events. The project team utilized a process of engagement with subject matter experts and a cross section of those with experience in flood events. Key findings are provided in this report, and recommendations based on consultation have been developed.

Following an initial report review, the project team determined that research, findings, and recommendations related to the Disaster Financial Assistance (DFA) program in British Columbia, and the Disaster Financial Assistance Arrangements (DFAA - a Government of Canada program) were better suited for inclusion within the C-3 – Flood Recovery report. These were initially scoped for inclusion in the C-2 – Emergency Response report.

This report is built largely upon the lived expertise and insight of emergency program managers, subject matter experts, and practitioners of recovery and recovery support services in British Columbia. Disaster recovery is an evolving and maturing field in British Columbia, and as such, empirical data about recoveries, their effectiveness, cost, and other metrics often do not exist. For this reason, the findings and resultant recommendations are based mainly on the observations and lived experience of a diversity of experts who are involved with disaster recovery, and specifically flood recovery, from a variety of perspectives across British Columbia and Canada.

1.1 Project Description and Background

Flood recovery efforts are often incredibly challenging, broad in scope, and taxing on those organizations who find themselves in need of immediate development of a flood recovery program. However, there is written guidance, national, provincial, and local government expertise, and best practices we can and should draw from within British Columbia. Large scale disaster recovery operations are thankfully rare in British Columbia, and by relation, flood recoveries even less common. However, events over the past decade have shown that flood recoveries are necessary, are complex, and are significantly impactful to those they affect – in terms of both the public at large and the organizations who support these recoveries.

Red Dragon Consulting Ltd. was retained by Fraser Basin Council to coordinate a series of investigations and provide recommendations to inform flood management programs in relation to flood recovery and emergency response (with the emergency response project being a separate report, under Issue C-2). Fraser Basin Council, within the scope of the project, identified the need to consult different levels of government and with subject matter experts to gather data, find best practices, and to identify opportunities for improving flood recovery efforts. This initiative was proposed and funded by the BC Ministry of Forests, Lands, Natural Resource Operations and Rural Development (MFLNRORD).

This project report undertook consultations with subject matter experts, and provides recommendations within the scope of the following areas of flood recovery:

- C-3.1 Investigate the current status of coverage of existing overland flood insurance available to homeowners.
- C-3.2 Investigate the concept of "build back better" and impediments to implementation.

1.2 Project Team

The project team, under Red Dragon principal and lead consultant Paul Edmonds, was comprised of five individuals. Each team member has significant flood management experience in various government sectors across British Columbia and around the world. This experienced and adaptive team allowed the project access to a significant amount of existing professional relationships, expertise, and differing perspectives on flood recovery processes and best practices.

For this project, the primary project contacts were Paul Edmonds as the project manager, and Chris Marsh as the deputy project manager.

Further information about the project team members and experience, and the project team design, can be found in Appendix B.

1.3 Project Scope and Context

British Columbia has challenging topography on which communities have historically been founded. Communities have grown along bodies of water to provide access to trade and transportation corridors, and where flat, viable and arable land was traditionally found. Our complicated relationship with living near water includes the fact that water bodies are aesthetically pleasing, and since the colonization of British Columbia, people have desired to own property and build homes near rivers, lakes, and oceans. As the climate continues to change and flooding events become more frequent and more impactful, British Columbia communities have had to reconcile their approach to development and continued habitation in these areas. However, communities find themselves under continual and increasing pressure to develop flood plains. The intersect of these issues happens when floods impact the built environment. If flood plain development policies, risk assessments, and mitigation strategies are not in place, or have only partially addressed issues to reduce the impact of a high-water event, flood response and recovery must be undertaken to protect lives and property. Following flood responses, an effective flood recovery program is a significant opportunity to resolve flood issues and restore community resources prior to future flood events.

Providing flood protection to communities is complex and requires understanding the problems, data, plans and actions that address different issues associated with floods. Mitigation, preparedness, planning, data gathering, and assessment are some of the early stages that make up flood protection. Later stages include layers like effective and adequate insurance and disaster financial assistance programs to protect and support communities that are exposed to floods. When impacts do occur, flood recovery efforts are undertaken and must be underpinned by effective policies, guidance, and resources for them to be effective. Flood recovery efforts provide opportunities to build back communities better in some cases, but this concept is relatively new in British Columbia, and its application requires policy development and resources for it to be effective. However, recent high impact flood events in British Columbia have shown that to best

protect British Columbians from the effects of flooding, both emergency flood response and recovery efforts within the province must be enhanced.

This project focuses on the following two investigations to provide recommendations for the future direction of all orders of government and practitioners involved in flood recovery.

1. **Investigation C-3.1 - Investigate the current status of coverage of existing overland flood insurance available to homeowners.**

Scope:
- Include consideration of the high-risk pool concept being investigated by insurers.
- Engage & interview senior representatives at Insurance Bureau of Canada with view to identifying general level of flood insurance availability in British Columbia.
- Review insurance industry current & best practices.
- Review & identify potential best practices from other (inter)national jurisdictions related to flood insurance.

2. **Investigation C-3.2 - Investigate the concept of "build back better" and impediments to implementation.**

Scope:
- Examine the “build back better” concept, where and how it is used in other jurisdictions, and the benefits realized.
- Examine impediments to its implementation (outside of figuring out costs).
- Examine the role of Disaster Financial Assistance in supporting floodplain development in high-risk areas.
- Investigate local government views on the concept regarding their infrastructure and to residents in lowering their risk.
- Investigate whether local governments have plans for flood recovery post-earthquake.

Following an initial review of both the C-2 – Emergency Response and C-3 Flood Recovery reports, a decision was made by the project team (representatives from both Fraser Basin Council and Red Dragon) to incorporate portions of the C-2 report scope which investigated the British Columbia Disaster Financial Assistance Program and the Government of Canada Disaster Financial Assistance Arrangements Program. These sections have subsequently been incorporated into this report, with sections in both the key findings and recommendations.

1.4 Interdependencies with Other Themes and Projects

There are two provincial led projects investigating flood strategy in British Columbia initiated in 2020 that have interdependency with this report. The first project is the Fraser Basin Council investigations, where the recommendations will inform provincial, local and First Nations flood strategies and programs. This report forms one of the 11 investigations. Described in the preamble, these projects propose best practices and recommendations gathered from consultation with subject matter experts. This Issue C-3 – Flood Recovery report is closely aligned and interdependent in relation to many of the other reports developed throughout these investigations (primarily, with Theme A and certain Theme B investigations). In particular, the C-2 – Emergency Response report was undertaken as a co-project to this report, and much of the data presented, concerns raised, and recommendations provided by interviewees are applicable in some way to both reports.

Concerning the C-3 project for flood recovery, the project team has assessed interdependencies with the other investigations that can influence the investigation subject activities. Table 1 below provides a high-level overview of the interdependence with other Fraser Basin Council investigations recently completed or currently underway.

Table 1. Interdependence with other FBC Investigations

C-3 Flood Recovery Project Investigations	Strong dependency with other investigation outcomes	Lesser dependency with other investigation outcomes
C-3.1 Current status of overland flood insurance available to homeowners	▪ B-1 – Impacts of Climate Change, B-2 – Flood Hazard Information, B-3 – Flood Risk Assessment B-4 Flood Planning, B-5 – Structural Flood Management and B-6 – Non-Structural Flood Management ▪ C-1 – River and Flood Forecasting, and C-2 – Emergency Response	▪ A-1 – Collaboration and Coordination and A-2 – Consolidating Flood Management ▪ D-1 – Resources and Funding
C-3.2 The concept of "build back better" and impediments to implementation	▪ A-1 – Collaboration and Coordination and A-2 – Consolidating Flood Management ▪ B-1 – Impacts of Climate Change and B-4 Flood Planning ▪ C-2 – Emergency Response ▪ D-1 – Resources and Funding	▪ B-2 – Flood Hazard Information, B-3 – Flood Risk Assessment, B-5 – Structural Flood Management and B-6 – Non-Structural Flood Management ▪ C-1 – River and Flood Forecasting

The second project, the B.C. Flood Strategy, is in progress and is being undertaken by the Province of British Columbia. It will articulate a vision, principles, and outcomes for flood management across the province, to bridge between current and future states of flood management and governance. These projects are informed, underpinned, and in some cases, are being developed in parallel to program level reviews and legislation renewal.

It is essential to consider that there are many additional projects, investigations, and program updates underway that can influence the investigation activities illustrated above. Examples of these include:

- The Modernization of the Emergency Program Act.
- Pending updates to both the Compensation and Disaster Financial Assistance regulation and the federally managed Disaster Financial Assistance Arrangements.
- The update of a wide variety of provincial and federal regulations.
- Ongoing development of new policy and policy amendments by all levels of government (but, in direct relation to this report – within Emergency Management BC and MFLNRORD).
- Current and future ministry mandates; the differences in service level legislation between regional districts and municipalities within British Columbia.
- First Nation governance.
- The ongoing expanded consideration of, and inclusion of, First Nations historical and traditional knowledge and government to government relations.
- Trend analysis of historical and current emergency events.
- The emergency management culture and the nature of past, present and future disasters in British Columbia.

2.0 Relevant Policies, Legislation and Guidance

There are many acts, regulations, documents, reports, and other publications that support, direct, and influence the emergency management legislative environment across Canada and within British Columbia. Legislation and policies that are more pertinent to the investigation of flood recovery strategy are discussed below.

2.1 Key Federal and Provincial Emergency Management Legislation and Strategy

At the Government of Canada level, the Emergency Management Act 2007 sets out the roles and responsibilities of individuals and government bodies within the federal government who participate in Canada's emergency management system. At this national stage, the Act sets out the leadership and responsibilities of the Minister of Public Safety and Emergency Preparedness, including coordinating emergency management activities among government institutions and in cooperation with the provinces and other entities. (Government of Canada, 2007)

To set a course for Canada, An Emergency Management Framework for Canada was revised and approved in 2017. This framework aims to guide and strengthen the way governments and partners assess risks and work together to prevent/mitigate, prepare for, respond to, and recover from the threats and hazards that pose the greatest risk to Canadians. (Emergency Management Policy and Outreach Directorate, 2017)

In addition, given that each federal, provincial, or territorial (FPT) government has a responsibility for emergency management and public safety in Canada, the framework aims to strengthen FPT collaboration and ensure more coherent and complementary actions between FPT government initiatives.

To strengthen the approach to Canada's resilience to disasters, the policy document "Emergency Management Strategy for Canada: Toward a Resilient 2030" was developed and released in 2019. The core objective of this strategy document is to provide a foundation for collaboration and a whole-of-society roadmap to strengthening Canada's ability to assess, prevent and mitigate risks, and to prepare for, respond to, and recover from disasters (Public Safety Canada, 2019).

By way of supportive research, this investigation reviewed the five strategic priority areas of action within the above-mentioned strategy and formulated questions to explore the future direction of the federal government, the significant consistent messages for provincial and First Nation and local government collaboration, co-ordination, and implementation to support an all-hazard approach. The five priority areas are:

- Enhance whole-of-society collaboration and governance to strengthen resilience.
- Improve understanding of disaster risks in all sectors of society.
- Increase focus on whole-of-society disaster prevention and mitigation activities.
- Enhance disaster response capacity and co-ordination and foster the development of new capabilities; and
- Strengthen recovery efforts by building back better to minimize the impacts of future disasters.

At the British Columbia l government level, much of the legislative authority that guides flood recovery is derived from Emergency Program Act (EPA) and its associated regulations (Emergency Management BC, 1996). Emergency Management BC (EMBC) is currently undertaking a modernization of the EPA to ensure more effective management of emergencies. This will include incorporating international best practices, including the United Nations (U.N.) Sendai Framework for Disaster Risk Reduction (Sendai Framework); the U.N. Declaration on the Rights of Indigenous Peoples (UNDRIP); and the draft principles that guide the provincial government's relationship with Indigenous Peoples. (Emergency Management BC, 1996; United Nations Office for Disaster Reduction, 2015; United Nations, 2007)

The revised Act will reflect the lessons learned from the unprecedented flood and wildfire seasons in 2017 and 2018, address all four pillars of emergency management (mitigation, preparedness, response, and recovery), and place more emphasis on disaster risk reduction to prevent disasters from happening and to lessen the impact when they do. This project seeks to deliver a modernization of emergency management legislation that is required to move forward into a resilient future.

In October 2018, British Columbia adopted the Sendai Framework to encompass an "all of society" approach to emergency management to help build resilience at the individual and community levels. At the time of this report, the provincial government is refining their legislative framework to build on these measures and will position British Columbia as a leading and progressive jurisdiction in emergency management (Government of British Columbia, 2020). This includes the in-progress development of a British Columbia Flood Strategy discussion paper, which also speaks to the principles found in the Sendai Framework, and will also provide guidance to flood response and recovery activities.

2.2 Disaster Financial Assistance and Disaster Financial Assistance Arrangements

Many provinces and territories have disaster financial assistance programs. The frameworks, policies and procedures of these programs are governed at the provincial and territorial levels and vary greatly in how they provide service to their residents.

The key findings and recommendations from research and engagement sessions regarding the DFA and DFAA programs are discussed in Section 4.1.

2.2.1 British Columbia Disaster Financial Assistance Program

In British Columbia, the Disaster Financial Assistance (DFA) program is managed by the Community Recovery Branch of Emergency Management BC (EMBC). The DFA program is comprised of staff with support from contractors who help assess damage to homes, businesses, and communities when disasters happen. The DFA program in British Columbia is a widely accessed program, as nearly every region has either been impacted by some form of disaster in recent years.

The British Columbia DFA program operates under the following parameters:

- Financial assistance is provided for each accepted claim at 80 percent of the amount of total eligible damage that exceeds $1,000, to a maximum claim of $300,000.
- Claims may be made in more than one category (e.g., homeowner and farm owner).
- A homeowner or residential tenant must show that the home is their principal residence. Seasonal or recreational properties, hot tubs, patios, pools, garden tools, landscaping, luxury items (like jewelry, fur coats and collectibles), and recreational items (like bicycles) are not eligible for assistance.
- Small business owners and farm owners must demonstrate it is their primary source of income. Owners of damaged rental property must apply and qualify as a small business.
- Charitable Organizations must provide a benefit of service to the community at large.
- Applications for DFA must be submitted to Emergency Management BC (EMBC) within 90 days of the date that DFA was authorized. (Emergency Management BC, 2021)

In British Columbia, all DFA claims are assessed by representatives of the provincial DFA program. These representatives evaluate the cost of restoring essentials and make recommendations as to compensation amounts. DFA program staff assess these claims for their anticipated impact, and any prior claims. For example, "Is the loss reasonable considering the emergency event, that has been declared DFA eligible?" Claimants are provided a one-time lump-sum amount that they may expend as needed to support their recovery, however, claimants may re-apply for DFA coverage if they are again struck by disaster. The DFA program (and EMBC) manages claimants who have had three or more claims for the

same type of event in cooperation with local governments to find more permanent solutions. These situations are often challenging to navigate in their complexity and existing programs are not currently designed to provide permanent solutions.

Note that for the purposes of this report, Disaster Financial Assistance (DFA) refers to the Province of British Columbia disaster relief program. The Disaster Financial Assistance Arrangements (DFAA) is a program managed federally by the Government of Canada to provide a means of compensation to provinces for major emergency events. Both are referenced frequently in the following sections but refer to programs managed by separate entities.

The Compensation and Disaster Financial Assistance Regulation (B.C. Reg. 124/95) is enabled under the British Columbia Emergency Program Act. In particular, the Regulation establishes the framework for the provisions of Disaster Financial Assistance. (Emergency Management BC, 2016)

This provincial program is provided to assist property and business owners, tenants, non-profit societies, and local governments recover from uninsurable disasters. The DFA program operates under the provincial Emergency Program Act and is managed by Emergency Management BC. DFA may be available in the event of a disaster if the Minister of Public Safety, or designate, has determined disaster financial assistance may be provided. The eligible dates and geographic locations of the availability are provided to local governments impacted by the disaster, following approval by the minister. (Emergency Management BC, 2021)

DFA is intended to support British Columbia communities through:

- Providing or reinstating the necessities of life to individuals, including help to repair and restore damaged homes.
- Re-establishing or maintaining the viability of small businesses and working farms.
- Repairing, rebuilding, and restoring public works and the essential community services specified in these guidelines to their pre-disaster capabilities.
- Funding limited mitigation measures to reduce the future vulnerability of repaired or replaced infrastructure.

As of the creation of this report, the Compensation and Disaster Financial Assistance Regulation (CDFA) is undergoing consideration for legislative renewal. Much like its related statute, the Emergency Program Act, the CDFA Regulation has been in force for some time, and with the changing nature of emergency management, enhanced risk analysis and increasing frequency of eligible emergency events, as well as changing economics, the regulation needs amendment. As well, amendment of the CDFA will bring in into line with the expected changes for the new version of the Emergency Program Act. Provincial recovery program staff, contacted through consultations for this report, were not able to release the kinds of changes that may be coming to the regulation. However, staff connected to the review and the application of the regulation note that there are amendments that will be important to incorporate, particularly as flood insurance becomes more readily available, as the cost of homes and living essentials increase in value, and as emergencies become more prevalent.

2.2.2 Government of Canada Disaster Financial Assistance Arrangements

Provincial and territorial DFA programs are backed by federally managed Disaster Financial Assistance Arrangements (DFAA) (Public Safety Canada, 2007). When disasters exceed the capacity of provinces or territories to manage on their own, the DFAA program may be accessed. Providing certain thresholds are met (as per Appendix A and B of the arrangements themselves), and significant losses have been incurred by provincial or territorial governments, the Government of Canada aids these jurisdictions through the DFAA program (Public Safety Canada, 2021). This arrangement is governed by formal agreements between provincial and territorial governments and the federal government and provides a compensation scheme so that individual provinces and territories are not unduly impacted by the financial costs of major disasters.

The federal DFAA program is also undergoing a review, with amendments proposed to the program. Other federal initiatives, like the findings from the Task Force on Flood Insurance and Relocation for at-risk flood-prone properties will likely affect these amendments. At the time of the creation of this report, those consulted about federal disaster assistance programs were not able to release any information about what the revised DFAA program may look like. Significant analysis is being undertaken to determine the suitability of several program amendments. There has been a public commitment by the Government of Canada to undertake a review of the DFAA program.

The Geneva Association is an international insurance industry think tank. The Geneva Association has undertaken comprehensive reviews of flood risk management, and specifically, overland flood insurance, for five mature national economies - including Canada. The Association reports that the DFAA program in Canada has reimbursed over $5 billion in disaster assistance since its inception and over 78% of these costs are related to flood losses. Furthermore, the annual cost of federal DFAA payments has increased significantly over the past decade, growing from an average of $10 million for the period 1970–1995 to $110 million for 1996–2010 to $360 million for 2011–2016, now far surpassing the program's nominal $100 million annual budget (The Geneva Association, 2020).

2.3 United Nations Sendai Framework for Disaster Risk Reduction

The United Nations (UN) Sendai Framework for Disaster Risk Reduction 2015-2030 (Sendai Framework) outlines seven clear targets and four priorities for action to prevent new and reduce existing disaster risks. The priorities are listed below.

- Understanding disaster risk
- Strengthening disaster risk governance to manage disaster risk
- Investing in disaster reduction for resilience
- Enhancing disaster preparedness for effective response, and to "Build Back Better" in recovery, rehabilitation, and reconstruction

It aims to achieve the substantial reduction of disaster risk and losses in lives, livelihoods, and health and in the economic, physical, social, cultural, and environmental assets of persons, businesses, communities, and countries during the period from 2015 to 2030.

The most significant shifts promoted by the Sendai Framework are a strong emphasis on disaster risk management as opposed to disaster management, the reduction of disaster risk as an expected outcome, focus on preventing new risk, reducing existing risk and strengthening resilience, as well as providing a set of guiding principles, primary among them a commitment to an all-of-society approach to disaster risk reduction, including provisions for undertaking community-led disaster recovery. The Sendai Framework is composed of expected outcomes, guiding principles, the role of participants, and principles of international cooperation and partnership.

The Framework was adopted at the Third UN World Conference on Disaster Risk Reduction in Sendai, Japan, on March 18, 2015. (United Nations Office for Disaster Risk Reduction, 2015)

The Sendai Framework was adopted in October of 2018 by the Province of British Columbia, as the first province in Canada to ratify the agreement. It is expected that legislation in review and revision, such as the British Columbia Emergency Program Act, will reflect the principles and priorities found within the Sendai framework. (Emergency Management BC, 2019)

2.4 Federal and Provincial Insurance Governance

Property insurance companies in Canada are regulated by federal and/or provincial regulators, called Superintendents of Insurance. Each province or territory is its own Superintendent. (Insurance Bureau of Canada, 2021)

The federal Office of the Superintendent of Financial Institutions (OSFI) is an independent agency of the Government of Canada, which contributes to the safety and soundness of the Canadian financial system. OSFI supervises and regulates federally registered banks and insurers, trust, and loan companies, as well as private pension plans (but only those plans which are subject to federal oversight). (Office of the Superintendent of Financial Institutions, 2021)

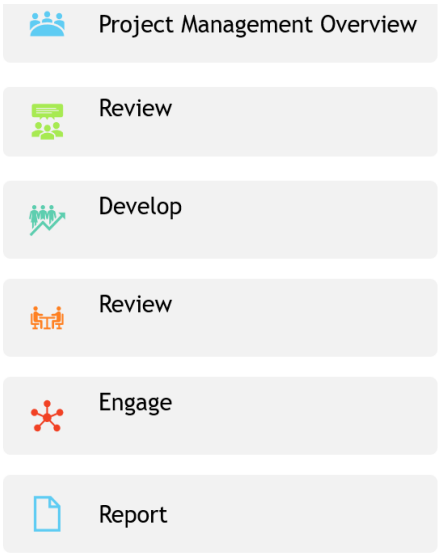
OFSI works with the British Columbia Financial Services Authority (BCFSA) at the provincial level. BCFSA has four core business areas that are organized around its areas of regulatory responsibility. Of primary interest regarding this report is the core business area that focuses on the insurance industry. BCFSA regulates insurers under the Financial Institutions Act, Insurance Act, and Insurance (Captive Company) Act. (BC Financial Services Authority , 2021)

3.0 Method

The project management approach for this project included reviewing, developing, revising, engaging, and reporting activities. This systematic review process allowed the capture of different governments and First Nations perspectives, policies, approaches, and challenges in addressing the advancement of flood recovery activities.

The Theme C2 - Flood Response and C3 – Flood Recovery projects were managed under one project team, and an engagement process was used to provide data to both reports where applicable. For this reason, the project management methods for both projects are similar. Figure 1 below details the steps taken to complete the project.

Figure 1. Project Management Overview



The team identified best practices both regarding consultation tasks and engagement with federal and provincial levels to provide meaningful sharing and clarification of policy direction and outcomes. The team used evidence-based decision making from structured interviews, observations and comments to form report recommendations while allowing for research and clarification of findings.

In the design of this project team, it was recognized that all team members were skilled communicators and understood the need for engagement, and it was imperative that these skills were utilized to maximize the return of investment from all participants.

It became apparent during the engagement and research phase that there is extraordinarily little empirical data available that is specifically related to flood recovery within British Columbia. Also, those engaged were often cautious about releasing data for this project that was not widely known or publicly distributed. For these reasons, the findings and recommendation found in this report are largely built upon the lived experience, insight, opinion, and expertise of those who have played a role in the planning and execution of flood recovery programs, overland flood insurance, and the application of build back better principles. Where possible, sources of data and reports have been cited. However, in some cases, the values and perspectives presented are the opinions and recommendations of engaged parties, and these are reflected as such in the relevant citations.

The team approach provided an opportunity to discuss all pertinent C-3 information, and, where required, consultation for the C-2 Flood Response project. Shared insights that had inter-dependencies with other investigations within the greater project investigations were shared with the FBC project manager. In turn, those thoughts were forwarded to the appropriate consultant team for consideration/inclusion in reports under development for other investigations.

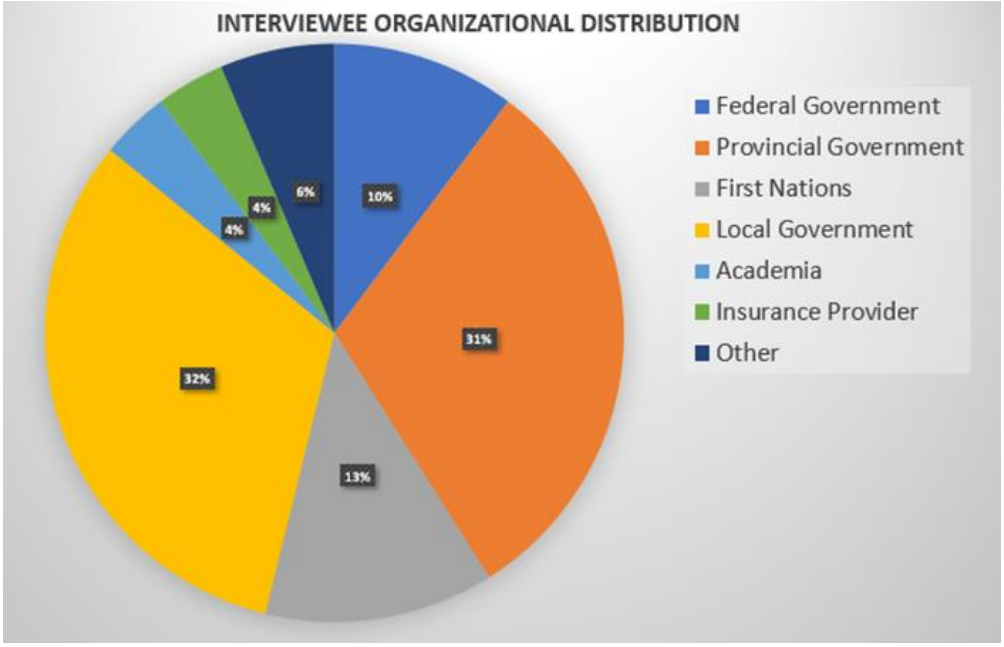
The project team used a continual review process to share and identify potential recommendations and observations for additional research through the sharing of files, structured team meetings and virtual communication.

3.1 Development of Consultation Process

A comprehensive interviewee list was key to gathering thoughtful and inspiring engagement. The project team collectively reviewed the contact lists and existing data provided by the Fraser Basin Council, utilized for other investigations, and expanded the list by adding contacts that were relevant for different required areas for engagement within Issues C-2 and C-3. In the design of the engagement, there was a need for a broad list of interviewees to capture

the significant differences in approach across all levels of government and subject matter expertise, as well as ensuring representation from a variety of geographic distributions across British Columbia. Many interviewees were consulted for both the C-2 and C-3 investigations, where they had expertise in both. Figure 2 below shows the different organizations sectors from which various interviewees were drawn.

Figure 2. Interviewee Organizational Distribution



Through existing professional networks, as well as through referrals and recommendations from other project participants, a substantial list of participant nominees was created and refined to provide subject matter, professional role, and geographic diversity wherever possible, subject to project scope and timescale. The initial list was considerably refined to complement the work plan schedule and on-time delivery of the investigation reports. In total, over 65 interviewees were engaged in either single or multi-participant interviews.

Within the project timeline, the 2020 British Columbia provincial election impacted several project participants within provincial government ministries. Interviews were scheduled to provide these participants flexibility. The COVID-19 pandemic was not a major issue as the interviews as meetings occurred either by video link or telephone, however, the pandemic had a major effect on the general availability of some interviewees, as they continued to manage their organizational pandemic responses.

Several interviews took place with multiple participants to ensure the project team respected the attendees' time, commitment, and schedule constraints. This approach worked best for conversations with federal and provincial counterparts, which allowed for expanded perspectives to be provided by call participants. Wherever possible, participants received structured questions and information about the project ahead of time and were only asked questions where they had relevant experience and insight.

Opportunities for re-engagement were identified, where needed, to clarify information, data, and comments for reporting purposes. Re-engagement was used primarily for consultations with the Insurance Bureau of Canada, Public Safety

Canada, and Emergency Management BC staff, and the Red Dragon project team thanks them for their additional time and insight.

There were 3 distinct engagement phases leading to the formal consultation process:

Phase 1: Developing the list of interviewees.
The list of interviewees was sorted into areas of subject matter expertise, geographic location and organizational representation, and a matrix was developed to show which investigation issues would be asked of each respective interviewee. This process was important to ensure efficient use of the project team and identify the subject matter experts who possessed the most knowledge in relation to the respective investigation.

Phase 2: Scoping the revised interviewee list.
This activity was conducted in parallel with investigation research and consultation question development to ensure the questions were asked of those on the interviewee list who were best suited to speak to the issue.

Phase 3: Consultation Development
The project team came together to specifically discuss issues, challenges, and solutions related to creating a managed consultation process. The final desired approach was to appoint a single point of contact to each interviewee, or group of interviewees, so they did not receive multiple requests regarding the investigations. This approach also considered the interviewee's relevant expertise and knowledge. Some of the interviewees were volunteers who wished to be provide input to the investigation. The team collated commonalities from the structured interview observations and feedback to form report recommendations, while also developing other recommendations derived from research.

A significant challenge identified in this engagement process was the ability to provide a two-stage interview process with the option of the third clarification stage to allow for added participation, opportunity for reflection and consolidation of policy direction. The limiting factors were the project time length, confounding factors like the pandemic and provincial election, as well as the availability of interviewees.

3.2 Development of Consultation Questions

The aim of engagement phase of the project was to create ten relevant questions per investigation. A broad research phase was initiated to create relevant areas of interest and focus for exploration which, when refined, produced draft questions by Red Dragon project managers for the investigative sessions.

Flood recovery is a broad topic and, wherever possible the consultation questions were written in an open format to allow for a variety participant feedback, experience, and insight. It was identified early on by the Red Dragon project managers that these questions would require clarification or further context during the interview process to ensure that the interviewees were able to provide responses within the project scope, as the potential scope of flood-related topics is quite broad. Figure 3 that follows shows an example of a typical question that was asked of interview participants.

Figure 3. An Example of a Consultation Question

Question Example:
Personal and organizational awareness plays a role in having the ability to enhance recovery post-disaster.

A. Does your organization have a recovery plan with build back better scenarios pre-identified?
B. Would you say residents and communities are thinking of ways recovery efforts could be enhanced post-disaster?
C. What ways could mitigation and preparedness be enhanced, thereby shortening the recovery timelines, and encouraging a complete recovery for individuals and communities?

A copy of all consultation questions can be found in Appendix C.

Once internal review had taken place, all questions were shared with the Fraser Basin Council Project management team for further comment and subsequent amendment.

Because of the specialized nature of consultation for overland flood insurance, provincial and federal disaster financial assistance programs, flood recovery expertise, and build back better concepts, not all 65 consultations included these topics. Rather, subject matter experts and strategic leaders in these fields were consulted to provide feedback and data to form recommendations.

3.3 Research Phase

The team conducted a research and review phase to ensure that all investigation deliverables were supported by research. In this early phase it was decided to combine C-2 and C-3 Flood Response and Recovery research activities to share team resources and ensure efficiency of the project team.

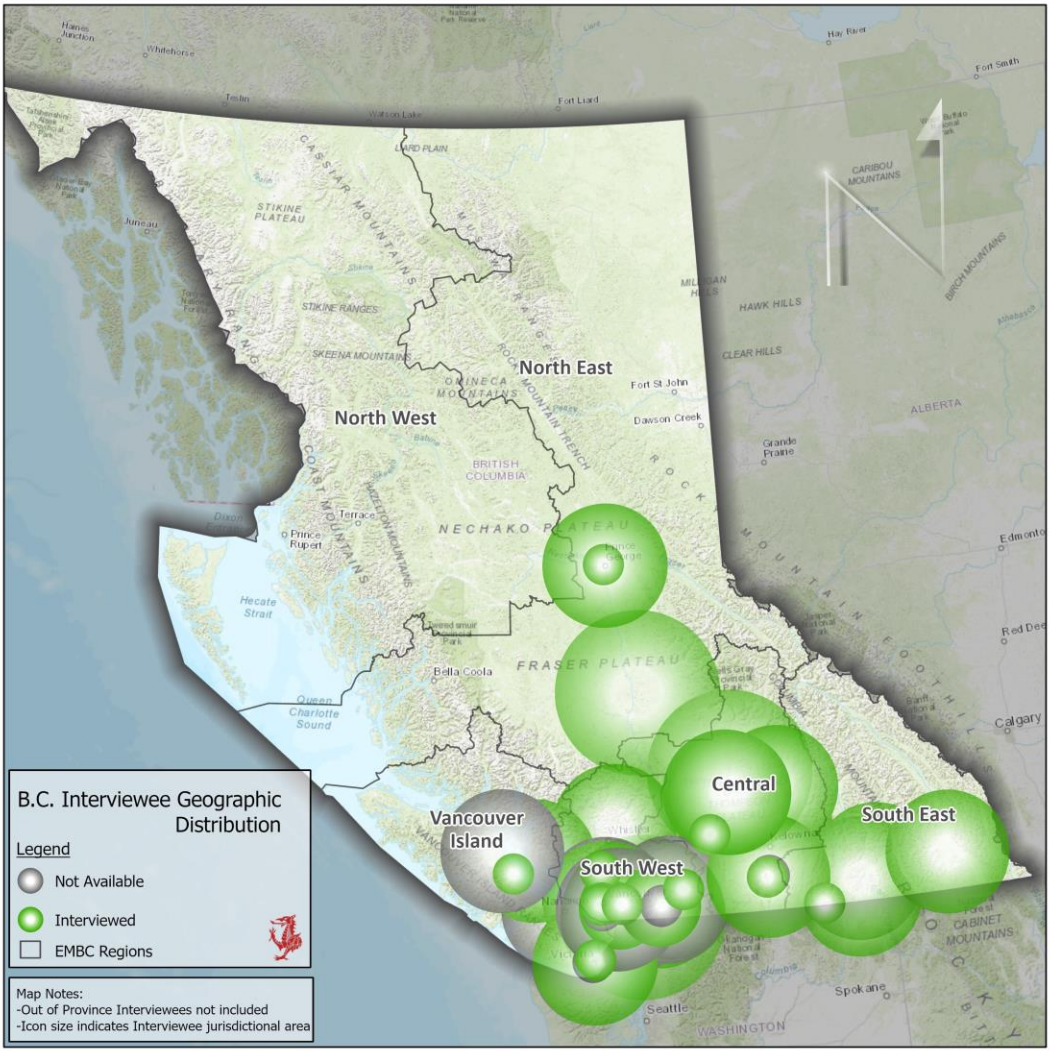
Key areas of focus included:

- Fraser Basin Council reports and data from previous investigations
- Flood status reports from academia and government
- Federal strategy documents from Public Safety Canada and other federal government departments
- British Columbia government documents and the Modernization of Emergency Management project
- Federal and provincial flood response and recovery arrangements
- Indigenous Services Canada and Emergency Management BC agreements, bipartite and tripartite agreements, and United Nations indigenous peoples related documents
- Sendai Framework documents and associated documents from the United Nations Office for Disaster Risk Reduction
- Flood insurance information and Insurance Bureau of Canada associated reports
- UK, European, Australian, United States and other national-level document sources

3.4 Geographic Distribution of Project Participants

As illustrated in Figure 4 below, the project team undertook an extensive engagement process to try to capture diverse representation of British Columbia communities and First Nations. Geographic diversity was identified as important, as was engagement with communities with a wide range of populations, composition and both First Nations and settler communities. Some of the partners interviewed were responsible for municipalities with defined borders, while others were representatives from larger regional districts with huge areas, for which they were responsible. This variability in responsibility area is represented by the size of the circles in the graphic below. This affects the experience, and the knowledge that partners were able to share.

Figure 4. Geographical representation of requested and completed consultations



4.0 Key Flood Recovery Findings and Recommendations

4.1 Province of British Columbia Disaster Financial Assistance Program and Government of Canada Disaster Financial Assistance Arrangements

The British Columbia DFA program provides support to property and business owners, tenants, non-profit societies, and local governments in specific situations. DFA is offered in situations to cover the loss of essentials that are not insurable. The overarching principle that denotes whether a resident is eligible for DFA assistance is whether the resident had access to insurance for the emergency event in question that was readily available. The British Columbia DFA program defines readily available in that insurance was offered to the recipient, available through their local insurance broker and available without switching insurers for the sole purpose of receiving coverage, and available as a reasonable additional cost to their overarching insurance coverage. The notion of affordable insurance is challenging for the DFA program, as it is difficult to know what is affordable to different people, and a subjective assessment and application of a means test to ensure the appropriateness of availability of coverage is sometimes necessary. A means test is a determination of whether an individual or family is eligible for government assistance or welfare, based upon whether the individual or family possesses the means to do without that help).

The issue of how overland flood insurance affects DFA eligibility is complex. After a claim is submitted to the DFA program, the claimant is provided a form to have filled out by their broker, noting that they had not been offered flood insurance and did not decline it. This must be a conscious decision and does not denote that insurance was "readily available" if the claimant was sent insurance marketing materials, for example. DFA assistance is possible for items that might exceed overland flood insurance policy caps, or for items (such as access roads, bridges, water, sewer and septic systems) that are not normally covered by overland flood insurance.

Some types of DFA claims are more complex than others. Where compensation for property owners and renters are typical and are relatively straightforward in their assessment and compensation, claims for commercial enterprises, non-profit societies and local governments require much more documentation to be provided, a more in-depth analysis and characterization of the loss, potential insurability of the loss, and the organization's intention of returning the loss to the same state as before the event, or to build back better (or differently).

As mentioned in Section 2.2, the British Columbia DFA program is backed by the Compensation and Disaster Financial Assistance Regulation (CDFA regulation). This regulation defines the structure and authority of the DFA program. It defines how compensation is provided, arbitration processes, claims evaluation and other protocols of the program.

Section 2.2 also notes that the British Columbia DFA program is backed by the federally managed Disaster Financial Assistance Arrangements. This program provides a means for individual provinces to seek financial compensation from the federal government when significant disasters occur, so that entire cost of the disaster response and recovery is not borne by the provinces themselves.

Both the British Columbia DFA program legislation and the DFAA are slated for legislative renewal.

4.1.1 Key Findings from the Investigation of the Disaster Financial Assistance Program and Disaster Financial Assistance Arrangements

There were numerous concerns regarding the DFA program and legislation that were mentioned repeatedly in consultations, particularly with First Nations and small rural communities through the engagement phase of this project. The complexity of the program is reflected by the program description in Section 2.2.

Community representatives who were consulted reported that there is a low level of understanding of what the DFA program is, and the types of service provided by this group. Notably, both the DFA program and rural and First Nations communities share during the engagement sessions that if there was a low level of awareness of the DFA program present in an affected community, residents often erroneously thought that the DFA program would be a replacement for insurance, when the program is designed specifically to compensate for essential uninsurable losses. This creates an emotional rollercoaster ride for recipients as they often initially think that they are being covered for all their losses by government programs when they are not.

Many provinces in Canada have moved to a model of risk reduction for high-risk properties at risk of severe and dangerous flooding. Ontario, Quebec, Alberta, Manitoba, and New Brunswick, among others, have programs that, at times, have provided for the purchase or compensation for at-risk properties (often in collaboration with local governments and federal grant programs). As well, the British Columbia DFA program provides funding for personal losses up to a maximum of $300,000. These amounts are generally reserved for the total loss of a home in a flood, fire, or landslide. For example, the complete loss of a home valued at $500,000 would only see a payout maximum of $300,000. These amounts are generally low for much of the value of housing stock within British Columbia, and this was emphasized by local government interviewees who had navigated these issues. To provide additional guidance and direction for these situations, the Flood Insurance and Relocation Task Force has been created (a national, provincial and Insurance Bureau of Canada shared project) (Public Safety Canada, 2021). Much of the impetus for the establishment of this task force (combined with the rising cost of post-disaster financial assistance claims to provincial and federal assistance programs) was due to the creation of the IBC report "Options for Managing Flood Costs of Canada's Highest Risk Residential Properties" (Insurance Bureau of Canada, 2019). This report focussed primarily on measures to transfer residential property risk from public sector disaster financial assistance programs, which are funded by the taxpayer, to private sector insurance solutions, which are primarily funded by the property owner.

The disaster compensation program in New Brunswick is of considerable interest and was identified by both Red Dragon project team members familiar with the program, and recovery managers consulted for the purposes of this report. The New Brunswick DFA program provides three levels of support for flood affected residents, which (within Canada) is a relatively novel means of addressing areas of extreme flood risk. The three styles of compensation are detailed below:

- Disaster financial assistance is offered once to flood-affected residents. Should the following two options not be accepted, the resident is made aware that there will be no future compensation provided for flood losses.
- Disaster financial assistance is provided to support the loss of essential items. The improvements found on the affected property are removed (with support from the DFA program). This includes all homes, structures, and utilities. The property is rendered sterile to prevent any future development, through a covenant on the property title. However, the resident may keep the property as recreational property. The covenant passes between owners during property transactions so that the property remains undeveloped in perpetuity.
- At the property owner's discretion, they may choose to take a one-time, $160,000 property buy-out. The property improvements are removed through DFA compensation, and the property returns to green space or riparian use.

The program in New Brunswick has completely removed 174 properties from high-risk flood plain areas since 2008. 79 properties were purchased after major flooding in 2018 and 12 more after the 2019 flood. The effectiveness of the program is self-realizing – properties that are purchased do not pose any future risk of flooding, and therefore

require no additional response and recovery costs. The bulk of these purchases were made along the St. John's River, with the most recent purchases along tributaries to the St. John's River, which have also sustained record floods in recent years.

There are also restrictions related to eligibility for many business owners and agricultural producers in British Columbia. Currently, businesses or farms are only eligible for DFA compensation if greater than 50% of the applicant's income comes from that business or farm. This does not reflect the reality for many British Columbia-based small businesses and agricultural producers, as many rural residents have home-based businesses or small farms that supplement their day-to-day income. The disproportionate impacts of disasters on these small businesses are profound. Their losses can be incredibly debilitating, amounting to hundreds of thousands of dollars per event. Insurance overage can be extremely expensive for these assets. Often, these small businesses are the life blood of small towns in British Columbia, and their likely and repeated exposure to emergency events can create hardship for entire communities when disaster strikes. For example, the prolonged economic recovery of downtown Grand Forks after the 2018 Boundary flood illustrates the gap between insurance and DFA support. These issues were highlighted by British Columbia recovery managers who were consulted about this project and had dealt with these issues through various recovery processes.

4.1.2 Recommendations for the Disaster Financial Assistance Program and Disaster Financial Assistance Arrangements

Disaster financial assistance in British Columbia provides an important recovery support for those who have experienced a disaster and lost assets and property because of it. DFA is often an important stopgap to not being completely destitute after an emergency event and is critical to restoring the health and wellness of a community. However, all respondents who were asked about the DFA program indicated that it was both timely and necessary to review program policies and legislation as the province faces more frequent and impactful disasters, increasing home and property values, and the prevalence of more readily available flood insurance. The following recommendations were the result of speaking with several DFA subject matter experts.

Recommendation 1:

The provincial government, with representation from local authorities, should create a task force to research the issues around legality and liability of having one level of government making decisions (like locally implemented land use planning and building construction approvals) that lead to legal and liability issues for other levels of government (like DFA compensation) in terms of disaster compensation.

One of the challenges with providing a disaster financial assistance program is that it may create the opportunity for a compensation scheme to exist without the proper levels of accountability or responsibility in place for other levels of government. DFA staff mentioned during engagement sessions that there were often instances of compensating individuals, businesses, and other recipients for flood losses in situations where proper flood mitigation, preparedness and response activities could reduce the reliance on the disaster financial assistance program. Where appropriate land use planning, zoning, building construction bylaws (such as flood construction levels and use of flood-proof building materials), and flood mitigation measures could prevent flood impacts are generally the same locations that are not eligible for flood insurance, and often face the greatest risks from flooding. These locations are often significant locations for DFA compensation following flooding.

This task force would be best staffed by members of the Ministries of FLNRORD and Public Safety and Solicitor General (EMBC), along with representation from municipalities, regional districts (for example, the Union of BC Municipalities) and First Nations.

Recommendation 2:

Emergency Management BC should undertake a province-wide project to define where the most frequent and highest value DFA payouts occur, particularly for flooding, to facilitate correlating these with currently available grant and funding programs for mitigation enhancements.

One way of mitigating the inequity that exists between disaster compensation programs and grant programs would be to ensure that current mitigation and disaster risk reduction programs are supporting geographic areas where the greatest risk reduction need exists. The resulting cost savings should be significant, as costs to flood response, recovery, emergency support service and disaster financial assistance programs should all be reduced. These include such grant programs as the Community Emergency Preparedness funding available from the Union of BC Municipalities, National Disaster Mitigation Program funding, and the Disaster, Mitigation and Adaptation funding (the latter two provided in partnership with the Government of Canada.

This project would be best managed by the DFA program at EMBC with support from the Government of Canada DFAA program.

Recommendation 3:

As per Recommendation 2, the provincial government should develop specialist teams comprised of various government representatives to fast-track mitigation and risk reduction projects for these high-risk areas.

A relatively simple undertaking would be a cost-benefit analysis to determine if the application of flood risk reduction measures could simply be covered by the reduced costs applied to DFA, recovery and response costs, and other forms of after-event compensation.

Understanding the relationship between these correlated issues fast-tracking solutions could quickly and significantly reduce the reliance on the DFA program, thereby freeing up funding at all levels of government to undertake more flood risk reduction projects.

Team membership could be composed of MFLNRORD, EMBC, and Public Safety Canada staff, with input from local governments and First Nations.

Recommendation 4:

The provincial government should share the criteria of how disasters are determined to be DFA eligible with local governments and First Nations. As well, the provincial government should create policy guidance for better awareness about DFA eligibility, and how supporting a DFA eligible and non-DFA eligible events may differ (for both provincial and local government participants).

Not all disasters in British Columbia are immediately eligible for DFA program support. The criteria that are used to determine if a disaster is eligible for DFA support is not shared with local government applicants, by the Province of British Columbia. When disasters are not deemed to be DFA eligible, consultation respondents reported that often local government and First Nations face reduced support from Emergency Management BC. This appears to happen, as the disaster falsely appears to be not as impactful as those that reach the threshold in the eyes of provincial and non-profit support organizations. This is then experienced by local governments and First Nations as delays for decisions by the province, less chance of approval for response and recovery funding through the expense authorization process, and generally, less support for response and recovery activities. While this is likely not the intention of EMBC or partner support organizations, nonetheless it is reported as an issue by organizations who have managed both DFA eligible and non-eligible events.

- Local authorities must request Emergency Management BC to consider disasters to be eligible for DFA, based on initial damage assessments. However, local authorities consulted during this project indicated that the criteria for eligibility are not known or shared with them. If this were provided, it could help alleviate confusion, streamline communications, and acknowledge the needs of various organizations during the period immediately following a disaster.
- Sharing this guidance with response organizations province-wide would assist all to be able to amend their expectations accordingly.
- Local government and First Nations organizations will then be able to provide better post-disaster needs assessments and impact assessments based on known DFA availability.

These materials would be best developed by EMBC staff – specifically, from the DFA team.

Recommendation 5:
The provincial government, with support from federal and local governments, should create a program to remove habitation and development from high-risk locations, specifically for locations that have been devastated by flood events.

There is currently no defined program for removing and remediating properties from high-risk locations. This is particularly apparent when flooding vastly changes the landscape on or near properties, and the remaining and future risk is exacerbated because of these changes.

Recovery managers consulted for this project noted that their most challenging files related to ongoing situations with properties that had been rendered unsafe or unusable by flood events. Being the owner of a flood-affected property that has been rendered unusable and unsafe because of existing or heightened flood risk is one of the most brutal property ownership hurdles imaginable. Besides likely rendering your home and its entire contents as debris, and financially ruining you, property owners also face extensive delays as local governments grapple with how to manage these kinds of situations (for which there is little existing guidance or policy). Compensation is rarely provided, particularly when these events happen in small, sparsely populated communities. Often these files remain open for years with little chance of closure. Property owners face increased liability concerns if:

- Properties are rendered unsafe by erosion or subsidence.
- There is local or provincial government legal action if privately owned dwellings enter watercourses and cause environmental damage.
- Failing structures are rendered condemned by local governments, and therefore require action by property owners (Inter-Agency Emergency Preparedness Council, 2014).

Property owners who face these issues frequently describe them as the worst periods of their lives and lead to uncertain futures.

Within British Columbia, the provincial and local governments typically do not have programs that support resolution of these situations. Consequently, local governments and First Nations navigate these situations, often without policy guidance or financial support. The rationale that is often cited for not providing this kind of program is that local governments have provided zoning, land use planning, and building construction guidelines for these properties which ultimately led to their development and exposure to risk. While this is true to a certain extent, development within flood plains and geohazard risk areas within British Columbia is, and has historically been the responsibility of a variety of provincial and local governments.

Regardless of where the fault may be found for the properties now facing flood risk, reduction of that risk would have the following benefits:

- Preservation of life safety during flood emergencies
- Reduction of property loss and destruction of the built environment
- Less use of the DFA program
- Generally reduced insurance premiums for all residents as cost of claims are reduced
- Culture shift to reduce housing market demand in flood hazard areas
- Creation of green infrastructure and natural flood hazard mitigation spaces

These evaluations and recommendations could be formed by regional MFLNRORD and EMBC staff in cooperation with affected local governments and First Nations. These locations are generally known anecdotally.

Recommendation 6:
In relation to Recommendation 5, the provincial government could consider linking the DFA program (which currently does not compensate for the loss of land) with other provincial or federal programs or grant opportunities which do provide for the acquisition of land to remove problem properties.

For example, the DFA program already has the provision to compensate for the loss of a structure. A different program, such as the joint federal and provincial Disaster, Mitigation and Adaptation fund could be linked to the specific DFA claim and could provide compensation for the land in extreme circumstances. The land would then return to the crown or a municipal authority and would be covenanted to prevent future development or construction. Of note, the possibility of implementing a program such as this has recently been enhanced by having the mitigation and disaster recovery teams within the same branch at EMBC.

This work could be initiated by the Community Recovery Branch at EMBC with support for MFLNRORD staff and Public Safety Canada staff.

Recommendation 7:
Emergency Management BC should introduce legislation to allow the DFA program to compel funding recipients to use flood proof materials for flood remediation, or to make changes to their homes or properties to reduce the impact of future floods.

Examples of this would be to require the elevation of electrical outlets in basements, the use of flood resistant drywall and insulation in lower levels of homes, and the protection of things like water well pumps and sump pumps. Within any revision or rewrite of the DFA legislation, empowering the DFA program to require these sorts of changes when compensation is provided (along with suitable compensation for such) would be advantageous and should lead to lower demands on the DFA program over the long term.

This enhancement of the DFA program could be funded through grant systems that provide funding for other flood risk reduction initiatives. Recovery managers and emergency program coordinators consulted about this topic shared that remediation of insured properties varies widely and appears to seldom result in flood-proofing enhancements.

This work would best be managed by the DFA program through the rewrite of the Compensation and Disaster Financial Assistance regulation.

Recommendation 8:

Emergency Management BC should undertake an information campaign to increase awareness of the DFA program for both the public and local government emergency programs.

Within British Columbia, there are two types of people, businesses, organizations, and local governments – those who have been impacted by flood disasters and those who have not. Those who have been exposed to flood disasters, are generally aware of the DFA program and the services it provides. Those who have not experienced flooding generally do not know much about the DFA program or how it works.

When a community suffers flooding for the first time in recent memory, there is general uncertainty about where to start with recovery operations. The DFA program and staff are very responsive to these situations and are often on the ground quickly following a flood event. There is often much uncertainty about insurance claims, how the DFA program works, and other forms of support for affected residents through the recovery process. The optimal time to be determining how the DFA program might fit in with these supports is not during the chaos following a flood emergency, and these issues could be alleviated through an effective information campaign to increase awareness of the DFA program.

Information for local governments, First Nations, and British Columbia residents about the DFA program prior to flood emergencies would be helpful, and an information campaign could reinforce the need for preparedness and mitigation activities.

- More information about how the program works, how funds are provided, calculations, and claim acceptance would be helpful.
- This would allow local governments, First Nations, and flood plain residents to plan for better outcomes following a flood emergency, and to prepare their communities better for the recovery process.
- Of particular importance is reinforcing the notion that DFA is not a replacement for flood insurance and does not compensate for all losses. Often this is a misunderstanding that local governments and flood affected residents have following a flood loss.

The project could be undertaken by the British Columbia Government and Communications and Public Engagement group with support from the DFA program and others.

Recommendation 9:

The Government of British Columbia and the Government of Canada, respectively, should undertake coordinated and complementary revisions of both the Compensation and Disaster Financial Assistance regulations and the Disaster Financial Assistance Arrangements.

Currently, both the provincial DFA program and the federal DFAA program are proposing administrative and legislative changes to their programs. This in turn, will almost certainly lead to changes in how programs and compensation are provided.

The federal DFAA program currently provides a 15% enhancement cost to encourage provincial and territorial governments to, in turn, encourage their program participants to enhance their recoveries from disasters. This could be considered an avenue to entice those communities impacted by disasters to build back better. However, the process to access this enhancement is not well aligned between federal and provincial legislation, and it is underutilized when claims are made by the Province of British Columbia to the DFAA program.

As well, several small local government and First Nations project participants reported that the challenges for small businesses and agricultural producers to meet current DFA thresholds for support are unattainable. In particular, the 50% income requirement for a small business to be eligible for support under the DFA program is unrealistic for many small British Columbia businesses and farms. This requirement does not reflect the reality that many rural homeowners have multiple income sources, including full or part time wages and income from multiple home-based small businesses.

Through the course of these legislative enhancements, a best practice would be to ensure that each legislative amendment complements each other, so that all available program components are able to be accessed and utilized in the manner they were intended. This will require close coordination between both legislative update teams.

4.2 Investigation C3.1 - Investigate the current status of coverage of existing overland flood insurance available to homeowners.

Insured catastrophic losses from floods across Canada averaged about $595 million annually between 2009 and 2019 (Insurance Bureau of Canada, 2020). This does not account for the total uninsured losses such as the costs to government including emergency support services, disaster financial assistance support, and infrastructure repair and recovery.

To better understand the technical and changing nature of overland flood insurance and its related issues, the project team consulted with both subject matter experts and those who have dealt with overland flood insurance related issues during various flood recovery processes. Those consulted for this investigation included:

- Province of British Columbia DFA staff and program managers
- Public Safety Canada DFAA staff and program managers
- Insurance Bureau of Canada staff (various)
- Municipal, regional district and First Nations emergency program staff with relevant experience

As overland flood insurance in British Columbia for homeowners is relatively new, there are some issues that became apparent through the process of consulting with flood insurance experts, First Nations, local governments, insurance advocacy groups and DFA and DFAA specialists. Common issues became apparent through the process of engagement, and recommendations that may be suggested to increase the success of the protection that comes from having a robust overland flood insurance program were developed.

4.2.1 Overland Flood Insurance Key Findings

Overland flood insurance has been available within British Columbia to homeowners since approximately 2015. The availability of homeowners to receive flood insurance across the province is variable and challenges the interpretation of the British Columbia Disaster Financial Assistance program definition of “readily available”. During interviews with the overland flood experts, an Insurance Bureau of Canada staff person estimated that overland flood insurance is available to about 90-94% of British Columbians (IBC staff person, personal communication, December 7, 2020). Local insurance agencies may not carry overland flood insurance lines themselves. As well, there are significant cost differences for overland flood insurance from various providers. Fifteen different insurance companies currently offer overland flood insurance in BC (Insurance Bureau of Canada, 2020).

The engagement team conducted additional follow-up meetings with the Insurance Bureau of Canada in March 2021 to determine if IBC had further information regarding the following two topics:

- Are there jurisdictions that are more advanced or more mature in how they approach overland flood insurance (nationally or internationally), that could be recommended as good case studies or examples for the BC government to reference?

- As federal and provincial governments, along with partners like IBC are working through the "Task Force on Flood Insurance and Relocation" (which is in the initial phases), are there jurisdictions (nationally or internationally) who are further along in this work, and again, would provide a good example of how the process should work and what the product should look like?

In determining a private sector model for an overland flood insurance product in Canada, IBC indicated that they had drawn best practices from several countries that had well established flood insurance product offerings already. IBC stated that the federal and provincial governance structure within Canada is vastly different than many other developed countries who may be considered role models for the development of overland flood insurance models and flood recovery management. IBC was not able to identify specific case studies or examples for reference that British Columbia could specifically follow or draw guidance from. Complicating the development of an overland flood insurance product in Canada was the lack of standardized and updated flood plain maps and flood risk assessments across the country. What was available was largely built on riverine flooding and not pluvial or coastal flooding, which were identified as significant data gaps in the Canadian-based information.

IBC noted that much of the information derived for the establishment of private overland flood insurance offerings in Canada were derived from data and publications provided by the international insurance think tank, The Geneva Association. The Geneva Association has undertaken significant research into overland food insurance programs around the world, including in such developed countries as the United States of America, England, Australia, and Germany (The Geneva Association, 2020). From the assemblage of international information, IBC created their own assessment of flood management programs and overland flood insurance across eight developed countries. The purpose of this report, titled, “The financial management of flood risk” was “to examine best practices and available models for managing the financial impact of floods” (Insurance Bureau of Canada, 2015). From the information gleaned from these research activities and report development, IBC was able to support private insurers in the development of overland flood insurance products that would be helpful for homeowners at a manageable risk for insurers. Though overland flood insurance is more readily available now than ever before in British Columbia, the availability of coverage and offerings and practices of insurers remains a patchwork of coverage.

The Insurance Bureau of Canada estimates that up to 10% of residences within British Columbia may not be eligible for overland flood insurance because the risk of flooding is too high (specifically, where insurers will choose not to provide overland flood insurance coverage as the risk of financial loss in underwriting the property would be undesirable) (IBC staff person, personal communication, December 7, 2020). These include properties of elevations that would or could see frequent flooding from nearby watercourses, have been recently impacted by severe flooding, or are at severe risk of erosion effects from high water events. Through consultation with the Disaster Financial Assistance program staff in British Columbia, by their metrics, up to 30% of residential properties may not be eligible for overland flood insurance (DFA staff person, personal communication, December 10, 2020). The difference between these two interpretations of insurance availability comes from how each organization defines whether overland flood insurance is readily available. IBC considers overland flood insurance readily available if it can be found within the insurance market within a given community (even if it means changing insurance underwriters or agents) and even if the cost is prohibitive (as they do not determine affordability). Disaster Financial Assistance program staff explained to the project team, though, that they do not consider overland flood insurance to be readily available if a claimant would have been required to change insurance providers to receive overland flood insurance, or if they would have to pay excessively high insurance premiums. These two scenarios would not necessarily trigger their refusal of an overland flood related DFA claim.

First Nations communities within British Columbia often either insure themselves (sometimes at the band level for coverage for members) or are insured through the Government of Canada. There are some insurance companies that market directly to First Nations communities. It can be challenging for First Nations governments to find suitable insurance options as the historical practice of placing reserves was to locate them near watercourses, often with

minimal land attributed to them. This reduces the opportunity for individual communities to develop in low flood risk areas, undertake managed retreat programs or implement mitigation measures in some cases. Further investigation is suggested regarding the eligibility of different types of First Nations options for overland flood insurance.

Every local government emergency program manager and recovery manager who had significant flood experience noted, during the engagement process, that many of those they assisted through the flood or during recovery operations had little understanding of whether they had flood insurance, how to access it, or what it covered. As well, senior staff from Emergency Management BC and the MFLNRORD Water Stewardship division reiterated these same observations. The flood impacted individual's frustration was then often directed towards local and provincial government staff, rather than at their insurance provider. These repeated issues are clearly an issue for local and provincial government staff, and their feedback has been developed into a recommendation. Several local government staff expressly requested that there needs to be a comprehensive outreach and educational campaign, supported by insurance providers and government alike, to increase familiarity with overland flood insurance offerings, and what can be expected by insurance clients during the claims process. This will likely assist with the uptake of flood insurance and simplify recovery efforts following an event.

Overland flood insurance is also a challenge for business owners and agricultural producers. These types of insurance offerings have been available for much longer. The issues often stem from high premium costs, unclear policies about what is covered during a flood and what is not, policy and coverage caps, and variable interpretations of impact and policy coverage by adjusters. Often, these groups may not seek insurance coverage either because they do not know it is available, or they find the cost to be prohibitive.

Disaster Financial Assistance staff noted during consultations that those who have overland flood insurance coverage must be vigilant in understanding the requirements and limitations of their coverage. Things like claim payout caps, requirements for back flow preventers (even during overland flood events, as some of the damage caused by backflow from overwhelmed municipal sewage and storm sewer systems during a flood event may be argued as a preventable loss), and damage within specified timeframes of flood notification create additional hurdles for flood victims to navigate to initiate their recovery plans and to initiate overland flood insurance claims. Specifically, British Columbia Disaster Financial Assistance program staff stated during consultation sessions that they regularly receive DFA claims from homeowners who thought they were adequately covered for insurable flood losses but found that they were unable to receive expected compensation for claims following a flood. Some homeowners were surprised to learn that their overland flood insurance coverage has a maximum claim payout, in some situations, of $10,000 or $25,000, which may not cover all flood losses. Others are surprised to learn that their insurance included a requirement to install a backflow preventer on their main sewer line that they were not aware of. Still others found that they were required to make a claim for flood losses within 48 hours of the onset of the flood event, even when they have been under evacuation order for longer than that, and not physically able to verify flood damage to their home. For many, it can be challenging to receive compensation for flood losses that they had thought were included as part of their overland flood insurance. Recovery managers consulted during this project reported instances where insurance adjusters assessed flood insurance claims differently during the same event, leading to successful claims for some individuals, and denied claims for others.

One issue which was mentioned frequently by emergency program staff from smaller and rural communities, was the need for greater disclosure for flood risk and historical flood impacts. Often, home and property purchasers in British Columbia make purchases without knowing the flood risk that their new property may be exposed to, and emergency program staff and recovery managers noted that they are often angry, frustrated and hurt that the risk was not disclosed to them at the time of purchase following a flood event. A second common issue was the need for better public education about overland flood insurance – how to get it, what it covers, and how to make a claim. A third issue that was identified was that emergency program managers and recovery managers who were consulted about overland flood insurance issues reported that overland flood insurance clients often have significant concerns about

the transparency regarding the basis for insurance premiums. Risk information, used to set premiums for overland flood insurance, use flood plain maps and flood risk assessments to calculate the risk involved in providing flood insurance, and this information is held by, and deemed proprietary by insurers (each does their own analysis). This information is not shared between insurers, or with clients, and this leads to a lack of transparency in premium costs, insurance coverage and availability, and discrepancy in what is offered within a local market between homeowners.

4.2.2 Overland Flood Insurance Recommendations

Overland flood insurance programs are generally outside of the influence of government, as these programs are provided by private enterprises, who merely seek to fill a need that the community has. However, through consultations with the Insurance Bureau of Canada and other flood insurance experts, there is a clear desire for collaborative efforts to improve overland flood insurance availability, reduce premiums, ensure standards and stability for overland flood insurance, and find solutions for high-risk properties.

Recommendation 10:

All levels of government are encouraged to support, and actively participate in increasing the availability of overland flood insurance that is accessible, fair cost and easy to understand.

Some properties might never be able to be insured through private overland flood insurance. These properties, identified either through risk analysis or through repeated flood emergencies, simply are too high risk for insurers to provide coverage. Most properties can be insured, but the cost of doing so would be so high as to make the insurance unaffordable. These rates are set by each insurer, and each insurer will charge a premium for the insurance based on what their assessment of the risk is. Different insurers keep different qualities of flood data, and this information is used to develop the insurance options for the property. This information is deemed proprietary by insurers and is not shared.

Regardless of the reasons for being able to access insurance or not, some properties within British Columbia will never have an acceptable level of insurance protection (acceptable being defined as a level of insurance to repair housing and living essentials and not as coverage for all losses). This places increased costs on the Province of British Columbia as the DFA program is expected to compensate for essential losses when insurance is not readily available. These properties are disproportionately owned and rented by people in lower income brackets, and as such, face much more hardship during a flood emergency as they do not have the financial resources to support their own recovery (Red Dragon Consulting Ltd., 2020).

It is encouraging that provincial and federal governments are working with the Insurance Bureau of Canada to determine options for a high-risk class or pool of properties and management strategies for high-risk locations, through the Task Force on Flood Insurance and Relocation (Public Safety Canada, 2021). While this project is under development and is not in a state where it can be shared, the Province of British Columbia is encouraged to continue with this vital work. Determining ways to better protect – or if needed, relocate – those in hazardous locations, and often with no additional options, will be important as the overland flood insurance industry continues to mature, and climate change brings more emergency events to at-risk areas. These types of programs already exist in jurisdictions like the UK and Germany, and countries such as Australia which are much more restrictive about floodplain development. This means that in some jurisdictions, the challenges around insurance and post disaster flood relief are less of an issue.

This work would be led primarily by the Province of British Columbia, with support from the Insurance Bureau of Canada, and would have the most success with support and input from the Government of Canada and local government and First Nation representation.

Recommendation 11:

The Province of British Columbia, in partnership with the Insurance Bureau of Canada and others, should undertake a comprehensive public education campaign to educate homeowners, business owners, agricultural producers, and local authorities about overland flood insurance.

As discussed in key findings around overland flood insurance, recovery managers consulted about these issues noted that many floodplain residents do not know much about the overland flood insurance they do or do not carry. Many homeowners and tenants do not know if their insurance policies include overland flood insurance and are surprised to learn that they carry no coverage when impacted by floods. Many are not sure if it has been offered to them, or if it is readily available to them. Many do not know that if it is offered to them, and they decline, that they also waive their right to support from the provincial government in the event of a disaster through the DFA program. These issues are compounded after a flood, where residents have experienced loss and then face the reality that something that could have helped them endure the flood impacts is not available to them.

Increasing the awareness of what overland flood insurance is, what it covers, what it does not, how to get it, and how to understand coverage – all of these could reduce the reliance on the provincial DFA program following a flood, reduce recovery timelines, and reduce hardship on flood affected individuals. This kind of program would be best provided through a partnership between the Insurance Bureau of Canada and the Community Recovery Branch of EMBC (as the lead organization for the provincial DFA program).

Recommendation 12:

The Province of British Columbia, in partnership with the Government of Canada, should develop a grant or subsidy program that would provide insurance (including overland flood insurance) for individuals and families who own homes but cannot afford insurance.

Recovery managers and emergency program coordinators consulted for this project indicated significant challenges where socioeconomic factors prevented homeowners from having overland flood insurance.

There are many reasons that people do not seek insurance coverage for flood, or for any other potential loss. Some do not believe that the cost of the insurance, over the near or long term, is worth the expenditure, given the potential loss. Others do not believe the possibility of loss is high enough for them to justify the cost. Others use the funds that may be expended on insurance to make property improvements instead, such as installing sprinklers to protect from wildfire, or flood proof materials to protect from floods. However, for many, the cost of insurance is simply too high. Because of socioeconomic disparity within communities, those on lower fixed incomes often end up living in areas that are of higher risk from flooding. In these cases, people make decisions about how to spend their limited incomes. Their choices may include to not purchase overland flood insurance, as feeding their families and keeping a roof over their heads are of a greater immediate need than purchasing protection from an event that may never happen.

In these cases, there exists an opportunity to help provide insurance coverage to residents who find themselves in these positions. It would be a helpful social program to alleviate some of the stress that people on fixed or lower incomes face. As well, having these residents covered by insurance (and particularly by overland flood insurance) has the potential to reduce emergency support service (ESS) costs following a flood, and disaster financial assistance support to affected residents.

A cost-benefit analysis could be undertaken to determine if the cost of providing insurance to these kinds of properties would be covered by the savings from both the emergency support service program and from DFA. This analysis could easily be determined by linking community-level planning and land-use data with information about those seeking social support services from other government programs.

This kind of program would be best undertaken at the provincial government level, as a partnership between ministries such as Social Development and Poverty Reduction, and EMBC.

4.3 Investigation C3.2 - Investigate the concept of "build back better" and impediments to implementation

Build back better is a term heard often during the recovery phase following a disaster.

Organized and coordinated disaster recovery itself is a relatively new undertaking in British Columbia. Recent severe wildfire seasons and flood events have shown the need for an expanded recovery phase to take its place alongside our traditional strong disaster response practices. The consultation sessions showed that while there are ever increasing resources in British Columbia to manage disaster recovery, many communities have very minimal recovery planning, often do not have recovery plans, and have not considered what might be needed from them and their communities following an emergency event. Effort is needed to enhance the disaster recovery sector in British Columbia through training, support, education, and planning.

Build back better is defined as "the use of the recovery, rehabilitation and reconstruction phases after a disaster to increase the resilience of communities through integrating disaster risk reduction measures into the restoration of physical infrastructure and societal systems, and into the revitalization of livelihoods, economies, and the environment." (Emergency Management BC, 2019)

Build back better was a key factor in the subsequent development and creation of the Sendai Framework for Disaster Risk Reduction. Build back better recognizes that an optimal time to make improvements within a community is the period immediately following a disaster.

In 2006, following the 2004 Indian Ocean tsunami, the UN Special Envoy for Tsunami Recovery, William J. Clinton, presented these ten points as primary objectives of the disaster recovery process (Clinton, 2006).

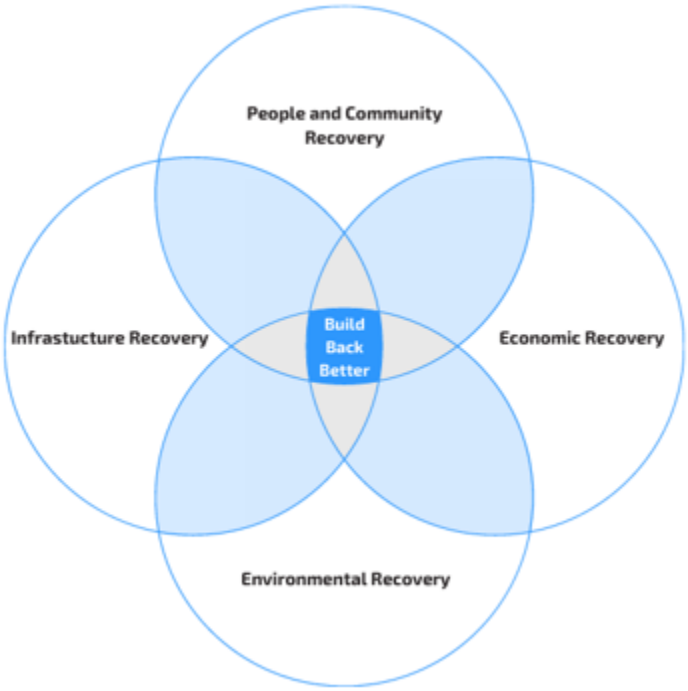
- Governments, donors, and aid agencies must recognize that families and communities drive their own recovery.
- Recovery must promote fairness and equity.
- Governments must enhance preparedness for future disasters.
- Local governments must be empowered to manage recovery efforts, and donors must devote greater resources to strengthening government recovery institutions, especially at the local level.
- Good recovery planning and effective coordination depend on good information.
- The UN, World Bank, and other multilateral agencies must clarify their roles and relationships, especially in addressing the early stage of a recovery process.
- The expanding role of NGOs and the Red Cross/ Red Crescent Movement carries greater responsibilities for quality in recovery efforts.
- From the start of recovery operations, governments and aid agencies must create the conditions for entrepreneurs to flourish.
- Beneficiaries deserve the kind of agency partnerships that move beyond rivalry and unhealthy competition.
- Good recovery must leave communities safer by reducing risks and building resilience.

Build back better seeks to introduce resilience to communities following disaster and aims to eliminate vulnerabilities. Issues that were present prior to the disaster and which may have contributed to hardship and loss may be simpler to correct following a disaster as funding, government cooperation and administrative barriers are often streamlined to promote a quicker recovery process. Issues prevalent prior to the disaster may also be easier to identify and resolve following a disaster. The intent is to return a community and its population to a better situation (i.e., lower risk) through

not just restoring everything in the same way but enhancing the recovery process to provide opportunities for improvement.

For build back better principles to work, effort needs to be applied across the full spectrum of recovery sectors to ensure a fair and equitable uplift to those in need of assistance during disaster recovery. Looking at the different recovery sectors, there are build back better objectives that can be applied to each. Figure 5 below shows the recovery sectors, how they are interconnected, and how equal contributions from all promote build back better principles.

Figure 5. Equal contribution of recovery sectors provides the greatest potential to build back better



4.3.1 Building Back Better Principles and the Relation to Disaster Recovery Sectors

The following sections denote the typical subject areas that define a typical disaster recovery operation. Emergency Management BC categorizes the four phases of disaster response as "sectors" – to distinguish these areas of focus from the four pillars of emergency management (response, recovery, preparedness, and mitigation). As well, the intent is to distinguish these sectors from the four "sections" found within the Incident Command System – operations, logistics, finance, and planning.

The concept of building back better produces several questions for the community to consider. Can we make communities more liveable, walkable, and secure through build back programs? Have we carefully considered how building back better can have both positive and negative effects on a community? Have we engaged with the community to see what their vision of building back better might look like? Are desired outcomes like moving to a greener economy, ensuring communities have diversified their income sources, and promoting better access to market part of the build back better objectives? The consideration of several variables makes the build back better concept more challenging. Build back better is a larger concept and has ramifications outside of the emergency management recovery phase, and outside of

flood management in general. The scale of a potential disaster affects the ability of a given organization to implement build back better actions. As well, as with any innovative or new concept in government and society, there are challenges when it comes to public support, political will, and cost.

4.3.1.1 PEOPLE AND COMMUNITY SECTOR

The Emergency Management BC Interim Provincial Disaster Recovery Framework hosts a helpful definition of recovery intended to support people and communities following a disaster.

> *This sector considers impacts on the physical, mental, spiritual, and social well-being of the population. This sector primarily concerns, but is not limited to, health and safety, mental health, community psychosocial, emotional, cultural, and spiritual well-being, vulnerable populations, cultural aspects, and interim housing. This sector uses an intersectional approach in addressing recovery needs, and activities included within this sector are very closely related to the other three sectors identified. (Emergency Management BC, 2019)*

To build back better within the People and Community sector of recovery, a holistic approach to community resilience must be taken. To build back better means to enhance both physical and mental health supports within a community, to levels improved above what they were before the disaster. It means restoring and enhancing a sense of community. It means rebuilding and improving social systems that support vulnerable or disadvantaged segments of the population. To build back the people and communities sector better means fair, secure, and affordable housing for all residents, in communities that provide a high standard of living, and it seeks to reduce barriers to services and support for all citizens.

4.3.1.2 ECONOMIC SECTOR

The EMBC Interim Provincial Disaster Recovery Framework has a helpful definition of economic recovery.

> *This sector considers direct and indirect impacts on the local economy. This sector primarily concerns small, medium, and large enterprise, tourism and cultural livelihood, agriculture, and the broader economy. It is critical that recovery activities related to the economic sector are considered early. The recovery of the community relies significantly on the speed in which local economies recover and will determine how quickly individuals begin to return to the community. (Emergency Management BC, 2019)*

Building back better from an economic focus means more than injecting funds to support the most prominent employers and financial contributors. It must address restoring services and reducing barriers for small businesses to return to operation. It means actively supporting small-, medium-, and large-scale enterprise recovery and ensuring that government systems are implemented and designed to meet their needs. It means seeking out local goods and service providers and acknowledging the contributions of all sectors of local economies and their supply chains – agriculture, resource-based employers, industry, goods and service providers, professional services, home-based business, and community support employers. It means understanding the contributions of these sectors and taking steps to ensure that the portions of our economy that enhance our communities are supported. It means streamlining the recovery systems that assist these businesses and reducing bureaucracy and inequality in support programs.

4.3.1.3 INFRASTRUCTURE SECTOR

From the EMBC Interim Provincial Disaster Recovery Framework, the definition of infrastructure recovery is one that many people will see as a familiar activity following a disaster.

> *This sector considers impacts on private and public physical infrastructure. This sector primarily concerns residential and commercial buildings, utilities, and infrastructure planning. (Emergency Management BC, 2019)*

Typically, the infrastructure sector is well supported during the recovery phase of a disaster. The roads are cleared and repaired, transportation routes are opened both for response and commerce, and great efforts are put into restoring communications and utility services. From a build back better perspective, we must ensure that not all of a community's focus is strictly on building back infrastructure better. As well, are there enhancements that improve the quality of life in a community? Can we reduce energy use and create smarter, more flood resilient infrastructure?
One of the challenges with building back better in the infrastructure sector is cost. The political will must accompany the desire to build back better, as without it, organizations will likely be dissuaded from spending the additional funds needed to build back better. As well, the issue of how the costs will be covered – by those located on the floodplain or across taxpayer sectors is also a challenge.

4.3.1.4 ENVIRONMENTAL SECTOR

The definition of environmental recovery following a flood event, from the EMBC Interim Provincial Disaster Recovery Framework, denotes the wide scope and long-term objectives related to environmental recovery.

> *This sector considers impacts on the environment and steps needed to reestablish a healthy state while mitigating long-term impacts. This sector primarily concerns land degradation and contamination, biodiversity and ecosystem impacts, cultural land use, and natural resource damage/loss. (Emergency Management BC, 2019)*

During the engagement process, local government and First Nations representatives who were engaged often noted that they felt the environmental sector was often one of the most difficult to employ build back better principles. Funding was reported as a significant impediment – local authorities often to do not have significant reserve funds for recovery itself and found it challenging to prioritize the application of those funds over other, more seemingly important sectors such as people and communities (including housing), infrastructure recovery, or economic recovery. While, holistically, flood managers consulted affirmed the importance of environmental recovery, they also indicated that there was a challenge in providing the same amount of attention to the environmental sector or feeling that they could not always explain to residents or other within their organizations the importance of the recovery in this sector. Both provincial and local authority interviewees mentioned that there were not as many avenues for recovery or support programs available for environmental recovery. Interviewees noted existing programs for economic recovery (through direct support by the BC Economic Development Association) and disaster housing programs (through BC Housing), and that there did not appear to be parallel programs for environmental recovery (though recovery managers from recent events confirmed that there was support provided for environmental issues from both the Ministry of Environment and Climate Change, and the Ministry of Forests, Lands, Natural Resource Operations and Rural Development).

Interviewees also reported that there are challenges to understanding authority and responsibility for environmental recovery. An example of this provided by a recent flood responder related to log jams in rivers. In the example provided, the regional district was responsible for local area governance, the Province of British Columbia had the authority over the watercourse, and a downstream municipality could have been potentially impacted by a sudden release of the log jam. Whose responsibility the risk reduction regarding the log jam was remained in debate for some time, with no parties wanting to fund the removal or assume the workload. However, in the interim, the risk remained for downstream river users and residents. This kind of unclarity was repeatedly mentioned during discussions involving contamination concerns, debris transport, erosion, and other by-products of flood events. Clearly, the floods themselves do not respect jurisdictional boundaries, and respondents repeatedly spoke of challenges with these kinds of inter-jurisdictional issues.

There is reference literature is helpful when considering ways that environmental recovery can be undertaken. The Insurance Bureau of Canada has created a report that provides guidance and case studies to help communities reduce flood costs by using natural infrastructure called "Combatting Canada's Rising Flood Costs: Natural infrastructure is an underutilized option" (Insurance Bureau of Canada, 2018). Following the 2013 flood in Calgary, the City developed an innovative document titled (the Riparian Action Program: A blueprint for resilience" (City of Calgary, 2017). An associated

case study from the Inglewood neighbourhood in Calgary provides a snapshot of how riparian health and floods are linked, and how natural infrastructure can reduce flood response and recovery needs and costs (City of Calgary, 2021). Many recovery activities within the environmental sector share interdependency with the mitigation and preparedness phases of emergency management, as the activities are both linked to recovery from a previous flood and are undertaken to reduce the impact of future floods (as is the intent of the application of build back better concepts).

Climate change is leading to more frequent flood events and thereby more flood recovery operations. Improving forest health in the face of wildfires, and re-establishing natural wetlands and river function is often beneficial to reducing the impact of flood conditions. Rehabilitation of contaminated waters, soils and ecosystems is another important consideration in flood recovery and building back better. For example, land uses that are potential sources of contaminants during floods, could be relocated to areas not prone to flooding.

4.3.2 Key Findings of Building Back Better Principle Investigations

A prime example of building back better was evident during the recovery from the 2018 Kettle and Granby River floods in 2018. A specific example of being able to build back the people and communities recovery sector was the fast tracking of an affordable housing project by BC Housing the year after the flood. This provided much needed supportive housing for those who remained out of their homes following the flood, with little ability to restore their homes or undertake challenging remediation. Concurrent with this was the empowerment of a community social support organization (Boundary Family Services) to expand into supportive housing management, a business area that they had not previously been a part of. In this way, flood affected individuals were provided housing support, the community benefitted from additional affordable housing stock, and a community support organization gained new experience and responsibilities, furthering their mission to provide direct social support to the community. This approach could be applied in other areas in need of recovery (BC Gov News, 2019).

The concept of build back better has gained prominence in British Columbia since the devasting wildfires experienced within the Province of British Columbia in the 2000s, 2017 and 2018 (Abbott, Chapman, 2018). Build back better was a core objective during the 2018 Grand Forks flood recovery efforts and saw the City of Grand Forks seek $50 million in Disaster Mitigation and Adaptation Fund grant funding specifically to build back flood affected neighbourhoods and infrastructure better and more resilient, while permanently removing vulnerable residential areas from risk. Obtaining a grant of this size for a smaller British Columbia community is notable, as most communities of this size would not have the wherewithal to undertake a project of this magnitude. The delegation of resources and the scope of change would simply be too great (City of Grand Forks, 2020).

Many project participants noted, from federal, provincial, and local governments, that since the start of the COVID-19 pandemic, the term “build back better” has been a reoccurring topic in government communication, referring to recovery of the economy considering the effects that the virus has had on jobs, communities, and personal income. While this is a form of building back better, it is only one facet of the expected recovery from a disaster. As well, participants indicated frequently that the term build back better is often a cornerstone of infrastructure renewal. As such, many grant programs disproportionately favour infrastructure programs, which are politically favourable, and are viewed as an easy way to inject funding into the economy with measurable results. This is a relatively narrow view of what the build back better concept embodies.

The project team specifically asked flood managers, insurance experts and DFA specialists about the concept of whether the availability of disaster financial assistance supported risky development in flood plains. All subject matter experts consulted agreed that this was not a factor in flood plain development. The desire to use flat, aesthetically pleasing, and readily available land by developers, the lack of clarity (or wherewithal by local authorities) around flood plain development requirements, lack of clarity around responsibility for mitigative measures, and uncertain insurance coverage all contribute to risky floodplain development. However, respondents did not see a correlation between the availability of DFA (which only covers essential losses) and flood plain development.

Many aspects of the build back better concept would benefit from advanced planning by local and First Nations governments. Determining recovery priorities and strategic objectives can clarify build back better principles before they are needed. The careful consideration of current land use and zoning, and how these may be amended if the opportunity presented itself can be helpful. As well, thoughtful advance planning can indicate opportunities for mitigation and preparedness that may be achievable before an emergency event occurs, for example, building back better during redevelopment cycles or infrastructure renewal projects.

Those respondents who had managed recent flood recovery operations indicated that there is a distinction to be made within the build back better discussion. Building back better can be enhanced by a community that has analyzed their vulnerabilities and risks, and as such will likely have a better idea of how to build back better. This does not mean that a community does not know what needs to be changed or fixed prior to a disaster, and those changes should be implemented wherever possible during the mitigation and preparedness phases of emergency management. A community that has analyzed their risk and identified vulnerabilities often has a greater understanding of what needs to be undertaken to build resilience within the community. Substantial mitigation and preparedness programs ensure that a community is not waiting for disasters to occur before acting to reduce risk. Applying the proper resources and effort to mitigating hazards and to prepare the public for disasters is an essential aspect of community planning. There will presumably be much less impact from any risks or vulnerabilities that can be eliminated prior to the onset of an emergency event.

Local government emergency program managers and recovery managers consulted communicated that building back better following a flood is challenging for all involved, but particularly for those residents who face catastrophic losses after a flood event. They described that in their experience, flooding is a challenge in that the flood rarely leads to the loss of a home or structure, but leaves significant destruction, hardship and emotional trauma after the flood waters have receded. The recovery term can be exceptionally long, and often issues remain – along with heightened risk of re-flooding for the property – long after external recovery support programs have ended. Recovery managers indicated that better programs to support flood affected individuals and communities are needed to support more holistic and restorative approaches to flood recovery, particularly if the post-recovery mitigation phase causes further disruption or relocation of flood affected community members.

Several recovery managers also noted that following flood events, many flood plain residents shared that they had no idea that there was flood risk for their homes and properties. Specific recommendations suggested by interviewees are provided in the recommendations section below. Respondents proposed a number of solutions to improve flood risk awareness.

4.3.2.1 STATUS OF BUILD BACK BETTER CONCEPTS

Discussing build back better principles during the consultations with government staff and recovery experts elicited a variety of responses. Some were encouraged by the use of the term and point to recent successes where the principles were applied with benefit to the community. Others viewed the term as jargon and did not see how the concept is possible without significant advanced planning, funding both before and after an emergency event, and standards and policy development about how the principles would be applied in British Columbia. Of note is the newly emerging concept of "build back stronger," which denotes not just change for the sake of change, but of a deliberate and planned effort to build resilience and a resolution for foundational improvement.

The build back better concept is still in its infancy within British Columbia, and within Canada. However, a commitment to the Sendai Framework for Disaster Risk Reduction by both the provincial and federal governments is an important first step in realizing build back better principles.

Due to the relative newness of the build back better concept, it is difficult to find concrete examples where it was utilized and deemed successful within British Columbia. Specific recovery projects, like the Disaster, Mitigation and Adaptation Fund grant project underway in Grand Forks, or ongoing recovery efforts from flooding in the Cariboo Regional District are

still underway and are not currently suitable for analysis of success. Of note, project consultations spoke to critical infrastructure operators, who, as necessitated by both regulation and community obligation, observe a continuous improvement method to manage their lands and facilities. The cost to the community if these resources fail is simply too great from a life safety perspective to treat these concepts any differently. As well, they have a significant, continuous, and predictable injection of funding to be able to apply to these concepts. This example of infrastructure renewal utilizes the concept of building back better, with an injection of funding and commitment prior to an event. It is not necessary to wait for an event to happen to implement build back better principles, but funding and capacity restrictions are often impediments for governments to implement these concepts prior to emergency events.

We can draw some lessons learned from the City of Grand Forks Disaster, Mitigation and Adaption fund process, where approximately 85 at-risk properties will be purchased from their owners and returned to the floodplain in a natural state, following a devasting flood in 2018. There are some lessons that can be derived from a cursory review of the process to date.

- Residents would have been more prepared for the possibility of having their properties purchased post-disaster if this possibility had been explained to them prior to the event. This would have given residents time to prepare themselves and consider their options.

- If this process were clearly understood by both local governments, the provincial government, and federal funding agencies, the entire process would have been more straightforward and much less traumatic for those residents involved in the property purchase process.

- Had the City of Grand Forks considered the possibilities that might arise from a catastrophic flood and considered how they may have wanted to apply build back better principles following a flood of some magnitude, with engagement and guidance from residents, there may have been community level planning that could have been applied prior to, and immediately after the event.

In the absence of standards, guidance or existing programs, the City of Grand Forks should be commended for undertaking such progressive efforts to minimize future flood danger to its residents.

One of the main concepts of building back better is whether physical assets should be restored after a flood in their existing location. To this end, many jurisdictions in Canada – both provincial and local – are considering or rolling out managed retreat programs. These programs suggest that either in advance of a flood or following one, that the homes and improvements be removed from high flood risk areas, and these lands are returned to functional floodplain (or low risk community use). The Government of New Brunswick described in the DFA section also has build back components associated with its function.

As well, other provinces within Canada have managed retreat programs. The Province of Quebec is considering a program to provide a compensation package of $200,000 per home to homeowners who agree to leave their homes in floodplains. This program is very controversial, as the value of the homes in question are generally higher than this compensation amount. Most Canadian provinces and territories are considering some form of managed retreat from at-risk flood plains.

4.3.2.2 FLOOD RECOVERY FOLLOWING AN EARTHQUAKE

Lower mainland local governments and First Nations consultation respondents were asked about their community's ability to undertake flood recovery and build back better principles following an earthquake. Further to this question, the concepts of compounding disasters were discussed – such as, would the loss of a neighbourhood to a wildfire result in changes to rebuilding requirements (such as reconstruction to flood construction levels). These questions were primarily posed to Lower Mainland communities, but also to others across the province (with less emphasis on the earthquake

portion of the question). The questions were also asked of insurance, DFA and public safety personnel. The full text of the question posed can be found in Appendix C.

Most consultation respondents noted that they do not have fully mature recovery plans created for their communities. Of those that do have recovery plans, even fewer have specific flood recovery procedures. Even fewer of those had considered compounding disasters – for example, what effect would an earthquake have on flood defences? How could flood mitigation structures be built back better after a different natural disaster? All respondents indicated that their organizations work with objectives and goals of continuous improvement in mind. But none of the communities consulted had considered, in a formal manner, how they would provide flood protection differently following an earthquake or formal plans of how flood protection structures could be built back better following an earthquake. The Province of British Columbia has developed Seismic Guidelines for Flood Protection Dikes in British Columbia. These guidelines apply to major upgrades or new construction of high consequence dikes and could be applicable during recovery after an earthquake (Ministry of Forests, Lands and Natural Resource Operations , 2014).

As well, changing land use practices and zoning following an emergency event was discussed, and was agreed to be a good concept, but none of the respondents indicated that they had specific plans to change land use within their communities following a disaster. Rather, these plans were in the development phase for some, and may be accelerated if there were an emergency event that provided an opportunity to change land use, zoning, or flood protection works.

All lower mainland community representatives who were consulted for this report did note, however, concerns about earthquakes and the potential ensuing tsunami threat. Generally speaking, in the event of an earthquake and subsequent tsunami, emergency managers indicated that they would follow the British Columbia Emergency Management System goals of first protecting the safety of the public and of responders. In this sense, all efforts would be made to protect life safety whether the current response threat was from earthquake or tsunami, and that these would be disaster response-based decisions and tactics. It is also important to note the potential for an earthquake to damage flood protection structures, in which case there would be a need to repair such damages prior to future flood events.

4.3.3 Impediments to Implementing Build Back Better Principles

100% of consultation respondents indicated that the concepts of building back better should be pursued. However, there were significant barriers identified as restrictions to how these principles may be actioned. As well, the responses regarding how build back better principles should be developed and applied were varied as well.

1. ***Lack of Clarity regarding build back better concepts***

Respondents noted that there is a lack of overarching principles, documentation, and guidance regarding build back better principles. Through consultation with local governments and First Nations communities, there has not be significant investigation applied at the local level as to what, generally, this would mean for a given community. Likewise, at the federal and provincial government levels, these terms are becoming more commonplace, and the principle is applied where deemed possible, but there does not seem to be policy guidance that supports staff in making these decisions, nor in implementation.

The modernization of the Emergency Program Act in British Columbia may alleviate some of the issues associated with this lack of clarity. The "Modernizing BC's Emergency Management Legislation" white paper does speak to the intent of EMBC to incorporate the principles found within the Sendai Framework, so it is likely that there will be inclusion of build back better principles. However, at the time of the creation of this report, specifics about the proposed legislation have not been shared (Emergency Management BC, 2019).

2. Funding

Immediately following a disaster, funding at all levels of government may be constrained. As well, and particularly at the provincial government level, there is no dedicated funding stream for the recovery phase of a disaster. There is, of course, DFA available to owners of various private and non-profit enterprises, and local authorities. However, these DFA claims are specifically for losses to essentials, the built environment or infrastructure and do not apply to community recovery projects that do not fit within DFA parameters. These types of recovery related costs (typically related to housing, environmental recovery, or economic recovery, and other non-infrastructure related recovery efforts) are also not covered by insurance. As well, within the current Emergency Management BC budget system, there is no defined budget for support of local government recovery initiatives (as reported by representatives from the EMBC community Recovery Branch). This contrasts with clearly defined practices and written guidance for response-related costs. Recovery managers consulted for this report indicated this was a serious impediment, as every recovery expense where approval is requested must somehow fit into existing programs and budgets (which is out of alignment with response practices, where a response cost budget is maintained and can be accessed in time of need). Provincial government staff recounted challenges in assessing the validity and fundability of recovery phase projects as the guidance and budget framework of these activities is in development. As such, recovery-based projects are challenging to assess and approve for funding.

This makes the concept of funding build back better-styled projects even more challenging, as a system to incorporate or analyze the benefit of these principles does not exist currently.

As well, and particularly for small local governments, regional districts, and First Nations, there is little capacity to plan funded build back better projects. These organizations typically rely upon senior government grant programs to enhance and upgrade systems for their residents. There is often little to no capacity to carry a surplus of funds to fund build back better projects in the event of a disaster.

3. Determination of responsibility

Many consultation respondents were unclear as to whose responsibility the concept of building back better might be. Many local governments expect that funding and guidance for any build back better program would need to be guided and funded by the provincial and federal governments. Provincial and federal government respondents often felt that it was the responsibility of local governments and First Nations to guide and fund their own build back better programs, particularly since local governments have been the beneficiaries of tax revenue from floodplain development.

A comprehensive review of roles, responsibilities, and governance of flood management in general, capturing all levels of government, would be helpful to delineate who has the responsibility for applying build back better principles. This is listed in the recommendation section below.

4.3.4 Recommendations for Build Back Better Principles

Consultation respondents provided valuable feedback during discussions about build back better principles. There were indications of a clear desire, at all levels of government, to explore and apply these concepts more fully. Specific recommendations about how build back better principles could be applied were challenging to derive, as respondents mentioned frequently that the concepts are relatively new to British Columbia recovery operations and methods to implement these principles are uncertain. The project team was able to collate several recommendations to help build the knowledge and familiarity of build back better concepts, linked with general recovery planning best practices, along with perspectives of how these might be implemented to support British Columbia communities.

Recommendation 13:

The Government of British Columbia and Canada should work to develop better policy guidance and functional direction around build back better principles across British Columbia and Canada, respectively.

Within British Columbia, the basic concept of build back better is understood, but all levels of government are unclear as to their role, how the principles are defined, and the practical application of the principles to build back better. Creating a strategic policy development working group to undertake the following activities would help define the build back better concept in British Columbia and would be a good start towards developing the base level understanding of build back better principles. Some of the aspects that need to be defined to embrace the idea of building back better are as follows.

- Definitions related to building back better.
- An assessment of roles and responsibilities as they relate to the application of build back better principles in British Columbia.
- What the strategic objectives and desired outcomes of a build back better program would look like.
- Potential funding streams (grants, incentive programs, or other cost sharing vehicles).
- If any standards or policy were needed to be developed to backstop a build back better program.
- Educational components that would share the concept of building back better to create a culture that would support this type of activity.

These foundational documents should be developed through a consultative process with First Nations and local governments. It is worth noting that one of the parties consulted about the concept of building back better emphasized the need to create an aspect of "moral suasion" – appealing to morality to persuade someone to do the right thing.

A framework of how this may be achieved would be to assemble a task force, much like the Task Force on Flood Insurance and Relocation. Participation from MFLNRORD, EMBC, Public Safety Canada and British Columbia communities and First Nations would encourage collaborative solutions.

The Task Force would have the mandate to provide guidance and standards to the build back better process. The application of those principles following a disaster – and the funding – would likely benefit from a cost sharing approach between all levels of government that was thoroughly researched and planned prior to any emergency event. As well, the promotion of build back better principles to the public could help develop a mindset of personal responsibility among flood victims and help empower them to make positive changes to their residences, farms, and businesses. In this way, there is an incentive for mitigation and preparedness to be enhanced between disasters at the local level.

Recommendation 14:

Local governments, with support from the provincial and federal governments and real estate organizations, should require the disclosure of flood risk information and history to home and property buyers, and renters, on floodplains.

Property transactions within British Columbia are a common, everyday occurrence. Properties on or near water courses are sometimes high value (and potentially historic) properties. At other times, communities and neighbourhoods located near to water can be made up of older, smaller homes that are more affordable. These locations often host many single people, seniors, those on fixed incomes, and new Canadians who may be socio-economically vulnerable. In these cases, some of these neighbourhoods can be disproportionately impacted by flooding, and the resulting recovery can be incredibly challenging due to economic and social disparity.

What was communicated by interviewees was that it becomes apparent immediately following any flood event that many residents had no idea that they were at risk of flooding.

To provide a means to implement this recommendation, there are several practices and programs that could be implemented to help home buyers and residents on flood plains understand the potential risk that they face. This, in turn, assists with the notion of building back better, as it clarifies the risk, and helps residents be prepared for potential floods and how to better manage their response to them when they happen.

- **Encourage clear communications from governments**

Much information is provided by local governments about how a resident can prepare for a flood emergency. Much less property-specific information is shared about the risk of flooding. Flood affected residents often complain, following floods, that they did not even know that there was flood risk, or that their specific property was located on a floodplain. Often these are new residents to these areas who have moved in within the past decade. Often substantial cost is incurred to landscape these properties or develop below level or lower levels of these homes. Floods then destroy these improvements, and often there is little compensation for these, if insurance is not specifically held for these types of events. As well, Disaster Financial Assistance programs rarely cover these non-essential items.

Local and First Nations governments could avoid potential hardship for property owners if they are made aware of the flood risk for their properties. This, of course, must be based on updated flood mapping and updated flood hazard risk assessments. Information about historic floods would also be helpful, as residents would be better informed about the potential risks of living on a floodplain, and this is a subtle but effective means of creating a change in mindset about the desirability (and elevated overall cost) of living within a zone of flood risk.

A simple way to provide this information would be to provide flood risk information to prospective home buyers on the land title and to homeowners during advisement of property tax deadlines, or other frequent and trusted communication from local and provincial governments. In addition, markers on landmarks or utility poles could show the water surface elevation of the flood of record and flood construction level to keep flood hazards top of mind for residents.

- **Disclose flood risk during property transactions and interactions with the public**

During property transactions, or during local government interactions with flood plain property owners, there is currently no requirement to make potential property purchasers aware of flood risk. This includes no requirement for disclosure of floodplain status, mitigation measures in place, status of flood protection plans or historical flood impacts. Residents who are impacted by floods shortly after purchasing properties often place the blame of lack of awareness solely with local government. However, many parties are responsible for this situation, including realtors, property sellers, developers, and all levels of government. There may also be a benefit for some to keeping this information obscure, as it maintains high values for waterfront properties without properly valuing the risk presented in such locations. Property purchasers as well should be well informed and be acquiring property with buyer-beware principles in mind. However, finding property-specific flood information is challenging in all jurisdictions and from all information sources.

Some of the methods to improve flood potential awareness could include:

- A requirement to notify of historical or potential flood impacts during property transactions.
- Noting the flood plain risk and historical impact information on title.
- Requiring buyers to have a quote for flood insurance prior to acceptance by mortgage lenders.

- A requirement for property tax notices or assessments by BC Housing to include information about property flood risk.
- Noting potential flood heights through signage and markings on utility poles and other permanent structures on flood plains.

While the requirement to deliver this information would rest with local governments, lending institutions, insurers, and real estate practitioners, the mandate and standard means to provide this information would require legislation at the provincial level.

These transactions should also include the required disclosure and clear explanation of any flood-related covenants on title for the property in question.

- **Provide a means for property owners and renters to easily access information about property specific flood risk**

In much the same way that any property owner in British Columbia can access the assessed value for properties near them, a similar system should exist for the review of flood risk for properties in British Columbia.

Having residents have immediate access to this type of information through easy-to-use data portals would increase the preparedness levels of flood plain residents and remove the obscurity related to accessing flood information.

There is a variety of information that could be provided, such as potential flood height, overland velocity, severity and potential, and whether the property was protected by mitigation measures (such as flood protection dikes or other potential structures). Disclaimers could also be provided about whether a dike was an officially registered flood protection structure, or an orphan dike or unregulated berm.

Again, this type of data can only be provided following the update of flood plain maps and flood hazard assessments have been updated. This recommendation would be best implemented through a partnership delivery with BC Housing and with the cooperation of real estate associations, and others, with the data provided by local governments and the Province of British Columbia.

Recommendation 15:

Enhance the recovery phase guidance available to local governments and First Nations as provided by the Province of British Columbia, to support build back better principles through more efficient recovery operations.

Community-led recovery has been shown to be overwhelmingly beneficial in managing and enhancing the recovery of a community from a disaster. Often, communities are starting out with no experience in the recovery sector and must create a recovery team, recovery objectives, a needs assessment following the disaster, and communicate clear plans and deliverables to a public that is often still in shock from the impact of the disaster. Often, larger recoveries will overwhelm the resources in the community who are traumatized and exhausted from the response phase of the event. The communities require strategic guidance to help them navigate the early stages of recovery, and this can be assisted with input from those with large scale recovery experience. This makes it incredibly challenging to utilize build back better concepts, as the initial planning and analysis that would show the benefit of building back better has not been undertaken.

Many steps must happen in the early days of recovery as that is when the most significant benefit can be provided to those in need. As well, strategic, and fast-moving recovery goals early in the process can significantly shorten the timelines for recovery, thereby reducing the overall impacts and trauma of the event for those involved. A reduction in the recovery timeline can provide more opportunities to implement build back better principles. As well, enhanced recovery planning can provide a greater chance that community leadership will be aware of the concepts and provide support to build back better initiatives.

One of the first things that needs to be completed following a disaster is a post-disaster needs assessment (PDNA). This quickly shows how a community will be able to apply their resources, and if additional external needs are required. The PDNA assists government and community recovery with assessing the full extent of a disaster's impact on the affected community, and, with these findings in hand, provides the ability to produce an actionable and sustainable recovery plan for mobilizing resources.

Community recovery operations would be enhanced with the following actions, thereby improving the chances of building back better.

- Currently, Emergency Management BC has an Interim Provincial Disaster Recovery Framework. This document guides how the British Columbia provincial government itself will navigate disaster recovery and explains roles and responsibilities at all levels of government. However, it has not been developed for local authorities to be able to apply much of the information to their own recoveries. As well, the Recovery Guide for Local Authorities and First Nations is a useful document to start recovery operations, but lacks specifics for more significant recoveries, and the guidance within the document is quickly exceeded. **Continuing to enhance and revise these documents and adding additional documentation for communities to use during the recovery process would be advantageous for all involved in recovery and should be amended to incorporate build back better principles.**
    - **Further to the point above, the creation of a recovery plan and post-disaster needs assessment template in the same format as the provincial hazard, risk, and vulnerability process, or as a form fillable document, would be beneficial during the initial phases of a recovery operations within local authorities.** Note that this assumes that amendments to the Emergency Program Act (and the incorporation of Sendai principles) will precede this work, and therefore principles of building back better may be then incorporated.
- **Creating a provincially managed catalogue of recovery capabilities and making this available to communities who find themselves in recovery operations, would be highly beneficial to those communities.** This list could be populated with qualified companies, contractors, and service providers that have specialized recovery

experience, skills, and abilities. As well, access to a list of non-profits and faith-based organizations that can assist in a community's period of need would be helpful. The list should include possible resources for all sectors of community recovery, including economic, environmental, infrastructure, housing, and people and community recovery. Note, that while this list complements recovery planning that intends to include build back better principles, this is recovery planning, and not an aspect of build back better.

These tools and materials would be best developed and managed by the Community Recovery Branch within EMBC.

Recommendation 16:

The Province of British Columbia, in partnership with local authorities, should enhance and improve local recovery planning through mandates, guidance, policy, and legislation to provide opportunities for building back better post flood.

Each community should have a recovery strategy "road map" including elements of how a potential recovery team and process would be structured, policy considerations, management of any recovery activities, potential recovery partners, and support agencies, among others. As well, consideration of various actions, strategies, information, and guidance that might be needed in a recovery phase should be included, such as land use planning, zoning, potential mitigative structures, and other forms of risk reduction that could be undertaken and would enhance the build back better aspect of recovery.

- Most consultation respondents indicated that they either did not have recovery plans, or that their plans provided little detail about how potential recovery processes would take place. Ideally, recovery plans would be prepared to provide information, at a minimum, about the following.
  - Recovery and build back better documents should include plans for future considerations for specific neighbourhoods or geographic areas.
    - This could include recommendations and consideration of potential changes to zoning or land us following an event, including areas considered for buy outs and/or managed retreat from hazard areas.
    - Plans could also consider the effect of compounding or interdependent disasters – for example, requiring flood proofing or rebuilding to appropriate flood construction levels following an earthquake.
  - Recovery plans should also identify lists of local subject matter experts available for hire, or non-profit support organizations.
  - Lists of other typical recovery resources such as heavy equipment operators, flood and damage assessors, construction companies, contractors, locations where ample supplies of materials can be found, engineering companies, and others are also helpful.
- Plans should be analyzed for opportunities to build back better, if an event happens, and there are funding opportunities or public commitments to make significant changes. Analyzing with this in mind is also a good way to consider opportunities for mitigation and preparedness activities in advance of any emergency events.
- Key to any recovery plans for floods would include pre-flood risk assessments of known or expected flood areas.
- Having access to an up-to-date gap analysis, where additional flood plain mapping and risk assessment is required is helpful as well, as recovery and build back better documents are crafted.
- The development of these recovery and build back better plans would be most successful if they could be included as a funding stream under existing grant programs – for example, the Union of British Columbia Municipalities (UBCM) offers funding streams for flood risk assessment and mapping, evacuation route planning, emergency operations and emergency support service operations and training through the Community Emergency Preparedness Fund (Union of BC Municipalities, 2021). The inclusion of a stream of grant opportunities related to recovery pre-planning could be beneficial, not only for the anticipation of eventual recovery needs, but would also help strengthen preparedness and mitigation efforts in British Columbia communities.

The bulk of these recommendations would need to be actioned by EMBC through the Community Recovery Branch, with changes to grant programs coordinated by the Union of BC Municipalities.

5.0 Out-of-Scope Findings and Issues for Future Investigations

Through the process of consulting with over 65 different flood, recovery and insurance subject matter experts, much data was gathered about the status of flood recovery within British Columbia. Not all the data gathered, issues identified, and recommendations formed were suitable within the scope of flood recovery in this report. However, the project team felt it was important to ensure that this valuable feedback was relayed to the Fraser Basin Council and the BC Ministry of Forests, Lands, Natural Resource Operations and Rural Development. These items may be referred to other project investigations or may be deferred to future projects.

These findings and issues are found in Appendix D.

6.0 Conclusion

Floods are extremely impactful events on the residents, communities, governments, and responders that experience them. The response phase is often traumatic, with little that can be done once the event is underway but wait for the water to recede. When the water does subside, flood victims are left with damaged and contaminated homes, destroyed personal belongings, the loss of place and income, and severe impacts to their mental health. The recovery phase can be slow to start, and once it begins, the scope of flood recovery is staggering and overwhelming for both flood affected residents and governments alike. Flood recovery takes time, and can be exhausting, stressful and frustrating when all levels of government are uncertain as to policies, roles and responsibilities, funding, and objectives. The people that feel the brunt of these government challenges are those who are most impacted by the flood waters themselves. Significant resources must be applied to all sectors of recovery to ensure the continual rebuilding of the mental, physical, and financial restoration of flood affected communities, and these resources must be guided by clear policies, and be able to be implemented quickly following a flood disaster.

The consultations that the project team undertook throughout this project on flood recovery priorities served to illustrate some critical issues around flood recovery.

The concept of building back better is clearly something that flood managers, emergency managers, responders, community leaders and others see as a key objective for flood recovery. However, the project team heard repeatedly that the lack of policy, clarity, information, and guidance around these concepts mean that they are not being implemented in a consistent manner, nor are they being implemented each time there is an opportunity to do so. Equally clear was the message that funding is a barrier, and the responsibility to build back better is uncertain. As many different groups have had responsibility for building on flood plains and sustaining these practices, the question of who should pay for better flood recovery practices remains uncertain.

Overland flood insurance is changing rapidly within British Columbia and across Canada. Overland flood insurance has become much more readily available over the past several years, and the project team heard examples of how insurers have been innovative around how they are able to provide coverage across a multitude of different floodplain scenarios. However, Canadian communities have been hit hard by floods over the past decade, and the overland flood insurance industry is understandably cautious about the levels of risk they face. It is encouraging to see the insurance industry and all levels of government committed to finding ways forward to manage high flood risk properties.

The acceleration of flood losses and changing policies is also having an impact on Disaster Financial Assistance programs. Both federal and provincial governments are now thinking about ways to keep these programs sustainable in the face of mounting flood losses. The project team heard that to do so, senior levels of government will need to find innovative ways to reduce their risk exposure to flood expenses, reduce the number of repeat claims for high-risk properties, and to find long term solutions for areas that will continue to face flood risk. These solutions will likely be a mix of mitigation measures, better building practices, infrastructure renewal to face a changing climate, and managed retreat from areas where there are not better choices.

The challenges faced by flood plain residents and governments who support them are daunting. Recovery from overland flood events is particularly difficult given the challenges presented by a changing overland flood insurance landscape, Disaster Financial Assistance program limitations, various impediments to implementing build back better principles, and a lack of clarity around how to manage high flood risk properties that are frequently impacted. However, with thoughtful, innovative, and decisive action, and through careful consideration of how flood mitigation, preparedness, response, and recovery can be managed holistically, these risks can be managed, and our communities can continue to grow and prosper.

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APPENDIX A. Glossary

The following terms are used throughout the Theme C3 – Flood Recovery Investigation:

Activation: The act of initiating the emergency plan and different levels of support.

Adaptation: The practice of adjusting or taking actions to limit or reduce vulnerability to changing hazard risk. In the context of climate change impacts on coastal flood hazard risk, specific adaptation actions might include improved coastal zone management, changes to planning, permitting, codes and standards, structural design, and social preparedness.

All-Hazards: Referring to the entire spectrum of hazards, whether they are natural or human-induced. For example, hazards can stem from natural (e.g., geological or meteorological) events, industrial accidents, national security events, or cyber events.

All-Hazards Approach: An emergency management approach that recognizes that the actions required to mitigate the effects of emergencies are essentially the same, irrespective of the nature of the incident, thereby permitting an optimization of planning, response and support resources.

Assets-at-Risk: Refers to those things that may be harmed by hazard (e.g., people, houses, buildings, cultural assets, or the environment).

British Columbia Emergency Management System (BCEMS): An emergency management system founded on the principles if the Incident Command System. BCEMS is required to be used by all ministries and Crown Corporations and cross-jurisdictionally in BC.

Build Back Better: A strategy aimed at reducing the risk to the people of nations and communities in the wake of future disasters and shocks. The approach integrates disaster risk reduction measures into the restoration of physical infrastructure, social systems and shelter, and the revitalization of livelihoods, economies and the environment

Business Continuity: An ongoing process by all type industries to ensure that the necessary steps are taken to determine the impact of potential losses and maintain viable recovery strategies, recovery plans, and continuity of services.

Coastal Flood Hazard: A potentially damaging flood event (or multiple events) in coastal regions, which may cause damage to buildings and infrastructure, and/or the loss of life, injury, property damage, social and economic disruption, or environmental degradation.

Coastal Flood Risk: The combination of the probability of a coastal flood hazard event (or multiple events) and the associated negative consequences.

Dike: An embankment designed and constructed to prevent the flooding of land. A dike is supported by related works, such as flood boxes, gates and pumps that serve to hold back floodwaters while continuing to discharge water from behind the dike.

Disaster: "A calamity that (a) is caused by accident, fire, explosion, or technical failure or by the forces of nature, and (b) has resulted in serious harm to the health, safety, or welfare of people, or in widespread damage to property." [*Emergency Program Act*]

Disaster Risk Reduction: The concept and practice of reducing disaster risks through systematic efforts to analyze and reduce the causal factors of disasters. Disaster risk reduction includes disciplines like disaster mitigation and preparedness.

Emergency: A present or imminent event that requires prompt co-ordination of action or special regulation of persons or property to protect the safety, health or welfare of people or to limit damage to property.

Emergency management: An ongoing process to prevent, mitigate, prepare for, respond to and recover from an emergency or disaster that threatens life, property, operations or the environment.

Emergency Management B.C.: The province's lead coordinating agency for all emergency management activities, including response, planning, training, testing, and exercising.

Emergency Operations Centre: The physical location at which the coordination of information and resources to support domestic incident management activities normally takes place. An EOC may be a temporary facility or may be located in a more central or permanently established facility, perhaps at a higher level of organization within a jurisdiction.

Emergency plan: A document developed to ensure quick access to the information necessary for effectively responding to an emergency.

Emergency Program Coordinator: The person responsible for the day-to-day management of an organization's emergency management program. May also be referred to as planner, manager, or director.

Engineers and Geoscientists B.C.: Engineers and Geoscientists British Columbia is the business name of the Association of Professional Engineers and Geoscientists of the Province of British Columbia. Engineers and Geoscientists BC regulates and governs these professions under the authority of the Professional Governance Act and the Engineers and Geoscientists Act.

First Nations: On-reserve communities that are supported by Emergency Management BC through a 10-year bilateral agreement signed in 2017 with the Federal Government. While the Federal Government, through the Department of Indigenous Services Canada (ISC), holds the legislated responsibility for emergency management activities on First Nations Reserve Lands, the Agreement enables EMBC to provide First Nations with the full range of emergency management services that Local Authorities receive.

Flood and Flooding: The presence of water on land that is normally dry. Often used to describe a watercourse or body of water that overtops its natural or artificial confines.

Flood Risk Assessment: Evaluation of a flood hazard (including the expected flood extent, depth and direction of flow) together with information about assets and people that are vulnerable to flooding to identify potential economic, social, cultural and environmental losses from flooding.

Flood Assessment Report: A report that is written by a Qualified Professional (QP) to outline the result of the flood assessment work that was completed. It may be a Flood Hazard Assessment, a Flood Risk Assessment, a Flood Mitigation Assessment, or some combination of these.

Flood Hazard: The potential for loss of life or injury and potential damage to property resulting from flooding. The degree of flood hazard varies with circumstances across the full range of floods.

Flood Intensity: A set of spatially distributed parameters related to the destructive power of a flood. The parameters may be described quantitatively or qualitatively, and may include the area inundated, the maximum flow velocity, total channel scour, sedimentation, and impact force.

Flood Mitigation: Steps to reduce flood damage by structural measures (such as dikes), non-structural measures (such as keeping populations and assets away from flood-prone areas or requiring floodproofing), or a combination of these measures.

Flood Plain: a nearly flat plain along the course of a stream or river or lake that is naturally subject to flooding.

Flood Risk: The combination of the probability of a flood event and the potential adverse Consequences to human health, the environment, and economic activity associated with a flood event.

Forests, Lands, Natural Resource Operations and Rural Development: The Ministry responsible for the stewardship of provincial Crown land and ensures the sustainable management of forest, wildlife, water and other land-based resources. The Ministry works with Indigenous and rural communities to strengthen and diversify their economies.

Hazard: A source of potential harm, or a situation with a potential for causing harm, in terms of human injury; damage to health, property, the environment, and other things of value; or some combination of these.

Hazard, Risk, and Vulnerability Analysis (HRVA): An assessment of:

• Hazards: These are sources of potential harm, or situations with a potential for causing harm, in terms of human injury; damage to health, property, the environment, and other things of value; or some combination of these.
• Risk: This refers to the likelihood that a hazard will occur, as well as the severity of possible impact to health, property, the environment, or other things of value.
• Vulnerability: This refers to the people, property, infrastructure, industry, resources, or environments that are particularly exposed to adverse impact from a hazardous event.

Impact: The physical/environmental, social, economic, and political consequences or adverse effects that may occur as the result of a hazardous event.

Indigenous Traditional Knowledge: A holistic system of knowledge that belongs to First Nations, embedded in culture and tradition, built through generations of living in close relationship with the land, and which can carry spiritual significance.

Indigenous Traditional Knowledge Holders: A member from the community, or designate, who holds Indigenous Traditional Knowledge.

Incident Command System (ICS): Originally developed as a fire response management system by various jurisdictions in the United States, this incident management system has been widely adopted by first responders and emergency management programs throughout North America.

Local Authority: Municipalities, regional districts, and Treaty First Nations who have specific legislated emergency management requirements set out in the Emergency Program Act (EPA).

Mitigation: Activities which reduce or eliminate the impacts of an emergency or anticipated emergency, before, during or after the emergency event.

Mitigation Measures: The alteration of land or buildings to reduce flood damage, including the use of building setbacks from water bodies to maintain a floodway and allow for potential erosion.
Mitigation Measures may be achieved by either or both of the following:

- Building on structural fill, provided such fill does not interfere with flood flows of the watercourse and is

adequately protected against floodwater erosion and scour

- Building raised by foundation walls, columns, or piles.

Preparedness: Activities undertaken prior to an emergency to ensure an effective response to and recovery from the consequences of an emergency event.

Provincial Emergency Coordination Centre: The central emergency operations centre activated to provide overall coordination of the integrated provincial response to an emergency or disaster. The Provincial Emergency Coordination Centre manages the overall provincial government response, which includes the provision of support for the regional levels. This may include consultation with senior elected officials, management of emergency information for the public, resource coordination and policy guidance. Communications and collaboration with external agencies such as crown corporations, federal emergency response agencies, non-governmental organizations and other provinces are managed at the Provincial Central Coordination level.

Provincial Regional Emergency Operations Centre: The Provincial Regional centre responsible for coordinating regional response activities, supporting local EOCs assigning regional (provincial and federally assigned) critical resources, providing regional messaging, and providing situational understanding to the PECC.

Recovery: Is the phase of emergency management in which steps and processes are taken and implemented to repair communities affected by a disaster; restore conditions to an acceptable level or, when feasible, improve them; and increase resilience in individuals, families, organizations, and communities

Resources: Equipment, supplies, personnel, volunteers, and facilities available for assignment or staging in support of emergency management activities.

Resilience: The ability of a system, community or society exposed to hazards to resist, absorb, accommodate, adapt to, transform and recover from the effects of a hazard in a timely and efficient manner.

Resource management: A process for identifying and managing available resources to enable timely and unimpeded access to the resources needed to prevent, mitigate, prepare for, respond to or recover from an incident.

Response: The phase of emergency management during which actions are taken in direct response to an imminent or occurring emergency/disaster to manage its consequences.

Risk: A measure of the probability and severity of an adverse effect to health, property, or the environment. Risk is often estimated by the product of probability and Consequence. A more general interpretation of Risk involves a comparison of the probability and Consequences in a non-product form.

Risk Assessment: A method to determine the nature and extent of risk by analyzing potential hazards and evaluating existing conditions of vulnerability that together could potentially harm exposed buildings, infrastructure, people, property, services, livelihoods, and the environment on which they depend.

Risk assessments (and associated risk mapping) include: a review of the technical characteristics of hazards, such as their location, intensity, frequency, and probability; the analysis of exposure and vulnerability, including the physical, social, health, economic, cultural, and environmental dimensions; and the evaluation of the effectiveness of prevailing and alternative coping capacities, with respect to likely risk scenarios. This series of activities is sometimes known as a risk analysis process.

Risk Management: The systematic approach and practice of managing uncertainty to minimize potential harm and loss.

Sendai Framework: The Sendai Framework for Disaster Risk Reduction 2015-2030 (Sendai Framework) was the first major agreement of the post-2015 development agenda and provides Member States with concrete actions to protect development gains from the risk of disaster. Canada and the Province of British Columbia have agreed to incorporate the framework into appropriate policies.

Situational Awareness: Knowing what is going on and what has happened with respect to the current incident, what could go on in terms of future impact or outcomes, and what options exist in terms of response actions.

Subject Matter Expert: Provincial, regional or local experts with knowledge on a specific area of expertise, such as hazard(s) likelihood, consequences, environmental and economic impacts.

Tolerable Risk: A Risk that society is willing to live with to secure certain benefits in the confidence that the Risk is being properly controlled, kept under review, and further reduced as and when possible.

Tsunami: A series of waves caused by a rapid, large-scale disturbance of water. Tsunamis can be triggered by earthquakes, landslides, volcanic eruptions, meteor impacts, human activities (e.g., explosions), and meteorological/atmospheric phenomena (meteo-tsunamis).

Vulnerability: The degree of loss to a given element or set of elements within the area affected by the Flood Hazard. Vulnerability is expressed on a scale of 0 (no loss) to 1 (total loss). For property, the loss will be the value of the damage relative to the value of the property; for persons it will be the probability that a particular life will be lost given that the person is subject to the flood, debris flood or debris flow.

APPENDIX B. Red Dragon Project Team

Red Dragon Consulting created a tailor-made project team for the flood recovery (and flood response) projects. The creation of such a team is to provide breadth and depth of knowledge to investigate the different work streams, as well as provide experienced perspectives from our collective experience and knowledge. The consulting team members consist of recognized professional experts with significant experience in delivering preparedness, mitigation, response, and recovery projects over many years of operational experience in emergency management and public safety careers. The team prides itself on working together, agility to assist clients and has over 100 years of combined experience.

Table: Reference Red Dragon Consulting Project Team

Project member	Project Role	Project Specific Experience
Paul Edmonds	Project Manager	National Emergency Management Strategy and Policy (Preparedness, Mitigation, Response and Recovery) All-hazard. Senior Government lead for emergency policy and legislative change. National all hazard emergency management and representation on variety of national groups including chairperson. National Flood Recovery Manager 2012 Strategic, Tactical and Operational Emergency Commander U.K. EOC Director B.C. Flood Recovery Adviser Flood Response Plan Developer
Chris Marsh	Deputy Project Manager	Emergency Operations Centre Director for Grand Forks and Boundary 2018 Flooding Recovery Co-Manager for Grand Forks and Boundary 2018 Flood Recovery Local Government Emergency Manager (Preparedness, Mitigation, Response and Recovery) Provincial Government – Various Technical and Leadership Roles Structural Firefighter, Instructor and Evaluator, including Leadership Roles and licensed emergency medical provider
Steve Newton	Consultant	Provincial Government Emergency Management Provincial Operations Flood All-hazard experience with First Nation and Local Government impacts. Provincial Government Wildfire Service Associated Roles Emergency Management, wildfire and flood.
Michael Andrews	Consultant	Justice Institute of B.C. Emergency Management Instructor Emergency Planning, Preparedness, Response and Recovery associated roles. Local Government Emergency Management Provincial Government Emergency Management
Greg Kanya	Consultant	Emergency Planning, Preparedness, Response and Recovery associated roles. Local Government Emergency Management Provincial Government Emergency Management Provincial Government Ministry of Environment associated roles

All consultants have a trust-based relationship and proven history of working together and with others from different organizations, ranging from provincial government ministries, First Nations, local governments, municipalities, and industries.

APPENDIX C. Engagement Questions

Questions for Task C3.1

Question Topic C3.1 Investigate the current status of coverage of existing overland flood insurance available to homeowners.

Question 1: Are you comfortable with your comments being shared, or is confidentiality required? It is not our intention to include direct quotes from individuals rather have organizational recommendations. If such a quote were appropriate, we would seek permission before, including in the report. This session will be recording for report writing processes only. All recordings are deleted after use.

Note 1: Please answer these questions from your organization's perspective and add any comments, observations, or findings to any item.

Question 2: In your experience, is flood insurance readily available to homeowners within B.C.?

Prompts: Are you aware of any differences across the regions of B.C. and Canada? Are you aware of the B.C. Disaster Financial Assistance program, and the concerns that if flood insurance is readily available and not taken, then DFA is not eligible? Are there groups who are underinsured? (Gender bias, income disparity, new Canadians, indigenous communities?) How would you define "readily available"? (Impediments may be cost, access, unclear policies, etc.)

Question 3: Are you aware of issues where those who have experienced a flood could not receive insurance following a flood? How are high-risk areas defined, where flood insurance may not be available?

Prompts: Were the reasons for non-insurability location, risk, policy constraints, or other reasons?

Question 4: Are you aware of any examples where homeowners have not purchased flood insurance and rely on the BC DFA program or other forms of government assistance?

Prompts Have you encountered situations where residents expect that governments will provide relief if there is a flood? Can you provide examples? Do you think flood risk is adequately explained to homeowners? Do you think flood insurance availability or flood risk should be explained or disclosed to homeowners when they purchase property?

Question 5: Do you believe that local and provincial governments, or developers, continue to develop property within the floodplains in B.C., specifically because there is the promise of DFA support after a flood?

Prompts: Is this a factor? Do you have any examples?

Question 6: How is the flood insurance industry changing? Where do you think flood insurance coverage is headed?

Prompts:

- How will the insurance industry treat high-risk properties or "repeat offenders"? What do you see currently?
- What other options are there for homeowners whose homes are deemed "uninsurable"? If a property is considered too hazardous to ensure, what should the next steps be? (Government buy-out program, etc.?)
- What options for insurance companies in assessing the location of dwellings in a flood risk area when flood mapping is currently inconsistent? And outdated in some places. (if not possible through postal code or property tax band information, or from modernized flood hazard maps)

Question 7: Are you aware of initiatives underway to streamline, change, or strengthen flood insurance availability between the government and the private insurance industry?

Prompts: Are you aware of other resources worth exploring as part of this investigation? Do you feel that the government and insurance should work together to provide a more consistent and comparable approach to flood insurance? (standards of application, etc.).

Question 8. How is climate change affecting the availability of flood insurance? How is climate change affecting the availability of insurance in general?

Prompts: Do you know if governments and insurance companies use the same source of data?

Question 9: How can governments and other organizations reform flood insurance to protect communities better? What would make the current situation better?

Prompts:

- Are you aware of government or private organizations that are "getting it right"?
- Should insurers provide incentive programs for homeowners in flood-proofing their property to have reduced premiums?

Question 10: Have you any additional comments? Is there anything else you would like to discuss that we may have missed? Are there any other useful contacts for these questions that you can think of?

Questions for Task C3.2

Question Topic C3.2 Investigate the concept of "build back better" and impediments to implementation.

Question 1: Are you comfortable with your comments being shared, or is confidentiality required? It is not our intention to include direct quotes from individuals rather have organizational recommendations. If such a quote were appropriate, we would seek permission before, including in the report. This session will be recording for report writing processes only. All recordings are deleted after use.

Note 1: Please answer these questions from your organization's perspective and add any comments, observations, or findings to any item.

Question 2: Does your organization have a recovery plan? Does it contain flood-specific procedures and considerations? If so, when was it last updated? What are the main components? Have you discussed recovery concepts with community stakeholders?

Prompts: If so, when was it last updated? What are the main components? Have you discussed recovery concepts with community stakeholders?

Question 3: In your experience, are governments and other agencies aware of the concept of build back better principles post-disaster? Are they applied when possible?

Prompts:

- Are these principles incorporated into planning activities? For example, would your organization, or others you know, have shovel-ready build back better projects to implement following a flood?
- What about non-construction projects? Are you aware of building back better principles being applied to environmental enhancement, economic recovery, community mental health wellness, or other recovery aspects?
- Are these plans shared among different levels of government so that everyone is aware of them?

Question 4: What sort of opportunities are there for building back better post-disaster? What are the challenges associated with building back better?

Prompts: Are they more likely to lack local buy-in or issues with government standards or programs if there are impediments?

Question 5: An initial disaster often presents an opportunity to "do things differently" going forward. For example, an earthquake and the subsequent rebuilding efforts would offer a unique opportunity for flood protection (either through changes to land use, or a different application of development approvals and building codes).

A. Does your organization have plans that consider an assessment and a program to build back better after an initial disaster?

B. Would flood protection be enhanced, or would rebuilding practices be changed (or in the case of updated flood construction levels and floodplain mapping, enforced) post-earthquake?

Prompts: Concurrent disasters can mean opportunities to enhance protective works.

Question 6: Building back better after a flood is often a challenge in B.C. because of our extensive and historical development of floodplains.

A. How do current, ongoing and future business practices related to flood plain development impact the opportunity to build back better?

B. What might governments, communities and individuals do better in new development and restoring assets post-flood?

C. Are there practices that are "hurting" our ability to build back better? (i.e. subdivision approval in floodplains with outdated flood plain maps and outdated flood construction levels for building permits). What are some ways we could promote resilient practices to make building back better easier?

Prompts: Seek to answer these questions specifically from the concept of building back better.

Question 6: Are you aware of any situations where you, or another community or organization built back better after an emergency event?

Prompts:

- What were the success factors? How were you able to do it? (funding, staff commitment, partnership, other)
- What were the challenges or impediments to the project? (timelines, funding, lack of internal or external support, etc.)

Question 7: Are build back better principals clearly defined in B.C.? Is there a clear understanding of how to build back better principles would be applied?

Prompts: Would you say that there are incentives to doing so or impediments to doing so? Do you know where you could get additional guidance and support?

Question 8. How can governments and other organizations encourage the application of build back better principles?

Prompts:

- Are you aware of government or private organizations that are "getting it right"?
- Are there examples that you are aware of beyond simply increasing funding availability?
- Have you been made aware of any specific funding streams to support build back better principles?

Question 9: Personal and organizational awareness plays a role in having the ability to enhance recovery post-disaster.

A. Does your organization have a recovery plan with build back better scenarios pre-identified?

B. Would you say residents and communities are thinking of ways recovery efforts could be enhanced post-disaster?

C. What ways could mitigation and preparedness be enhanced, thereby shortening the recovery timelines and encouraging a complete recovery for individuals and communities?

Question 10: Thank you for your time. Have you any additional comments? Is there anyone else I should be speaking to about these issues? Are there any resources you can direct me to which would enhance my research?

APPENDIX D. Out-of-Scope Findings and Issues Noted During Engagement Process

Out-Of-Scope Findings and Issues

- First Nation governments, local governments and provincial government staff noted during consultations that it is challenging to understand all the different policies, legislation and practices that guide flood management in BC (outside of recovery-specific issues). Interviewees stated that it would be helpful to have a task force work to identify if there are legislation, policy or guideline pieces that are causing confusion or ambiguity about direction or role of provincial government.

- Provincial government staff who deal with grant submissions for various flood and emergency management related funding opportunities reported that during consultations that grant requests (for CEPF, UBCM, NDMP, DMAF, etc.) are assessed incredibly vigorously once they are submitted to provincial government. Subject matter experts pore over these documents to ensure they are scientifically sound. However, interviewees who are part of the process that develops what grants are available noted that the process to determine over-arching priorities is non-existent. If rectified, this will help to transition successful grant requests from organizations who have the capacity to put together high-quality applications to include those who are facing the highest risk (who may not have the capacity for submitting a successful application).

- Both local government staff who were consulted through this project and provincial government staff who assess grant proposals noted that updating flood plain maps, assessing flood hazard information and undertaking flood risk assessments through grants creates disparity and is a significant undertaking for smaller communities. This was mentioned particularly for smaller municipalities and First Nations communities who do not have the internal capacity to manage grants, nor do they have the engineering and technical expertise to create proper grant applications. This pits large, well-resourced municipalities against smaller less well-resourced ones, which can lead to certain organizations being successful in grant applications and the program not necessarily being risk-based. Interviewees stated that it would be better to have all risk assessments, hazard information updates, and map updates placed on a regular update schedule (and fully funded) rather than through a grant process. It was acknowledged by interviewees that there would be effort required to develop a regular update cycle and could lead to increased grant costs but would alleviate the issues of disparity in the grant process. These issues are directedly linked to the investigations undertaken in Investigation B-2 – Flood Hazard Information and B-3 – Flood Risk Assessment.

- Local authorities consulted through the investigation in flood recovery noted that they need access to a tool and the data from provincial agencies to be able to accurately estimate flood response and recovery costs and impacts. The development of a guide or template would be helpful. Two different small municipalities recently impacted by major flooding reflected that this is information is often required for response and recovery support and funding, and that having an easy and standardized methods of estimating response costs and losses would be helpful. Post-response and -recovery grant programs also often require this information to be provided.

- EMBC and First Nations interviewees consulted through the process of this investigation noted that it would be helpful to re-evaluate provincial Emergency Management systems, guidance and policy from a First Nations culture and government lens.
  - For example, a specific example provided was that EMBC should consider if the BCEMS goals align with First Nations values – life safety is important, but cultural safety is also important (and may be viewed as more important than property protection).

  - It is worth noting that while EMBC does provide emergency management service and support to British Columbia First Nations communities through formal agreements, much of the guidance is not prepared from

a First Nations cultural standpoint – and existing guidance, systems and policy could be revised to be more culturally aware.

- MFLNRORD staff consulted during interviews noted that MFLNRORD and EMBC regions are different (MFLNRORD regions are based on watersheds and not geopolitical boundaries. Boundaries with local governments are often not aligned with provincial ministerial regions. This creates challenges when different staff from different ministries are responsible for different geographical areas – interviewees mentioned a loss of continuity during flood response and recovery (along with general flood management) where these discrepancies exist. Interviewees indicated that these differences could be reduced, where possible, when provincial ministry reorganizations take place.

APPENDIX E. List of All Fraser Basin Council Investigations

Investigations in Support of Flood Strategy Development in BC

List of All Investigations

Theme A. Governance

Issue	Investigation
A-1 Flood Risk Governance	1. Identify the flood management services provided by each order of government in BC.
	2. Investigate the roles of non-government entities in flood management in BC.
	3. Identify challenges, gaps and limitations with current service delivery.
	4. Identify opportunities for improving collaboration and coordination within and across authorities and adjusting non-government entities' roles that would address challenges and improve efficiency and effectiveness.
	5. Recommend changes to support improved collaboration and coordination in flood management, including an analysis of benefits and costs/limitations for each recommendation.
	6. Investigate alternative options for distributing and integrating flood management responsibilities among authorities, including an analysis of benefits and costs/limitations for each option.

Theme B. Flood Hazard and Risk Management

Issue	Investigation
B-1 Impacts of Climate Change	1. Investigate the state of climate change science in relation to BC flood hazards and identify gaps and limitations in provincial legislation, plans, guidelines and guidebooks related to flood hazard management in a changing climate.
	2. Identify current sources of information and models used by experts in the province to predict future climate impacts and investigate opportunities for improved predictive modeling.
	3. Investigate the capacity of responsible authorities and other professionals and practitioners in the province to integrate climate change impacts and scenarios to inform flood planning and management.
	4. Investigate the legislative, policy, and regulatory tools available to responsible authorities in all levels of government for integrating climate change impacts in flood planning and management.
B-2 Flood Hazard Information	1. Investigate the current state of flood mapping in the province, including gaps and limitations. Recommend an approach to improve the spatial coverage, quality, utility and accessibility of flood hazard maps and other flood hazard information.
	2. Investigate the approximate level of effort to prepare flood hazard mapping to address current gaps for existing communities and future areas of development (including floodplain maps and channel migration assessments).
	3. Investigate the current state of knowledge related to dike deficiencies and recommend an approach to improve the quality, consistency, review, utility and accessibility of this information.

Issue	Investigation
	4. Investigate the status of LiDAR standards for flood mapping and develop recommendations to improve standards if applicable.
B-3 Flood Risk Assessment	1. Investigate approaches to completing a province-wide flood risk assessment, addressing effort required, level of detail, types of flood risk, current and future scenarios, scale, and any information required and data gaps.
	2. Determine the effort required to undertake a local-scale comprehensive flood risk assessment for multiple types of flood hazards (e.g. riverine, coastal).and for varying degrees of available data on flood hazard, exposure, vulnerability and risk.
	3. Investigate the effort required to develop and maintain a province-wide asset inventory and/or exposure dataset covering flood prone areas.
	4. Investigate the level of effort to develop a coarse local-scale flood risk map based on available flood hazard map(s).
	5. Investigate methods for valuing the benefits and costs/limitations of flood risk reduction actions in a holistic and consistent manner and develop a framework for project prioritization that could be applied or adapted across the province to reduce flood risk.
	6. Evaluate and compare the benefits and costs/limitations of taking a risk-based approach to flood management versus a standards-based approach.
B-4 Flood Planning	1. Investigate the ability of responsible authorities in the province to develop adaptation plans and strategies for flood management.
	2. Investigate opportunities to improve the knowledge and capacity of local authorities with regard to climate change adaptation and the benefits of proactive flood risk reduction.
	3. Investigate the potential content of a provincial guideline to support the development of local Integrated Flood Management Plans.
	4. Investigate the level of effort for a local authority to complete an Integrated Flood Management Plan and the possible role of the province in reviewing and/or approving these plans.
B-5 Structural Flood Management Approaches	1. Investigate opportunities to incentivize or require diking authorities to maintain flood protection infrastructure and plan for future conditions such as changing flood hazards.
	2. Investigate opportunities to improve the knowledge and capacity of local diking authorities with regard to dike maintenance.
	3. Investigate opportunities to improve coordination amongst diking authorities under non-emergency conditions.
	4. Investigate impediments to and opportunities for implementing innovative structural flood risk reduction measures, including the role of incentives and regulation.
B-6 Non-Structural Flood Management Approaches	1. Investigate past and current approaches to land use and development decisions in floodplains by local and provincial authorities.
	2. Investigate alternatives to the current approach to managing development in floodplains, including returning regulatory authority for development approvals in municipal floodplains to the Province, and provide an analysis of the benefits and costs/limitations of both local and provincial authority.
	3. Investigate impediments to and opportunities for implementing available non-structural flood risk reduction actions, including the role of incentives and regulation.
	4. Investigate the nature of an educational campaign for regional, local and First Nations governments to raise awareness of flood risk and possible risk reduction options.

Theme C. Flood Forecasting, Emergency Response and Recovery

Issue	Investigation
C-1 Flood Forecasting Services	1. Investigate current capacity, coverage, value, and gaps in flood forecasting services.
	2. Visualize where flood forecasting gaps exist and estimate costs for improvement to end users.
C-2 Emergency Response	1. Investigate the future direction of the Federal government related to a National Flood Risk Strategy and the future of Disaster Financial Assistance Arrangements
	2. Investigate the Province's expanding role in providing flood response to First Nations.
	3. Investigate the status of local authority flood response plans and recommend an approach to manage, update and improve this information.
	4. Investigate flood response capabilities considering different flood hazards and different regions of the province.
	5. Investigate opportunities for improved organizational planning for emergency response in all levels of government.
C-3 Flood Recovery	1. Investigate the current status of coverage of existing overland flood insurance available to home-owners.
	2. Investigate the concept of "build back better" and impediments to implementation.

Theme D. Resources and Funding

Issue	Investigation
D-1 Resources and Funding	1. Investigate resource and funding needs associated with implementing recommendations to strengthen flood management in BC.
	2. Investigate evidence in support of investment in proactive flood planning and mitigation activities.

APPENDIX F. Recommendation Tables

Investigation – Disaster Financial Assistance and Disaster Financial Assistance Arrangements		
#	Lead Responsibility	Recommendation
1	Province	The provincial government, with representation from local authorities, should create a task force to research the issues around legality and liability of having one level of government making decisions (like locally implemented land use planning and building construction approvals) that lead to legal and liability issues for other levels of government (like DFA compensation) in terms of disaster compensation.
2	Province	Emergency Management BC should undertake a province-wide project to define where the most frequent and highest value DFA payouts occur, particularly for flooding, to facilitate correlating these with currently available grant and funding programs for mitigation enhancements.
3	Province	The provincial government should develop specialist teams comprised of various government representatives to fast-track mitigation and risk reduction projects for these high-risk areas.
4	Province	The provincial government should share the criteria of how disasters are determined to be DFA eligible with local governments and First Nations. As well, the provincial government should create policy guidance for better awareness about DFA eligibility, and how supporting a DFA eligible and non-DFA eligible events may differ (for both provincial and local government participants).
5	Province	The provincial government, with support from federal and local governments, should create a program to remove habitation and development from high-risk locations, specifically for locations that have been devastated by flood events.
6	Province	The provincial government could consider linking the DFA program (which currently does not compensate for the loss of land) with other provincial or federal programs or grant opportunities which do provide for the acquisition of land to remove problem properties.
7	Province	Emergency Management BC should introduce legislation to allow the DFA program to compel funding recipients to use flood proof materials for flood remediation, or to make changes to their homes or properties to reduce the impact of future floods.
8	Province	Emergency Management BC should undertake an information campaign to increase awareness of the DFA program for both the public and local government emergency programs.
9	Provincial / Federal	The Government of British Columbia and the Government of Canada, respectively, should undertake coordinated and complementary revisions of both the Compensation and Disaster Financial Assistance regulations and the Disaster Financial Assistance Arrangements.
C-3.1 Investigate the current status of coverage of existing overland flood insurance available to home-owners.		
#	Lead Responsibility	Recommendation
10	Provincial / Federal / Local	All levels of government are encouraged to support, and actively participate in increasing the availability of overland flood insurance that is accessible, fair cost and easy to understand.
11	Province	The Province of British Columbia, in partnership with the Insurance Bureau of Canada and others, should undertake a comprehensive public education campaign to educate homeowners, business owners, agricultural producers, and local authorities about overland flood insurance.
12	Province	The Province of British Columbia in partnership with the Government of Canada should develop a grant or subsidy program that would either provide insurance (including overland flood insurance) for individuals and families who own homes but cannot afford insurance.

C-3.2 Investigate the concept of "build back better" and impediments to implementation.		
#	Lead Responsibility	Recommendation
13	Provincial / Federal	The Government of British Columbia and Canada should work to develop better policy guidance and functional direction around build back better principles across British Columbia and Canada, respectively.
14	Local government	Local governments, with support from the provincial and federal governments and real estate organizations, should require the disclosure of flood risk information and history to home and property buyers, and renters, on floodplains.
15	Province	Enhance the recovery phase guidance available to local governments and First Nations as provided by the Province of British Columbia, to support build back better principles through more efficient recovery operations.
16	Province	The Province of British Columbia, in partnership with local authorities, should enhance and improve local recovery planning through mandates, guidance, policy, and legislation to provide opportunities for building back better post flood.

Certification page

Red Dragon Consulting project team presents our findings in undertaking an investigation into flood risk initiatives pertaining to flood emergency response in British Columbia, Canada.
Respectfully submitted,

Sincerely,

Project Manager

Paul Edmonds
BSc Hons Tech, SIC, OSC, NEBOSH, MEPS, QDJM.
Principal Consultant
Red Dragon Consulting Ltd

Deputy Project Manager

Chris Marsh
Principal Consultant
Clear Sky Consulting Ltd
Contracted Under Red Dragon Consulting Ltd

Project Team Members:

Paul Edmonds, Chris Marsh, Steve Newton, Michael Andrews & Greg Kanya.