Sixth Annual National Roundtable on Disaster Risk Reduction

Charting the Future of Disaster Risk Reduction in Canada

Canada's Platform for Disaster Risk Reduction

FINAL REPORT 2015

Canada

Table of Contents

Letter from the Advisory Committee

As the Advisory Committee for Canada's Platform for Disaster Risk Reduction, we are pleased to present you with the Final Report for the Sixth National Roundtable on Disaster Risk Reduction that took place in Calgary, Alberta on November 2 and 3, 2015.

We accomplished our objective of bringing the membership together for open and inclusive dialogue on Disaster Risk Reduction (DRR). This year's Roundtable was attended by close to two hundred participants, representing a broad range of stakeholders from across numerous sectors of our society.

With Canada signing the United Nations *Sendai Framework for Disaster Risk Reduction 2015-2030,* in March 2015, the Roundtable was an opportunity to engage our partners and to start the discussion on Canada's domestic implementation of the Framework. We were privileged to have Ms. Margareta Wahlström, United Nations (UN) Special Representative of the Secretary-General for Disaster Risk Reduction, attend the Roundtable as the keynote speaker. Ms. Wahlström shared her unique perspective of the Sendai Framework. The remainder of the program included plenary and parallel sessions which generated thought-provoking and stimulating discussions and that revolved around this year's theme: *Charting the Future of Disaster Risk Reduction in Canada*.

We would like to thank all of the speakers, panellists, and participants for their contributions to this event. This report contains some of the messages and themes that emerged from the sessions. It is our goal that the information presented inspires you to continue to engage and to collaborate on advancing DRR in Canada.

We look forward to seeing you at the Seventh Annual Roundtable to be held in Montréal, Quebec in 2016.

Sincerely,

Canada's Platform Advisory Committee

Stéphanie Durand (Chair)
Marion Boon
Francis Bradley
Ian Burton
Andrée Chénard
Jeff Gill
David McCormack
Laurie Pearce
John Saunders
Michael Templeton
Mark Williamson
Rodney Yip

Canada's Platform Principles

Platform Vision:

A safer and more resilient Canada through the reduction of risks and the leveraging of capacities and opportunities across all levels of government, the private sector, academia, non-governmental organizations (NGOs), professional associations, Aboriginal groups, and the general public.

Platform Aim:

To provide a gathering place for ideas where members can connect in a way that facilitates dialogue and enables objective consideration of the current state of DRR activities, as well as new perspectives on trusted roles and partnerships, while spurring exploration of new ideas and collaborative opportunities.

Platform Objectives:

- Develop broad awareness and an integrated approach towards reducing risk, increasing resilience, and mitigating impacts of disasters to Canadians;
- Provide a coordinating mechanism for DRR across sectors by leveraging networks and creating new partnerships; and
- Support stakeholders with relevant policy, program and research information at local, regional, national, and international levels.

Structure:

Canada's Platform has established an organization and governance structure that consists of four interconnected components: general members; working groups; an advisory committee; and a secretariat.

Annual National Roundtable on DRR:

The Annual National Roundtable facilitates coordination and implementation of Canada's Platform activities, and serves as a multi-stakeholder mechanism for discussing national DRR issues and information sharing. Six Roundtables have been held in locations across Canada:

- October 26, 2010 – Fredericton, New Brunswick
- October 18, 2011 – Ottawa, Ontario
- October 23, 2012 – Vancouver, British Columbia
- November 5, 2013 – Regina, Saskatchewan
- October 21, 2014 – Toronto, Ontario
- November 2 & 3, 2015 – Calgary, Alberta

Objectives and Outcomes for Roundtable 2015:

Inclusive, horizontal and participatory dialogue with DRR stakeholders across Canada is facilitated focusing on:
- Sharing views on the way forward for emergency management in Canada; and
- Developing an action plan for Canada implementing the new Sendai Framework for DRR 2015 – 2030.

Agenda at a Glance

Master of Ceremonies: Constable Jean-Philippe Michaud, Royal Canadian Mounted Police
Day 1 - Monday, Nov 2, 2015

Timing	Activity
12:00 - 13:00	Registration
13:00 – 13:20	Opening of the Roundtable
13:20 – 13:40	Introduction
13:40 – 14:30	Keynote Address – Margareta Wahlström
14:30 – 14:40	Health Break
14:40 – 15:30	World Café: New Sendai Framework - Domestic Implementation – Introduction to upcoming session
15:30 – 15:40	Health Break
15:40 – 16:50	World Café: New Sendai Framework - Domestic Implementation (Cont'd)
16:50 – 17:00	Close of Day and Preview of Day 2
17:30	Site Visit - Calgary Emergency Operations Centre

Day 2 - Tuesday, Nov 3, 2015

Timing	Activity		
8:00 – 9:00	Registration (continued)		
9:00 – 9:20	Day 2 Opening Message and Recap of Day 1		
9:20 – 10:40	Disaster Risk Reduction is Everyone's Business		
10:40 – 11:00	Health Break		
11:00 – 12:30	Parallel Sessions		
	Workshop 1 – Using the Calgary Flood as a Case Study for the Application of Risk Based Land Use Planning and Flood Mapping	Workshop 2 – Youth, Disaster Risk Reduction and Resilience Leadership: Framing the Youth Agenda for Canada's Response to the Sendai Framework	Workshop 3 – Fostering Trust-Based Relationships to Facilitate Enhanced Disaster Risk Reduction in Aboriginal Communities
12:30 – 13:30	Lunch		
13:30 – 14:45	A Talk Show: Building Back Better – An Essential Aspect of Recovery		
14:45 – 15:00	Health Break		
15:00 – 16:10	Consultation Session: Innovation and Research		
16:10 – 16:30	Concluding Remarks		

Summary of Proceedings

The Sixth Annual National Roundtable of Canada's Platform for Disaster Risk Reduction

Coast Hotel and Conference Center
Calgary, Alberta
November 2 & 3, 2015

Opening of the Roundtable

Constable Jean-Philippe Michaud of the Royal Canadian Mounted Police opened the Roundtable and provided the master of ceremonies services throughout the program.

Constable Michaud set the tone for the Roundtable by sharing that he has worked in building community resiliency and underlined the importance of DRR by speaking of his personal experiences during the Calgary flood of 2013.

Welcome Remarks

Lori MacDonald, Assistant Deputy Minister (ADM), Public Safety Canada (PS), was joined by Dave Galea, Executive Director, and Public Safety Initiatives of the Alberta Emergency Management Agency, to welcome participants to the Sixth Annual National Roundtable on DRR.

ADM MacDonald acknowledged the broad range of stakeholders present at the event and welcomed Margareta Wahlström, Special Representative for DRR from the UN to the Roundtable.

She noted that the Roundtable provides a valuable opportunity to strengthen relationships amongst key stakeholders and to learn first-hand of the impact their work has on their communities and the DRR community as a whole.

She remarked that the discussions and workshops planned for this year's Roundtable intended to bring the membership together for inclusive dialogue in the interest of upholding the shared mandate with all stakeholders keeping Canadians safe.

ADM MacDonald concluded by thanking the participants and membership for their continued hard work and dedication.

Mr. Dave Galea provided welcoming remarks on behalf of the Alberta Emergency Management Agency. He noted he has participated in three Roundtables and stressed the importance of the DRR work.

Mr. Galea highlighted the flood activity in Alberta in 1995, 2005, 2010 and 2013 and underlined the importance of events such as the Roundtable to share best practices, listen to experts and to learn lessons from each other that will make our communities safer and more resilient.

Traditional Welcome

Leonard Bastien, an Elder from the Blackfoot Confederacy, provided a traditional welcome to the Roundtable. He expressed his gratitude for being a part of Roundtable and shared stories and teachings with the group. He provided a blessing in his native tongue and prayed that the participants gathered at the Roundtable would continue their work in DRR with the hope of creating a better tomorrow. The traditional welcome concluded with a song about the sacred white buffalo with the message of moving forward in life.

Introduction

Gina Wilson, Associate Deputy Minister (Associate DM), PS began by thanking Mr. Bastien for his teachings and blessings. She shared her experience of having visited Mr. Bastien's community about twenty years ago, during a time when the community was experiencing a housing disaster and again three years ago. She noted that the positive difference demonstrated by the people of that community is a perfect example of community resilience through the incorporation of Indigenous views.

Associate DM Wilson then acknowledged the participants at this year's Roundtable, who came from across the country and across various sectors. She spoke about why Canada's Platform on DRR is so important. She also provided an overview of the history of the National Roundtable, which was established in 2009 under the auspices of the UN International Strategy for Disaster Reduction Global Platform.

The past year was referred to as a year of reflection and renewal by Associate DM Wilson. She explained that 2015 saw the conclusion of the UN's Hyogo Framework for Action and the signing of its successor, The Sendai Framework.

Associate DM Wilson highlighted Canada's ever-changing risk environment and noted that since 2010, the trend has been that Canada experiences a $1 billion disaster each year. This fact helped to demonstrate the need for Canada to focus on a shared vision for a holistic, adaptive, and responsive emergency management system.

Associate DM Wilson challenged the participants to discuss, debate, participate, and come away inspired to help build a safer and more resilient Canada.

Keynote Address

Margareta Wahlström, Special Representative of the UN Secretary-General for Disaster Risk Reduction, expressed her gratitude for being invited to the Roundtable. She noted that she reviewed the outcomes of the previous Roundtables and was pleased to see that the DRR "movement" in Canada has continued to grow.

Ms. Wahlström provided an overview of the journey of adopting the new Sendai Framework, including its predecessor, the Hyogo Framework for Action (HFA). She acknowledged that many of the gaps identified by nations in the HFA were addressed during the consultations and negotiation of the Sendai Framework.

Ms. Wahlström highlighted that this year's Roundtable theme "DRR is everyone's business" is articulated throughout the Sendai Framework; however the challenge remains of how to get all sectors of society to understand DRR.

Ms. Wahlström noted that 2015 is an important year as a number of conferences, such as the Addis Ababa Action Agenda and the Conference on Climate Change will take place. Much work has been done to ensure the integration of the principals identified in the Sendai Framework into these potential agreements. Important elements that were identified during the negotiation of the Sendai Framework include the need to link climate change and DRR; the need to link between development planning and DRR; and the need to establish international measurements and standards.

Ms. Wahlstrom referred to the Sendai Framework's ambitious goal of "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".

> *"Sendai takes us from managing the disaster to managing the risk."*

She noted that the scope of the framework is also ambitious, by including small-scale disasters which are not accounted for, but represent fifty per cent of global losses. The Sendai Framework includes a strong focus on the local-level of action, capacity, and resources.

> *"Disaster risk reduction is everyone's business. Governments remain in the lead and are overall responsible. But, they cannot do it alone, the Framework says. They need to ensure that they can create the conditions for everybody else, to not only participate, but to actually engage in the definition of the problem, in finding the solutions and the execution."*

Ms. Wahlström underlined the continued need to focus on health, vulnerable populations, science and technology, and the private sector. She stated that the term "vulnerable groups" was replaced by the more practical term "persons living in situations of vulnerability", which more accurately reflects the changing situations experienced by people, rather than painting them with the same brush. With the increased scope and magnitude of disasters, she commented that more engagement with private sector and the science technology groups are needed to build resilient communities. Ms. Wahlström reinforced Elder Bastien's thoughts about his teachings to the participants by noting that the Sendai Framework priorities could be achieved through a number of means including traditional, Indigenous, and local knowledge along with modern science.

An overview of the four priorities for action areas in the Sendai Framework was provided.

(i) Understanding disaster risk. Information must be available and accessible so that citizens can understand and interpret those risks they face.

(ii) Strengthening disaster risk governance to manage disaster risk. Good governance structure is needed that includes only with legislation and policies, but effectively retaining lessons from past events.

(iii) Investing in disaster risk reduction for resilience. Creating the space for all sectors of society to work together, including the business community as well as using effectively social media and networks to help people during crisis situations.

(iv) Enhancing disaster preparedness for effective response and to "Build Back Better" in recovery, rehabilitation, and reconstruction. Importance of reconstruction.

> *"…one of the key issues, I believe, that we have to recognize the changes that communities go through in disasters. Not to look at the negative side, but instead, to look at the opportunities and not build back the risks that have just been destroyed."*

In addition, seven global targets were articulated in the Sendai Framework. The first four targets focus on reducing mortality; the number of affected people; the losses to the global gross domestic product; and the losses to infrastructure. The remaining targets emphasize the need for governments and local authorities to develop a risk-informed plan by 2020; to enhance cooperation with developing countries and to support the implementation of the Framework; and to develop and make available early warning systems and access to information about disaster risk.

To support the implementation of the Sendai Framework, Ms. Wahlström noted that the UN General Assembly has set up an intergovernmental expert group to define the indicators that will be used to track progress against the targets in the coming years. In addition to creating the indicators, the intergovernmental group is also revising the terminology related to the International Strategies for Disaster Reduction.

Ms. Wahlström underlined the continued importance of global, regional and national platforms in the Sendai Framework and noted that there are about 86 countries with national platforms of varying degrees of participation and engagement. She suggested that other nations could draw from the Canadian experience and model.

In conclusion, Ms. Wahlström noted how impressed she was with how the Sendai Framework has facilitated the critical thinking of nations and regions, but that the challenge now is its implementation. She encouraged participants to look at the future and continue to strive for building resilience and reducing disaster risks.

World Café Session

Stéphanie Durand, Director General, PS provided an introduction to the World Café session. She explained that the goal of the World Café was to tap into the collective intelligence of the participants through meaningful conversations and to discuss innovative ways to advance disaster risk reduction in Canada.

She noted that the frequency and intensity of natural disasters in Canada is increasing alongside the cost of dealing with them. She observed that as Canadians, we strive to work together in times of crisis, but stressed that we also need to be prudent in our approach to dealing with disasters, and to focus on prevention and mitigation.

Ms. Durand introduced Laurie Pearce, Research Chair from Justice Institute of British Columbia and Royal Roads University, to facilitate the World Café session. Ms. Durand noted the work that Ms. Pearce has advanced as Chair of the Resilient Communities Working Group (RCWG).

Laurie Pearce explained the principles of the World Café as a way of engaging the collective intelligence through open conversations. Generally, a World Café is an opportunity to tackle questions, be innovative and to build networks and linkages. The RCWG met to review the many action items listed as priorities in the Sendai Framework and developed a list of the ones they believed to be the most important nationally. A poll was then taken by all the RCWG members to identify their choices to bring forward to the World Café. Following this, the World Café questions were determined based on the most important priorities identified.

Ms. Pearce went on to explain that the objective of this World Café is to answer questions framed around key priorities and the development of Canada's contribution to the Sendai Framework. The four priorities with their corresponding questions were as follows:

Priority 1: Understanding disaster risk.
Question 1: What could take place nationally to energize and fully engage local communities and citizens to strengthen public education and awareness in disaster risk reduction?

Priority 2: Strengthening disaster risk governance to manage disaster risk.
Question 2: What steps could be taken at the national level that could support and empower local authorities to work and coordinate more inclusive disaster risk management approaches (e.g.: with civil society, communities and indigenous peoples and migrants)? Keep in mind the need to strengthen comprehensive public and community consultations composed of relevant stakeholders at the national and local levels.

Priority 3: Investing in disaster risk reduction for resilience.
Question 3: What actions could be taken nationally to improve local understanding of disaster risk that might influence mainstreaming disaster risk assessments into land-use policy, developments and implementation?

Priority 4: Enhancing disaster preparedness for effective response and to "Build Back Better" in recovery, rehabilitation and reconstruction.

Question 4: What actions (and by whom) could make the most difference in developing a fully participatory process for common national multi-hazard, multi-sectoral forecasting and early warning systems that are people-centred and community-accessible?

The World Café proved to be a successful session as participants were engaged in the conversations and their ideas were recorded. Ms. Pearce encouraged people to continue these conversations after the Roundtable. She noted that Roundtable organizers would collate the information and provide an opportunity the following day for participants to vote on themes that emerged for each question.

The results from the electronic voting session begin on page 12 of this report.

Closing Remarks - Day 1

ADM MacDonald closed Day 1 of the Roundtable by noting the level of energy from the group during the World Café session and thanked all the attendees for their active participation. She also thanked Associate DM Wilson, Mr. Galea, Mr. Bastien, and Ms. Wahlström for their participation the first day.

ADM MacDonald then provided a preview of the agenda for Day 2 of the Roundtable, which included an electronic voting session on the themes generated in the World Café session and the two panel discussions.

Site Visit - Calgary Emergency Operations Centre

For the first time, the organizers of the Roundtable coordinated an optional site visit for Roundtable participants. The site visit to the Calgary Emergency Operations Centre (EOC) took place during the evening of November 2, 2015. The EOC's Chief, Tom Sampson, and Deputy Chief, Susan Henry facilitated the tour for the 50 participants who attended.

The participants were first led into the media briefing room where they were met by Chief Sampson. He explained that this was the room where he and his team briefed the media during the Calgary Flood of 2013. He gave a history of the building's construction, which was built to LEED® Gold standards and officially opened in November 2012. He then spoke about the layout and functions of the Centre. The self-contained facility is basically an underground bunker, designed to be a hub for coordinating response efforts in the event of a disaster or major emergency. During disasters, major emergencies and drill exercises, representatives from the City of Calgary, business units and external agencies (like utility companies) work together at the EOC to respond and to solve problems. He explained that the reinforcement of the EOC's power supply and communications systems allow the EOC to operate off the grid during the critical first 72 hours following an emergency.

Following the briefing, the group was led underground by Chief Sampson to see for themselves the 'nuts and bolts' of the EOC. He shared stories with the group, including the evacuation of the Calgary Zoo during the last major flood event.

Chief Sampson concluded the site visit with a tour of the command center with Deputy Chief Susan Henry, who demonstrated the many capabilities of the state-of-the-art Geographic Information System. She explained how social media can be used during times of disasters and showed examples on the video board using Twitter. She highlighted the collaborative approach to problem-solving that occurs in the center. The tour wrapped-up with Chief Sampson and Deputy Chief Henry answering questions from the participants.

Opening Remarks – Day 2

Constable Michaud welcomed participants back for Day 2 of the Roundtable and took the opportunity to acknowledge the volunteer groups who respond when disaster strikes. Drawing on his experience from the Calgary flood of 2013, he spoke about the challenges that the high water levels and debris caused to first responders in getting into the communities. Constable Michaud acknowledged the often-overlooked efforts of the farmers during the flood. It was thanks to their efforts and their equipment that the first responders were able to get into the communities quickly in order to save lives.
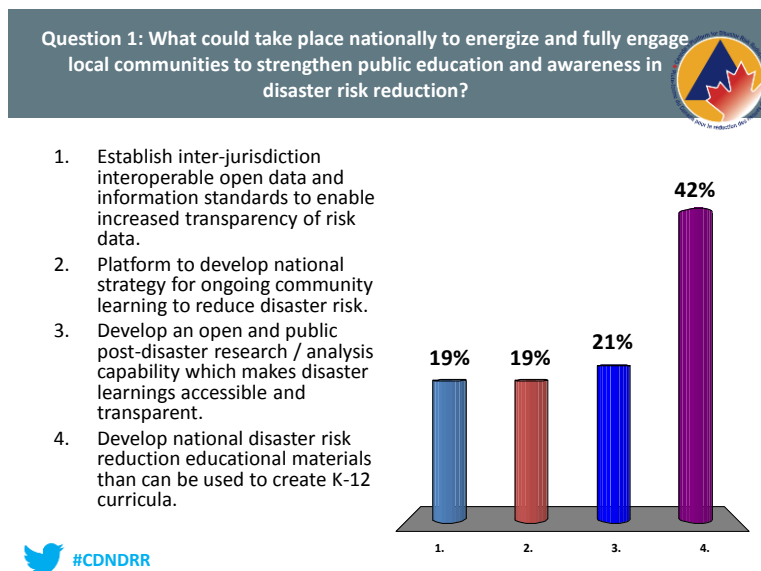
World Café – Voting Session and Results

At each table at the World Café there was a moderator and recorder. Key points from the participants were recorded on flip charts and placemats. Following the World Café, all of these points were reviewed and aggregated into the themes presented for voting on Day 2 of the Roundtable. By necessity, many points made regarding vulnerable or special populations, site or community specific actions were rolled up into broader, more generically-based themes for voting purposes. All of the recorded points are included in Appendix A.

Dr. Renée Gobeil, Manager, Research Unit, PS facilitated the voting session, which gave participants an opportunity to vote electronically using hand-held clickers on the theme that they felt was the most important area of focus for each priority in the Sendai Framework.

The results of the electronic voting session on the themes and priorities will be used to help shape Canada's domestic implementation of the Sendai Framework as well as the Consolidated Research Agenda (CRA). More information on the CRA can be found on page 26 of this report.

Here are the results of the electronic voting by Roundtable participants:

Priority 1: Understanding disaster risk.

Question 1: What could take place nationally to energize and fully engage local communities to strengthen public education and awareness in disaster risk reduction?

1. Establish inter-jurisdiction interoperable open data and information standards to enable increased transparency of risk data.
2. Platform to develop national strategy for ongoing community learning to reduce disaster risk.
3. Develop an open and public post-disaster research / analysis capability which makes disaster learnings accessible and transparent.
4. Develop national disaster risk reduction educational materials than can be used to create K-12 curricula.

#CDNDRR

1. 19%
2. 19%
3. 21%
4. 42%

Priority 2: Strengthening disaster risk governance to manage disaster risk.

Question 2: What steps could be taken at the national level that could support and empower local authorities to work and coordinate more inclusive disaster risk management approaches?

1. Simplify access to policies, legislation, and programs for accessing funds.
2. Develop a forum / portal to enable transparent access to disaster risk reduction information, resources, and tools.
3. Multi-jurisdictional development of guidelines for creative, representative, and respectful engagement across all steps of disaster risk reduction.
4. Greater, more creative, and more concrete communication, and facilitation of communication through the provision of tools and information sharing.
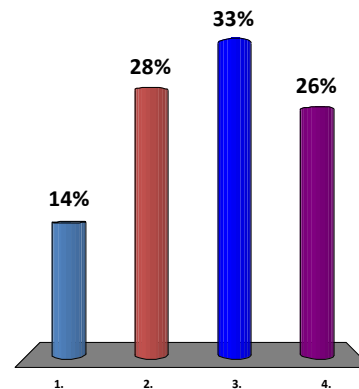
#CDNDRR

Priority 3: Investing in disaster risk reduction for resilience.

Question 3: What actions could be taken nationally to improve local understanding of disaster risk that might influence mainstreaming disaster risk assessments into land-use policy, developments and implementation?

1. Develop a federal funding mechanism to support incentives for businesses, homeowners, and developers to take concrete steps to retrofit or existing standards to increase disaster resiliency.
2. Develop national risk assessment and risk management principles, standards and guidelines for disaster risk reduction at the local level supported by national risk-based information.
3. Develop consistent minimum standards for mapping for floods, landslides, tsunamis, and other hazards.
4. Develop educational tools to encourage policy makers and elected officials to make risk-based land use planning decisions.
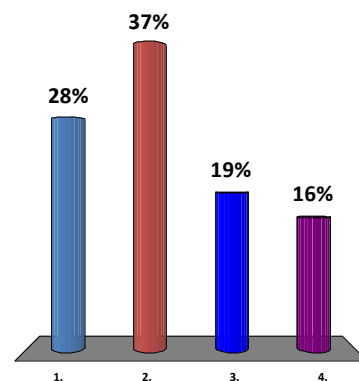
#CDNDRR

Priority 4: Enhancing disaster preparedness for effective response and to "Build Back Better" in recovery, rehabilitation and reconstruction.

Question 4: What actions (and by whom) could make the most difference in developing a fully participatory process for common national multi-hazard, multi-sectoral forecasting and early warning systems that are people-centred and community-accessible?

1. Develop guidelines for how to engage communities to mobilize public alerting and evacuation activities.
2. Develop and integrate multi-jurisdictional geo-physical monitoring and forecasting capabilities, for improved decision-making.
3. Conduct research into the most effective means of engaging non-traditional stakeholders in forecasting, early warning, and disaster risk reduction.
4. Conduct research to increase our understanding of how to leverage social media / social networks for disaster risk reduction.

#CDNDRR

24% — 1.
36% — 2.
23% — 3.
18% — 4.
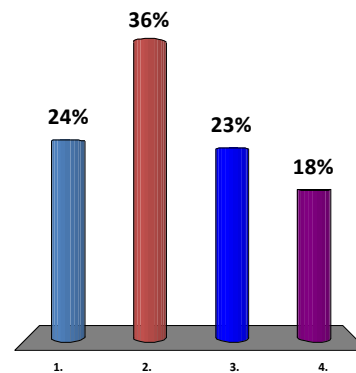
Panel Session: Disaster Risk Reduction is Everyone's Business

Moderator:
Kathy Le, CTV News

Panelists:
- Veronica Scotti, President and Chief Executive Officer, Swiss Re, Canada
- Richard Quail, Chief Administrative Officer, Town of Okotoks
- Sarah Sargent, Director of Programs, Disaster Management, Canadian Red Cross
- Duane McKay, Commissioner and Executive Director, Emergency Management and Fire Safety, Saskatchewan
- Lori MacDonald, Assistant Deputy Minister, Emergency Management and Programs, PS

Session Objective:
Provoke thinking and discussion regarding the need to change/evolve the DRR approach going forward. Government, emergency management organizations, policy makers, communities, and individuals will explore how each is contributing to the shift towards a whole of society approach to managing risks and consequences of disasters. A key element is the notion of shared responsibility and understanding what that means for different actors across Canadian society.

Highlights:
Kathy Le opened the session by noting the importance of events, like the Roundtable, that provide a platform for stakeholders to discuss ways that they can contribute to mitigate risks and manage disasters. She then introduced the panel that included a cross-section of key stakeholders and asked each panelist to provide an opening statement.

Veronica Scotti expressed her delight in participating in this discussion as a representative of the reinsurance industry. She briefly explained Swiss Re and the business of reinsurance and went on to mention three interlinked trends that are shaping the face of the world: globalization, urbanization and climate change. She underlined that 1.4 million people move into cities each week. Events like the Roundtable present challenges and risks that must be managed. With regards to the financial cost associated with disasters, Ms. Scotti noted the disappointing gap between economic losses and insured losses and noted that more preventative measures need to be put in place so that individuals and governments do not shoulder these high economic burdens.

She stated that dialogue with broad range of stakeholder, like this panel discussion, is essential.

> *"There is no easy answer. The dialogue is essential. Everyone has to chip in and do their best to actually contribute and to find solutions that are sustainable."*

Ms. Scotti highlighted some initiatives that Swiss Re is involved in around the theme of resiliency, including the *100 Resilient Cities*, of which Montréal, Quebec is listed.

Richard Quail began his statement by describing the town of Okotoks. He noted that "nature is the boss" and it is the job of the municipalities to make sure that they coordinate and plan in anticipation of natural events. He used the changing levels of the Sheep River, which runs through Okotoks as an example. Mr. Quail spoke about his experiences with the flood events and affirmed that the citizens of his community are aware and concerned about the risk. He stressed the importance of municipalities being recognized for playing a critical role in DRR through disaster planning units and front-line responders.

> *"Our citizens need to know that government - all levels of government are prepared, are properly planning and are aware of their needs and their issues. I want to emphasize the importance of all levels of government working together to make this happen."*

Duane McKay echoed the sentiments expressed earlier by saying that emergencies happen at the local level. He remarked that people are becoming increasingly dependent on all levels of government when it comes to disasters and that a coordinated approach to emergency management is needed. However, a cultural shift is necessary to make individuals more responsible and prepared.

> *"Anything that we can do to make individuals more resilient really assists the levels of government in moving their assistance forward."*

All levels of government must work together to have a solid coordinated response and mitigation programs. He underlined that individuals play an important role of building community resilience by being prepared for emergencies.

Sarah Sargent, as a representative from the voluntary sector, stated that disaster risk reduction starts at the community and individual level. The focus should shift from dealing with the vulnerabilities to identifying what our capabilities and areas of strength are. She noted that individuals and communities need to trust that the levels of government are playing their part in emergency management.

> "We can create and support and help maintain, but we need to ensure that everyone's playing their part."

She went on to acknowledge competing priorities and competition for resources when everyone is actively engaged in DRR. The challenge becomes facing these challenges through a holistic approach.

Lori MacDonald spoke about her experience with emergency management during the evacuation of Aboriginal communities affected by flood water. She acknowledged that PS is the national leader in emergency management, but highlighted that there are many partners that are involved before, during and after an emergency.

> *"We have to go to a whole of society approach in terms of how we manage risk and how we address that moving forward as a country."*

She noted the importance of never losing sight of the individual in the face of disaster. The decisions made by all stakeholders, ultimately have an effect on the individual.

After the panelists' opening statements, questions were put forth by the moderator as well as by the Roundtable participants. Some of the questions included:

- Within a whole of society approach, what is the shared responsibility, who shares the responsibility, how is it shared, and why is it important in creating a resilient society?
- How can we encourage individuals, public and private organizations to take a more proactive role in managing the risks that impact them and their communities?
- What are the biggest challenges/ barriers to pursuing a whole of society approach?

Generally, there was consensus from the panelists on the issues discussed. Many of the same themes arose throughout the discussion. The panelists built on the ideas discussed by their co-panelists and provided unique perspectives of the stakeholder groups they represent.

Here is a summary of the discussion and the key themes that emerged:

Theme:	Observations:
Shared Responsibility and Increased Collaboration	DRR is a responsibility that must be shared equitably amongst a broad range of stakeholders including federal, provincial and local levels of government, NGOs, Indigenous communities, the private sector, and individuals.
	DRR stakeholders need to work in tandem, rather than take a silo-type approach to governance. Greater partnership between all levels of government is the key to greater success in emergency planning. It is equally important that other key stakeholders (like NGOs, private industry, volunteer groups, Indigenous communities and individuals) be included at the table when establishing priorities, advancing initiatives, and coordinating efforts.
	If a broader range of stakeholders is included when dealing with disaster events, more resources can be tapped into when overcoming barriers that may arise during emergencies. This leads to more successful outcomes.
Knowledge and Understanding	Building DRR into the school curriculum can have a great impact on shifting the behaviours around emergency planning in Canada. Educating our youth will empower future generations to create a more resilient society.
	An equitable framework is essential for stakeholders to understand their roles and what they need to contribute in emergency planning, response and recovery.
	The effective use of social media is a cost-effective way to raise awareness and reach a vast audience.
	We need to not only adopt a 'lessons learned' approach, but we need to apply those lessons in order to minimize risks and build resiliency.
Transparency	Making research and data collection available to communities, urban planners and individuals demonstrates transparency. It also facilitates better-informed decisions that will ultimately lead to increasing resiliency in the ever-changing DRR landscape.
	Inclusion of a broader range of stakeholders in DRR discussions results in greater transparency.

Parallel Session 1: Using the Calgary Flood as a Case Study for the Application of Risk Based Land Use Planning and Flood Mapping

Session Chairs:
- **Dr. Laurie Pearce, Justice Institute of British Columbia**
- **Yvan Désy, Natural Resources Canada**

Presentation by:
John Conrad, Alberta Environment and Parks
Dr. Bert Struik, Adjunct Professor, Simon Fraser University

Session Objective:
Discussion on the Land Use Planning Guide and flood mapping in helping identify, evaluate, and monitor risks, and the lessons learned from the Calgary Flood.

Highlights:

After brief introductions from the Session Chairs, the group discussed the *Land Use Planning Guide* and flood mapping in the context of understanding risks. The discussion was punctuated with examples and experiences (by John Conrad) of the Calgary flood to better illustrate the points raised. Dr. Bert Struik, Adjunct Professor, Simon Fraser University, addressed the group about mitigating risks and provided a dynamic demonstration to emphasize his points.

Some points that were raised during the session include:

- Prior to 2013, few resources were allocated to mitigation initiatives, especially in areas not usually affected by disasters.
- Major risk factors in Alberta were heavy rain fall, snow etc.
- There was a question of who should be part of the hazard community.
- There is a need for additional resources in the areas of emergency geomatics, flood mapping, radar satellite imagery, etc.
- A need for a flood mapping technical working group was identified.
- Average response to flood events is longer than four months now and another challenge is ice jams.

Some key messages from the session are:

- There is a need to acquire topographic data on a very large scale.
- Hydrology and hydraulics modeling informed by climate change are necessary.

For those who attended the session, a printed banner was provided as a reference to the process of land use planning. It is included in this report as Appendix B.

Parallel Session 2: Youth, Disaster Risk Reduction and Resilience: Framing the Youth Agenda for Canada's Response to the Sendai Framework

Moderator: Robin Cox, Royal Roads University

Panelists:
- Michelle Marteleira, University of British Columbia graduate student
- Alexandra Preddy, Mount Royal University undergraduate student
- Kathryn Wells, Mount Royal University undergraduate student
- Roxy Trask, Mount Royal University undergraduate student
- Alex Christison, Mount Royal University undergraduate student
- Jithamal Caldera, University of Calgary graduate student
- Imogen Roulson, Mount Royal University undergraduate student

Session Objective:
Inclusion of youth voices, visions, and ideas in shaping Canada's response to the Sendai Framework and the national and global agenda for advancing disaster risk reduction and resilience. The dynamic youth-led discussion and activities are designed to identify priorities, principles and objectives for a youth-informed DRR agenda for Canada.

Key Questions: Why is it important to involve youth in an action strategy for Canada for the Sendai Framework? What action would be needed from youth perspective? What are their priorities?

The panelists spoke to a number of areas that are impacting and engaging youth on risk reduction. Issues that were raised include environmental change, bridging between generations, as well as the need to assure a strong future for all. Youth are already involved, engaged, informed, and opinioned on future decisions that are being made. Their right to influence these decisions but also to add new perspectives and think outside the box adds value to addressing risks. In addition, it was noted that youth influence younger age groups through peer groups. Policy must be inclusive of youth or it could leave gaps in the approach to managing risks.

Personal experiences were presented that emphasized the need for diversity in planning but also to build youth awareness, develop future leaders, and direction setters. An example was noted of Canadian Risk and Hazards Network, which has increased youth participation by giving youth voice, opportunity, and trust.

Break out groups discussed creating opportunities for youth to engage, particularly in terms of access to discussions including invitation, location, timeframe, and resources. Comments included: more efforts should be made to engage youth within their working and school environments; using social media would attract more interest from an age group with many competing issues, agendas and interests and that youth specific events on DRR in Canada could be one means as well as identifying other cultural events, identifying champions of interest, and using language and topics that will get attention.

Parallel Session 3: Fostering Trust-Based Relationships to Facilitate Enhanced Disaster Risk Reduction in Aboriginal Communities

Session Chairs:
- Dr. Brenda Murphy, Wilfred Laurier University
- Todd Kuiack, Aboriginal Affairs and Northern Development Canada

Key Participants:
- Terry Swan, Save the Children
- Irving Leblanc, Assembly of First Nations
- Melanie Goodchild, Canadian Red Cross
- Tom Littlechild, Siksika First Nation, Alberta

Session Objective:
To encourage participants to explore key opportunities for increasing disaster risk reduction amongst Aboriginal communities by sharing their own knowledge, experiences and expertise.

Highlights:

The format of this session was a talking circle, which facilitated open and inclusive conversation amongst the participants. After introductory remarks by the session's co-chairs, the key participants started by providing brief comments based on the perspectives of their respective organizations and personal experiences.

Some of the key ideas and opportunities that emerged from the conversation are:

- There are different kinds of trust, including bureaucratic trust and relationship trust. It is important to develop institutional connections for continuity and succession planning so that when people change roles, the relationship does not need to be continuously rebuilt.
- Communities develop mistrust when faced with bureaucratic 'run around'. Agencies need to work together to better identify their roles in emergency planning and disaster events.
- Greater consultation needs to happen on a nation to nation level as well as with Elders and community members. The 'one size fits all' approach to developing DRR solutions across First Nations communities does not work and leads to mistrust.
- Building trust takes time. It is important that relationships with communities are fostered over the long term and not just during emergency situations.
- There is a lot of useful information presented at events like the Roundtable. This information does not always make its way into our First Nations communities. Increasing participation by Elders would help to bridge relationships as well as to ensure that information is disseminated more widely.
- Building new and expand existing DRR networks to include communities from all areas of Canada to share knowledge, best practices while maintaining cultural safety is key in building trust.

Talk Show: Building Back Better – An Essential Aspect of Recovery

Moderator: David Grimes, Assistant Deputy Minister, Environment Canada

Panelists:
- Dr. Robin Cox, Royal Roads University
- Paul Kovacs, Institute of Catastrophic Loss Reduction
- Craig Stewart, Insurance Bureau of Canada
- Philip Rizcallah, National Research Council Canada (NRC)

Session Objective: *Building Back Better (BBB) is not only an essential aspect of recovery but is directly connected to the prevention and mitigation of future risks and consequences. Successful recovery must be holistic and include investments in the repair and rebuilding physical structures as well as addressing the psycho-social impacts of disasters on individuals. This session will seek to present different considerations for how to build back better spanning topics such as urban planning, mental health and financial tools and resources.*

David Grimes, as moderator, introduced the panel members and shared with the audience his experience in participating in the final stages of the adoption of the Sendai Framework and the Third Global Platform. He noted that it was at the Global Platform he heard the term "building back better" for the first time, where the Japanese Prime Minister spoke about the concept of BBB and used the experiences of major disasters that have affected Japan to illustrate this concept. Mr. Grimes highlighted the social dimension of BBB and the trust that the Japanese citizens put in their government to ensure that their families are taken care of.

The panelists provided their unique perspectives on BBB during the discussion. The issue was examined through different lenses such as those of the private industry, scientific research, social research, and regulatory authorities. The following key themes emerged.

The Economic Impact of Disasters:

The Sendai Framework sets out as a priority the need to develop fiscal resiliency. This involves predicting the financial impacts of significant catastrophes and planning for them well in advance of the disaster event. To help emphasize the importance of building fiscal resiliency, the possible fall-out of a major earthquake was described. For example, there is a 30% probability that Vancouver will suffer a major earthquake sometime within the next fifty years that would be powerful enough to buckle highways, destroy shipping terminals and severely damage the airport. Since Vancouver is a major economic gateway, the financial devastation would be far-reaching and the economic strain would be significant. Since research exists to better predict disasters, it is important to be fiscally prepared to reduce strain on resources and businesses.

The economic case for resilience is strong during the initial building and re-building phases. The example of backwater valves was presented to illustrate this point. To prevent sewer backup during a flood event, a backwater valve at a cost of $200.00 can be installed during the initial building phase. This is a very affordable solution that can significantly reduce the monetary damage caused by residential floods.

The importance of updating building codes was highlighted as a way to increase resiliency and reduce the financial impact of disasters. When building codes are reviewed, the baseline for the minimum standards usually increases. A balance needs to be struck between resiliency and practicality. Although science and engineering exist to build structures that can withstand any event, building codes need to be practical and affordable.

The Psycho-Social Impact of Disasters:

There is a sense of urgency after a catastrophic event to move forward and to rebuild so that people can return to their normal lives. The focus tends to be on rebuilding the physical infrastructure, while the psycho-social aspects are often overlooked. It was suggested that in order to "build back" effectively and be better prepared for future events, we need time to slow down and to reflect. When rushing to pick up the pieces and rebuild after an event, we risk rebuilding things the same way as before the disaster. Careful thinking about rebuilding from the inside out is of utmost importance.

Individuals:

Everyone agrees that in a disaster situation, it is the individual that is most affected. When implementing BBB strategies, the focus needs to be on people first. Many think of BBB as kicking into gear after a disaster strikes. However, it was suggested that the concepts of BBB and resiliency need to happen long before a catastrophic event. We must ensure that individuals are included at the table when planning strategies for resilience building. We can no longer make assumptions on what will work. This is especially relevant considering the uniqueness of every community and every situation they face.

Partnerships:

Establishing partnerships, ongoing consultation, and communication are necessary before, during and after disasters. An example of partnerships relevant to building codes was explained by NRC. NRC consults widely with provincial regulators, industry professionals and the general public when amending building codes. There are opportunities to build on this model, to create new linkages, and to strengthen existing partnerships with DRR stakeholders. Effective partnerships and inclusive dialogue amongst the DRR community will foster innovative solutions to build back better. The outcome will be more resilient and better prepared structures, communities and people.

Consultation Session: Innovation and Research

Session Chair: Dr. Mark Williamson, Director General, Defence Research and Development Canada – Centre for Security Science (DRDC CSS)

Speaker: Matthew Godsoe, DRDC CSS

Facilitators:
- Dr. Simona Verga, DRDC CSS
- Dr. Renée Gobeil, PS

Session Objective: *To develop, and consult on a consolidated national research agenda on Disaster Risk Reduction. This consolidated research agenda will serve to advance a more coordinated approach to the research and innovation work, not only within the Platform, but across the broader DRR community. It will also help inform the science and technology requirements for a range of research, science, technology and innovation partners, such as the Canadian Safety and Security Program (CSSP).*

Context: Before the Third Global Platform held in Sendai, Japan in March 2015, Canada and its global partners devoted significant energy to better understand the success and shortcomings of the UN 2005-2015 Hyogo Framework for Action. A major theme which emerged through this analysis was the centrality of Science and Technology at the core of disaster risk reduction activities. In recognition of this theme, the UNISDR commissioned Reid Basher to complete a discussion paper entitled *Science and Technology for Disaster Risk Reduction: A review of application and coordination needs*. This report summarized the importance of science and technology as follows:

- The task of managing disaster risks and disaster events is necessarily dependent on scientific knowledge and evidence-based technique.

- It would be impossible to deal with earthquakes, for example, without understanding where and how the Earth's crust moves and buckles and how different building materials and structures react to the shockwaves that result. Earthquake resistant buildings depend on proven methods of design and construction.

- Equally, it would be impossible to implement disaster risk reduction measures and achieve increased resilience of communities without knowledge of the social factors and cultural setting of the affected society and without use of social sciences concepts and tools.

- The public generally expect their leaders to take steps to reduce the threat of disasters, through sound policies and investments. Neglect of scientific knowledge and technology can cause great loss of life, severe property losses and potentially far-reaching economic and political consequences. This was sadly shown in the overtopping of dykes and flooding of New Orleans in 2005 during Hurricane Katrina and in the crisis in Japan in 2011 when the Fukushima Daiichi nuclear power plant failed after the Tohoku earthquake and tsunami.

- A growing concern for all countries and people is the increasing scale of disaster occurrence and disaster impact globally over the last fifty years. Poverty, conflict, food insecurity, scarce water supplies, air pollution and industrial risks together exacerbate

the risks of disaster. In addition, climate change is already occurring and is likely to make matters worse, through more extreme conditions and greater vulnerability of populations.

Many countries have achieved sustained reductions in risk, for example through systematic risk assessments, land use controls, flood management schemes, building codes and their enforcement, hazard monitoring and warning systems, and public education.

However, the evidence worldwide points to continuing shortcomings in how disaster risk is recognized and managed in practice. Among the underlying causes is an inadequate appreciation of the potential of science and technology to cut risk and losses. Many fields of sciences and technology are important to understanding and reducing disaster risk, including the natural and social sciences and various applied sciences. A major challenge is to coordinate and integrate their potential inputs to produce the comprehensive knowledge and practical tools needed to routinely manage and reduce risks. (Basher, 2013)

Background: Canada's Platform for DRR has also recognized the need to improve the development and integration of science and technology into DRR. As such in 2010, Canada's Platform established a Science and Technology (S&T) working group to identify gaps in Canada's research and knowledge based for DRR and to leverage collaborative work to address these needs. Although S&T Working Group has been inactive recently due to competing priorities and resource constraints; significant work on DRR related research has been undertaken by other Platform working groups which are more closely positioned with partners implementing disaster risk reduction policies and measures.

In an effort to reinvigorate the S&T Working Group and to better serve the needs of the Platform's working groups, DRDC CSS and PS chaired a plenary session at the 2015 Roundtable on research and innovation. The objective of this session was to develop a consolidated research agenda for Canada's Platform for DRR which would reflect the work of the Platform Working Groups and serve as a renewed focal point for the activities of the S&T Working Group.

Methods:

This participatory session invited Roundtable participants to provide feedback on research gaps and priorities in response to the new UN Sendai Framework for DRR and on the themes which emerged from the World Café and voting sessions. Participants were provided with context about the objectives of the session and then the following themes from the voting session were presented:

1- Develop national DRR education material that can be used to create K-12 curricula.
2- Develop a forum/portal to enable transparent access to DRR information, resources, and tools.
3- Multi-jurisdictional development of guidelines for creating, representative and respectful engagement across all steps of DRR.
4- Greater, more creative, and more concrete communication, as well as facilitation of communication through the provision of tools and information sharing.
5- Develop national risk assessment and risk management principles, standards and guidelines for DRR at the local level supported by national risk-based information.
6- Develop and integrate multi-jurisdictional geophysical monitoring and forecasting capabilities, for improved decision making.

Participants were then assembled into groups around each of these themes, based on personal interest, and asked to consider the following in relation to their selected theme:

1. To identify the research and knowledge gaps related to their selected themes (i.e. missing data, methodologies, technologies, studies, expertise etc.).

2. To identify existing or complimentary work already done in the past on these thematic areas.

3. Recognizing these gaps, and the work that has been done to date, what are the most important research and knowledge activities required to support our work over the next two-years?

Each group then used flip charts to document their discussions, and results were presented back to the plenary group. After the session, facilitators from DRDC CSS and PS transcribed the data from the flip charts, which was entered into a qualitative research software program in order to identify common, cross cutting research and knowledge priorities and activity areas.

The four research priority and related activity areas which emerged from the discussion make up the draft Consolidated Research Agenda for Canada's Platform for DRR, and are represented in the table below.

Findings - Consolidate Research and Innovation Agenda 2016-2018:

Goal:	Activities:
1.0 Develop and launch a Central Information Hub (CIH) to enable Platform members and working groups to collaborate and share information related to funding opportunities, best practices, and ongoing research.	1.1 Work with partners such as PS, DRDC CSS, and CRHNet to develop a centralized web presence for Platform members and working groups.
	1.2 Consult with the Platform to establish draft roles and responsibilities for the administration and content maintenance of the CIH.
2.0 Develop and distribute national level guidelines for risk and resilience assessment.	2.1 Facilitate linkages between the ongoing work of PS and DRDC CSS to create a national risk profile, and Canada's Platform for DRR.
	2.2 Support the integration of the National Risk Based Land Use Planning guide and process into best practice guidance for risk and resilience assessments
	2.3 Propose the inclusion of risk/resilience assessment related priorities into national research funding programs, such as the Canadian Safety and Security Program Call for Innovation.*
3.0 Develop and implement a common, and freely available, methodology to uncover the root causes of disasters through in-depth investigations that go beyond the typical reports and case studies conducted post-disaster events.	3.1 Support participation of Canada's Platform in the Integrated Research for Disaster Risk work moving forward, including in the FORIN disaster forensic investigation project.
	3.2 Propose the inclusion of disaster forensic/root cause assessment methodology development and implementation into national research funding programs, such as the Canadian Safety and Security Program Call for Innovation.*
4.0 Expand and improve the integration of children and youth into DRR.	4.1 Engage youth in the development of Canada's implementation planning for the Sendai Framework for DRR
	4.2 Support the recognition of youth leaders and innovators in DRR
	4.3 Propose the inclusion of children and youth empowerment action research into national research funding programs, such as the Canadian Safety and Security Program Call for Innovation.*

* NOTE: proposing priorities does not guarantee their inclusion in any research funding programs.

Next Steps:

The Consolidated Research and Innovation Agenda (CRIA) developed at the Roundtable is the first foray to better coordinate and support relevant activities across the Platform's members and Working Groups. As such, in the coming months, there will be the opportunity for a broader conversation on the Agenda, and also the chance for those who were potentially not present at the 2015 event to contribute goals and activities. The structure and progress of the CRIA will be reported upon at the 2016 Roundtable.

Post Roundtable Consultation

Dr. Renée Gobeil, Manager of the Research Unit, PS, facilitated a consultation session with the remaining participants on Day 2 of the Roundtable. Questions were posed by Dr. Gobeil to the group with the goal of extracting their feedback. Participants answered questions using an electronic voting system. They also had the opportunity to shout out ideas for future themes, topics and session formats. Dr. Gobeil thanked participants for their feedback during this exercise. The Roundtable organizers are analyzing the results and will incorporate the feedback in order to plan successful Roundtable events in the years to come.

Concluding Remarks

Jacqueline Randall, Director, Strategic Policy, PS, provided the closing remarks. She thanked all stakeholders who attended this year's Roundtable for their active participation and rich discussions on the dynamic issues that were explored.

She gave a special thanks to each of the members of the Advisory Committee for their continued dedication and work leading up to the Roundtable and to Constable Jean-Philippe Michaud who performed the Master of Ceremonies duties over the day and a half event.

Ms. Randall thanked the distinguished guests, including Margareta Wahlström from the UN. She explained that Ms. Wahlström was scheduled to address some 30 Assistant Deputy Ministers from across the federal government at a special meeting in Ottawa on November 4, 2015. She acknowledged how fortunate we were to have the opportunity to learn from Ms. Wahlström who has so much knowledge and experience in the area of DRR.

Special thanks and recognition were also conveyed to:
- The moderators, panelists and presenters of the Roundtable sessions;
- Tom Sampson of the Calgary Emergency Operations Centre; and
- Colleagues from PS, DRDC, Environment Canada, Natural Resources Canada, the private sector, and NGOs, who played an important role in organizing and helping make the Roundtable a success.

Ms. Randall concluded by expressing her desire to seeing everyone at the Seventh Annual National Roundtable on DRR to be held in Montréal in 2016.

Looking Ahead to 2016

Elections will be held in 2016 for 4 positions within the Advisory Committee. A call for nominations will be sent out to the Membership in advance of the Roundtable. The elected positions are for a two-year term. Details on the membership of the Platform Advisory Committee can be found at the end of this report.

_____

Special thanks is offered to contributors supporting the organizing committee of the
Sixth Annual National Roundtable on DRR

Constable Jean-Philippe Michaud (Master of Ceremonies)
Elder Leonard Bastien, Blackfoot Confederacy
Margareta Wahlström, United Nations
Chief Tom Sampson and Deputy Chief Susan Henry, Calgary Emergency Operations Centre
CRHNet Symposium Planning Committee

The Advisory Committee - Background

Canada's Platform Advisory Committee is composed of representatives from six organizations, who hold permanent organizational membership seats, and four rotating members elected by the membership of Canada's Platform. The Advisory Committee is co-chaired by two Advisory Committee members; Public Safety Canada and a second co-chair elected from within the Advisory Committee.

To enable horizontal collaboration, the Advisory Committee strives to fairly represent the following sectors: private; public; Aboriginal; academic; community; non-governmental; faith-based organizations; and professional/industrial associations.

Advisory Committee Tasks and Activities:

In support of the development and implementation of Canada's Platform for Disaster Risk Reduction, the Advisory Committee:
- provides advice to Canada's Platform on the direction and priorities for disaster risk reduction;
- approves an Action Plan for the Platform;
- hosts an annual National Roundtable event, which brings together the Platform's general membership; and
- approves an annual report.

Guiding Principles:

The following principles will be used to guide the activities of Canada's Platform Advisory Committee:
- ensure that respective organizational accountabilities and mandates are respected;
- operate on a consensus basis;
- commit to meaningful and effective dialogue, consultations and communication;
- commit to the notion of inclusiveness of potential DRR stakeholders; and
- commit to multi-stakeholder representation within the Platform.

Current Advisory Committee Membership:

- **Public Safety Canada** (Stéphanie Durand, Co-Chair)
- **Federal-Provincial-Territorial Senior Officials Responsible for Emergency Management (FPT SOREM)** (Michael Templeton, Government of Yukon)
- **Canadian Risk and Hazards Network** (Marion Boon)
- **Domestic Group for Emergency Management (DGEM)** (Jeff Gill, Canadian Red Cross)
- **Federal Directors General Emergency Management Policy Committee** (David McCormack, Natural Resources Canada)
- **Critical Infrastructure National Cross-Sector Forum** (Francis Bradley, Canadian Electricity Association)
- **Elected Member** (Ian Burton, Emeritus Professor, University of Toronto)
- **Elected Member** (Laurie Pearce, Royal Roads & JIBC)
- **Elected Member** (John Saunders, International Association of Emergency Managers-Canada Council)
- **Elected Member** (Rodney Yip, Co-Chair, Retired from IBM)

Appendix A

Participant Input from the World Café

Priority 1: Understanding disaster risk.
Question 1: What could take place nationally to energize and fully engage local communities and citizens to strengthen public education and awareness in disaster risk reduction?

Q1	• Need space for communities to identify what methods and tools are needed in order to then bring in support.
	• Measure impact/response:
	- to know if effective - has behavior triangulated?
	• Role for funding
	• DRR philosophy – breaks down and shows how to do it.
	• Need more outside emergency management – about people.
	• What to do with information? Challenge how to triangulated behavior (education does not equal action).
	• Need stick in some cases – difficult.
	• Who communicates disclosure of red estate risk?
	• Need understand and act on risk – need culture.
	• Community resilience equals responsibility e.g. land use planning.
	• Share risk information – help?
	• Communicate information.
	• Consider cultural approaches/values.
	• Also communicate community/cultural and local needs for planners.
	• Messaging customized to community needs.

- Schools: skills that need to be learned – 5th grade home assignment.

- Environmental Sciences – Explore risks (emergency management + homeland security, risk awareness curriculum – US).

- B.C shakeout exercise – national! – a day where there are numerous exercises for different events.

- People with no children – do not hear about EM initiatives.

- Public accessing MSAS/with content to manage fear.

- Re-balance risk between private and public sectors/manage expectations.

- Take "fear" out of preparedness.

Risk assessment at local level (quantified environmental scan)
- Risk assessment:

  - National
  - Provincial
  - Municipal
- School information.

- People internalize information.

- Sensitizing events – people listen.

- Insurance discounts – register for EM planning course.

- Exploited vested interests.

- Dutch or German model?

- Risk management part of process when building – mandatory.

- Need to target messaging to professionals (e.g. engineers, architect, urban planners, etc.).
- Use national level organizations (e.g. FCM, AFN, to deliver messages and P.A.).
- Use simple messages (e.g. fire drills in school = FM planning).
- Give communities a greater sense of ownership over programming.
- Use celebrity to get message out (e.g. UN program with Philippine Boxer).
- Local run volunteers' teams under a national; standard (e.g. GSAR).
- Use community associations.
- Platforms to share accomplishments and celebrate national success.
- Use disaster event to get out messages.
- Message that is appropriate to the audience in plain language.

	- Messaging that includes local metrics. - Need to better understand what motivates behavior change. - What dies PSC do for Canadians? Need to define/articulate its mandate. - DRR curriculum for youth. - More emphasis on pro-active. - Language/dialects – need messaging in more languages that reflect community. - Use of symbols vs. metrics (e.g. "20L" vs pictures of gas cans).
	- Sharing available resources. - CERT Program in Canada. - Local initiatives that can be shared nationally. - Take advantage of "events" to promote and educate. - Greater profile for emergency management week. - Focus on community rather than national level. - Proactive inter jurisdictional dialogue. - Generation and access to risk info at community level. - Translation of national programs to reflect local/community flavor. - Targeted Messaging. - PA through youth/schools. - Brownie Badge. - Boys + Girls Clubs. - Different Media (social media, multi-media, disaster app for local communities). - Tangible products (e.g. 72-hour Kits). - Who can we learn from? (Lessons learned from other jurisdictions). - Involvement of various sectors in developing messaging. - Involvement of celebrity and arts.
	- Partner education system to have behavior triangulation. - Develop school curriculum (e.g. emergency preparedness and resiliency, first aid). - Lessons learned: Important to document and maintain. - Transfer lessons learned need to be used. - Incorporate into training -Into school program. Welcome package for community - Awareness, hands on kit - Role for insurance incentives - Disclosure for home sales/purchase - Ontario High School volunteer hours - Challenge psychological resistance to share traumatic experience - Workplace "certification" e.g. American Red Cross - ISO workplace health and safety - CSA 1600 – emergency preparedness - Workplace disaster and resilience courses/training - National associations' emergency/ local government - Professional – Need to be engaged - Need regional approach – E.g. not stop at municipal boundary - FCM role – need more effectiveness, improve cooperation of institutions

	• Role codes/standards etc. e.g. fire • Role insurance/DFAA - $ incentives • High risk areas • Show business case for action • "Culture of passing along stories" e.g. notch in tree visual helpful

	Non-traditional communication
	    • e.g. on bills provide info and/or link
	
	Award prepared community – MB – large and small
	    • Sign recognition
	    • Media
	    • Self-assessment first and learn from process
	
	Share across regions lessons learned
	    • Maybe partner for emergency response
	
	How to define community? Need to cluster (e.g. NGO, immigrant)
	
	Need to target group and approach
	    • Peer to peer networking
	
	Work with organizations with network and experience
	
	Visualization tools (e.g. triangulate water level – use predictive tool and communication tool)
	
	Systemic barriers to share info
	    • Risk share info?
	
	Challenge speaker in language
	    • i.e. Not DRR, not meaningful local and connect to individual
	    • Education risk and risk avoidance
	    • Emergency vs disaster
	    • Make real e.g. Analogues
	
	Role regulations/standards

• Positive messaging – people more receptive (e.g. "invest in yourself" vs. "protect yourself"). • People need to see benefits in the short-term, medium to long term. • Collaboration with private sector (e.g. real estate, finance). • Need to capture and share the stories so that we better appreciate the depth and complexity. • Need to do more with psycho/social aspects.	

Priority 2: Strengthening disaster risk governance to manage disaster risk.	
Question 2: What steps could be taken at the national level that could support and empower local authorities to work and coordinate more inclusive disaster risk management approaches (e.g.: with civil society, communities and indigenous peoples and migrants)? Keep in mind the need to strengthen comprehensive public and community consultations composed of relevant stakeholders at the national and local levels.	
Q2	• More information/ communication to include risk assessment • Greater openness to new mitigation • Standards of practice for engagement • More sustainable engagement • Alternative measures of progress • Learning from past lessons e.g. people like to start things, lack of continuity Going to get people to get them engaged • Brookings insulites humans rights • coercive policy regulation Good grassroots ideas move forward • Government regulations • Lack of respect of local issues • Credibility for voices at the bottom
	Information cleaning house • Means to push information out • Newsletters/workshops • Art theatre options] • Reinforcing local importance • Respect authority/ build trust • Expedite release of post disaster funds • Community input • Standards for coloration in order to build accountability for governments Key words • Bottom up • Human rights • Respect for voices of marginalized • National risk assessments
	• Getting to different sectors of the population in creative ways and to sync • Risk assessment information needs to be scientifically credible and have standards which will build trust and balance • Be part of framing the problem or communities may not trust • The scientific evidence will make info + actions more transparent e.g. area dam removal to remediation instead • Special Ontario roles + responsibilities + accountabilities • \$ → Thorough legislation at national level to achieve needs and have a huge multi-level Ontario court • Do science properly with involvement + communication

- Citizens want to be informed/involved
- 2 early engagements can be challenging for citizens to see what the choices are e.g. conceptual arch, renderings can be difficult to visualize

- Use more visualization tools
- Post more risk assessment + more options to help see options to go forward
- Challenge for local governments regarding how to harness the public input/info/will
- Strategy → local government task force
- Lots of education to help set police to drive mitigation decisions
- Effective buffer (task force) e.g. science, layaways, financial, etc. as advisors to task force in government + broader constituents
- Present info/options in meaning terms e.g. 1% tax increase for DRR activities
- Harder for constituents to visualize soft mitigation options especially after a disaster event
- Important to be productive also important to be reactive i.e. protect after an event
- UDAR info + standards for minimum of hazard mapping

- Scientific capacity at national level to allow federal scientists to work more locally/work with e.g. national earthquake risk assessment
- Enhance platform/tool
- One platform that others can use/adapt
- Provide link science expertise + local knowledge
- Tool is part of the process
- Citizens involved in identification of community assets e.g. via map
- Have conversations to identify capacities recent in communities/citizenry i.e. Volunteer
- Canadian families → "Canada is our home e.g. our life in Canada visual book multi lingual/different types of families/rich picture e.g. platform of initiatives → showcase families, communities, local governments tools we use problems we have + solutions we have tried "tool box"

- Partnerships:

  -Multi-stakeholders
  -Processes (protocols)
  -Political Will
- Community (will)

  -Education
  -Awareness
  -Youth
  -Leaders/Champions
- Resources

  -$ from all levels
- Communication (meaning, decision)

  -Communication Structures

	-Social Media < > trust, panic -Mobile tech -Sirens -Media • Technology (Scientific, Government, Institution, Community) -models -forecasts -visuals
	1. Communication 2. Engagement approaches 3. Legislation and other approaches 4. Knowledge mobilization 5. Empowerment (Aboriginal) 6. Risk assessment 7. Government roles • Providing local communication tools • Greater openness to new mitigation • Standards of practice for engagement • More sustainable engagement • Alternative measures of progress • Learning from past lessons • Standards for collaboration in order to build accountability • Creative engagement strategies • Engage and communication as part of scientific process e.g. creative communication • Information cleaning house → push info out • More info/communication • Database/index of responses • How to tap into data and develop strategies before hand • Turn knowledge into action • National risk assessment • Risk assessment info needs to be seen as credible and have standards • Obtain money through legislation • Scientific capacity at federal level • National risk maps • Long term risk profile monitoring • Coercive policy regulations • Expedite release of post disaster funds • Increased accountability for government • Transparency be involved • Need incentive to BBB • National DRR legislation • Credibility for local bottom/respect

	• Voice → meaningful and representative consultation • Enforcing local importance • Respect authority/build trust • Community input • Challenge for local government to harness public input info and will • Link scientific expertise and local knowledge • Explicit roles and responsibilities need multi- level coordination
	• Connections with school curriculum • Database/ index of resources • Ci assets e.g. toolbox/ platform for local authorities and how do other cases fit to our situation • In large cities in particular having consultations can be costly, but we need to have meaningful + representative consolation however this is intensive in $, time, and HR intensive. • Solutions → video streaming, podcasting, webinars, moderated in person at various sites e.g. imagine Canada tamarack
	• Science based of hazards • National legislation (model from UNDEE must be adhered to by provinces, territories, federal, and municipal • Support resources • Rights including stakeholders in development of policy • Build relationships with all • Indigenous relationships in Canada • Dialog limited to AANDC/AEMC • Aboriginal people + vulnerable population • Aboriginal people having strong family connections
	• Policy legislation "AANDC" Inuit removed • First nations provinces – Federal Risk are federal responsibility (national risk maps = Geo hazard, climate change) • Relationships are key → consult at all levels with neighbouring areas when planning flooding etc. • National/nation discussion lacking • 2011 flood people still displaced (1800) 5% dying since • Aligning processes/ resources to mitigate and respond
	• Insurance affordable for many but not all • Role of banks ICMAC • Providing local communities with tools to enhance communication/collaboration/engagement • How to get messages out? Through associations, churches, • Tools to identify stakeholders in communities building back better • Building back better vs building the same • Incentive required to BBB • Where our research agenda is need to put knowledge into action • How to tap into data and develop strategies before hand

	• National Seismic Hazard → fear monger • Better coordination/ communication when planning sponsored refugees • Work collectively • Funding issue/ brings competition • Change • Needs a marketing campaign that is community driven "investing in yourself your family/community • It's not going to happen to me • Lessons learned → not shared • National system for sharing risk information • Education/ certification at national level • Basic EM courses at colleges • Causes/consequence/risk

Priority 3: Investing in disaster risk reduction for resilience. *Question 3: What actions could be taken nationally to improve local understanding of disaster risk that might influence mainstreaming disaster risk assessments into land-use policy, developments and implementation?*	

Q3	National/Provincial
	    1) Relate Sendai
	
	    2) Tools (working groups)
	
	Forecasting
	    - 1 – 150 year flood
	
	    - 1 – 63 year flood
	
	Set of tools (wide number)
	    - Education in use of data collection
	
	    - A lot of data we don't collect (national, provincial, local registry of hazards data).
	
	Local
	    - Knowledge transfer
	
	    - Translation
	
	    - Dialogue between working groups and local.
	
	    - Target audience
	
	    - Education of local politicians
	
	    - Build flexibility into land use
	
	Individual

- Don't know what data is?

- How the individual relates to DRR through actual stories and different perspectives

- Duplication due to lack of awareness → track existing resources → people, knowledge, equipment (sharing of knowledge)
- Promote dialogue between fire halls/business on businesses of the risks they focus on
- Introduce risk experts in university cross pollination
- All provinces and municipalities get together, need to spend money to build lower risk standardization
- Address the risk management cost implications cheapest is not the best
- Define risk management
- Royal roads study -$ saved by measures taken economic development and civic planning
- Teaching the business of disasters

- Grassroots at community level – to discuss strategies to reduce, prepare for, physical + psyche and emotional impacts
- Changing culture – the way forward is not continuing to do "what has always been done" e.g. daycares needed to rail roads do not need to build in river for transportation
- Personal consequences more impactful in times past though about all the risk because they were yours to bear
- Municipalities need to be masters of land use
- Different ways to engage on risk preparedness taking pride in how your house is built how prepared you are and use social media + gaming for this
- 1st your urban planning and engineering must include DRR
- Early support following disaster
- Local residence knowledge do not look only at books but actually converse about it
- Interdisciplinary expectations – university level to work on DRR

- Kyoto – climate change
- Could Sendai – emergency preparedness and call all people, government, groups to action → needs to be branded
- Marketing campaign – drum beating
- Incredible marketing campaign for BBB
- Zombie apocalypse – preparedness
- Gamification – making it fun
- Checklist
- Businesses are buying weather info to know what to promote, what will people buy could the stores have checklists like they do for school supplies?

- Engineering association to fund public education initiatives
- Find an education model in the grass roots and share it out add on to existing curriculum
- Create modules on the 72-hour kit shelter in place
- Schools/businesses to have increased legislation in terms of risk readiness/preparedness

	- Changing culture – safety focused, reducing risks - National fire prevention week, model country wide revitalized EM week, not to campaigns, but provide learning kit to schools having people by facilitating directly - National sharing forum concerning what programs are out there
	- National input to encourage business promotion of EM, need some cash influx, national logistics centre government run + partners - Food security – should there be mandated min amount of food, medical supplies - National level – need a national research that provides trustworthy info like FEMA, and translation of knowledge to action hazardous evaluations, most common outcome, what should the community be doing - Developing tools – trigger touch points e.g. evacuating a hospital when, who, - Aggressive social marketing
	- Federal/ provincial – big picture science to describe global/ national context - National standards/ legislation/ registry of all built assets and their exposure to hazards - Municipal locality – translate into land use planning, every municipality different in expressing land use - Challenges: - Funding - Regulations - Ongoing curriculum in DRR for land use planners, must educate through schools on DRR - Resource allocation among hazards
	- National flood maps - Other tools – economic risk for a specific location- website - Land use (municipal) tool kits - Best practices handbook listing best ways to incentivize municipalities to mitigate - Youth education tool kits for schools - Celebrity/arts communicate message - Educate through faith community + service associations - Post-secondary curriculum development - Support collaboration between first nations and municipalities for e.g. first responder and sharing best practices for training and drilling/ lessons learned
	- Ownership incentives – financial e.g. DFAA % - Encourage local communities to identify the risks - Feds share their data - Property purchase search dataset for risk similar to legal search - Dissemination tools easy to understand data - Public education including schools - Community mitigation liaisons for capacity building
	Local Understanding of Disaster Risk: - Duplication due to lack of awareness. Track existing resources and share knowledge – people, knowledge, and equipment. - Promote dialogue between businesses (i.e. fire halls) of the risks they focus on. - Introduce "risk experts" in university – cross pollination

	- All provinces and municipalities together need to spend money to build to lower risk. – Standardization. - Address the risk management cost implications – cheapest is not the cheapest - Define risk management - Royal Roads study – money saved by measures taken - Economic development and civic planning - Teaching the history of disasters
	- Engineering associations to fund public education initiatives - Find an education model in the grassroots and share it out – add on to existing curriculum - Create modules on the 72-hour kit and Shelter-in-place - Schools and businesses to have increased legislation in terms of risk readiness and preparedness - Changing culture – safety focused, reducing risks 'National Fire Prevention Week" model country-wide. Revitalized EM week National campaign. Provide learning kit to schools. Have people and organizations facilitate directly - National sharing forum concerning what programs are out there 211, 311, 411 – Social Media Campaign (door hangers, common messaging used by police, paramedic, fire
	- National input to encourage business promotion of EM – need some cash influx – National Logistics Centre - run by government and partners - Food security – should there be mandated minimum amount of food, medical supplies legally required - National level – need National research that provides trustworthy info (like FEMA) and translation of knowledge to action. Hazardous evaluations. Most common outcome – what should the community be doing? - Developing tools – trigger touch points (evacuating a hospital – when, who) - Aggressive social marketing
	- Government website - Media - plan for what people do - Education - Industry - Psychology of humans in disaster situations - Ripple effects of trusted sources - Community based organization - NGO - FBO - Other Countries (Cuba, Haiti, Chili)

Priority 4: Enhancing disaster preparedness for effective response and to "Build Back Better" in recovery, rehabilitation and reconstruction. *Question 4: What actions (and by whom) could make the most difference in developing a fully participatory process for common national multi-hazard, multi-sectoral forecasting and early warning systems that are people-centred and community-accessible?*	
Q4	- Engagement of diverse populations (e.g. youths) - Communication strategies for citizens who are not fluent in English - Individual preparedness – but some may be challenged to be individually prepared - Education process – school kids, communication - Local governments have key role - Information from authorities – translating information in ways that are clear/accommodation - Non-verbal communication - Clarify role/focal point - Technical solutions (high/low tech) usable by many stakeholders (simple language/pictures) - Citizens based, open source, validated by science, notifications including lifesaving messages - Must come with education process for the better understanding and to be prepared (language)
	Partnership: - Political will - Multi-stakeholder - Communication structure - Long processes Technology - Model - Visualization - Social media - Mobile technology Community (inside/outside) - Political will - Leader/champions - Awareness/education - Community based hazard assessment Resources - Money from whom? - All levels of government
	- Social media can have increased impact – authenticity? - ICS – single voice - Federal government's role to create environment to enable effective social media - Branding credible sources

	- Alert systems - Individual responsibility to know local risks - Understanding risk – NIMBY
	- Bottom up – municipal to national - Language diversity – symbolic standards - FCM/provincial municipality organizations - Information dissemination policy - Environment Canada to open 24-48 hours warning to eliminate private sector reliance
	- Public awareness – early warning systems - Widespread warnings (cell phones) - Framing sessions - Need to focus on next generation but also tools for current generation - Education on roles and responsible - Does it have to be fully participation – might not always be appropriate - Fire Prevention – strong example - Know and understand the risks and repercussions - Forecasting and decision making, believing situation will happen
	Infrastructure - Need national systems that address critical infrastructure shortfalls - Infrastructure as focus vs saving lives - Look at how decisions regarding infrastructure affect people Scope of Responsibility - Do systems have to be national? - Federal imposition isn't going to work – need horizontality and buy-in Data - Can reach consensus regarding data needs, yet there is decay in data collection/maintenance Need jurisdiction to negotiate relative roles and collaborative systems
	Metrics - Getting numbers may lead to people being more informed and more impact Data exist … but - Who collect is what is held, who interprets the data? - Who is at the watch tower? - Individual's disbelief risk data and act accordingly Information Transfer - Problematic - Not making it pts/ laterally - NDMP, for example

	• Knowledge dissemination is key (also knowledge uptake) • Opportunity, not just fearful
	<u>Who?</u> • National/ Federal →need community based systems allowing access to national resources e.g. firefighting equipment • Need to know the capacities that exist and how they relate to existing gaps <u>Action</u> • Understanding triggers and planning accordingly • "early warning" can have multiple definitions e.g. traditional knowledge • Focus on prediction/planning, not only responses • Focus on Prediction/planning, not only response • Gaps here ($) • We tend to have siloed responses • Reactive/ ad hoc • Sometimes there are even barriers re. Jurisdiction/responsibility that block effective response
	Interdisciplinary collaboration Partnership and government academic, communities Conversation – long process Basis of understandings • Partnership – government, local, academic • Technology tools available, navigation model • Prediction – model Make available to communities • Why did municipality allow development? • Mitigation/resilience • Strategies infrastructure Alert ready • People need to know potential risks – steps, education small groups • Not sure what to do of information • Municipal level, perform hazard assessment, engage community • Lack of resources Learn from previous event, social media groups – virtual • [eprep] • Social connection, education/information understanding risks • Kids – young generation • Resources from higher level of government Early warning • Information on the ground widens/pictures share • 911 – next generation. 911. Opportunity

- CRTC – alert radio, how to get alerts out on cell phones?
- How do we engage public?
- Tornado warning from
- Cell providers pushed in US
- Flash flood

Near – real time information, platform cyber
- Shutdown – who owns access information – inaccurate information?

Champions
- Leadership
- Too much information being sent
- Fear – not a joke
- Layer of credibility

Biggest problem
- Technical information to communities, 100 years flood 63% chance to get flood
- Common understanding/ meaningful action

Challenges rural community
- Facebook
- Twitter
- Not getting information on early warning

Early warning
- what does community need to do if they receive an alert

Education – kids, youth
- lesson plans
- experiential tools
- know who works in community

Australia – facilitator led 5%, matching funds
- Labour contributions, local communications

Create reflex system, everyone knows
- get help from local agency
- Parent councils in school
- Language
- Immigration
- Disabilities

Need engagement
- Different sources

Youth education program

	• Community meetings • Lower level community representative People need to know they put themselves at risk • Need to prepare • Citizen has responsibility • Air raid sirens Educate – about risk weather Video game for emergency what to do Media partnerships • Radio • Social • Create good resources that people can trust • Environment Canada – national alert system, each province also have to spread alert • Know what to do when receive alert • Welcome package in community to include disaster event what to do information – municipal planning

	• Communication
	• Multi-stream communication
	• Translating technical
	• Introduction to common understanding
	• Introduction meaningful information
	• Communication
	• Sirens (transitional)
	• Social – media + limited (old people)
	  + trust (resourceful people)
	  + panic fear
	
	Education
	• Education: schools (kids), youth
	• Awareness: education around risk
	•
	Communication
	• Media partnership
	
	Technology
	• Alert

	• Look out to 5 + years • Twitter is old news • Blogging is done (?) • The millennials run our society • Who do millennials trust

	- Less government than peers - Key – establishing trust in virtual world - Who? Does not matter but probably public sector - What – standards development – articulation of risk to public - Multicultural - Multilingual - Community based - Establish willingness for action/behavior change - Education – infrastructure to support alert - Targeting advantages of social needs - Connection platforms and partners to help to her the right message out - Interdisciplinary tools and policies targeted to users
	- Risk Hazards personalized to community - Education is key - Media partnerships - Amber alert model? - Roll out planning phone call last - Partnerships = at all levels - Communication outreach - Social networks - National knowledge sharing - Platform to share Web tool - Symbols instead of words → language diversity - Social media - Flexible frameworks that can morph as needed - Break down jurisdictional barriers + territorial thinking - Personal responsibility to seek out information - Take an inclusive approach to law and policy making processes - Long term risk profile monitoring + test cases + local high risk areas → past to future risk
	- Metrological maintain water, geology, monitoring systems as a multi-jurisdictional agreement and data sharing - Implement Neptune + Venus type networks model - Forecast risk - Build a national system and then who does what in it - Where the country should go
	Technical - Was tough to get out now and tough to stay on top 2 good references Haiti + Cuba + chili for good communication strategies - App, radio, TV - Low tech NGOs - Still needs to be coordinated - Government agencies cannot contain - GPS based communication reports - EnCan + weather workings

	- App technology stickers - Health adds, use same triggers and terms - Timing of – too late - More forecasting - Multi-mode systems – siren, SMS, telephone call out systems (Public Safety Canada) Charity - Not back to single system – growing number of sources - Taking sources must be trusted trigger consultant + reliable - Language diversity - System in tangible we network now - Consolidated approach - Having different tools - Words vs terms, warning vs watch Way to use - Re-enforce trusted sources - How do we work – sensory data - Way our brains work react – psychological - What will they do? - System to type of disaster e.g. heat wave vs flood - ruling out social fabric rural + urban - Writing low tech to high tech - Language + translation - Education, exercise, simulations, drills - Deliver through children, work into existing curriculum

Appendix B

The Process of Land Use Planning

Get Mandate and Assemble Team

Get a mandate for risk management and put together a team to make it happen
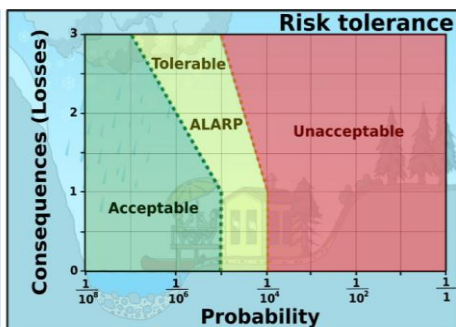
1.0 Establish Your Needs

1.1 Define desired outcomes and priorities

People | Buildings | Environment | Infrastructure
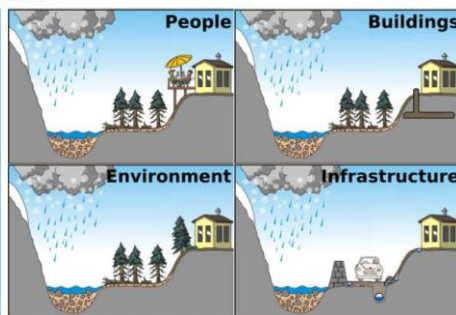
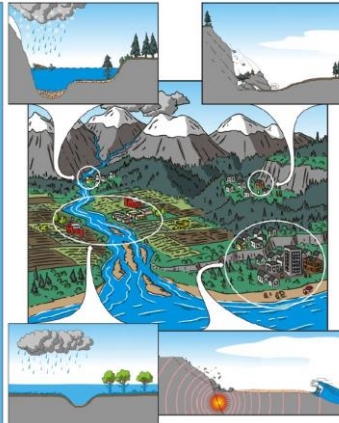1.2 Acquire needed information and resources, including expertise, risk-reduction tools, regulations, and processes

Information
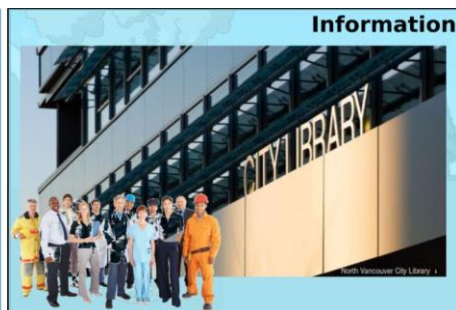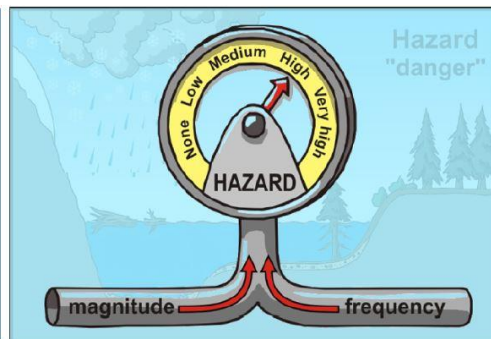
1.3 Define community tolerance for risk for each community priority

Risk tolerance — Consequences (Losses) / Probability — Tolerable, ALARP, Unacceptable, Acceptable

2.0 Define Hazard Potential

2.1 Identify hazards of concern, be they natural or man-made

2.2 Assess potential that events from such hazards of concern will happen

3.0 Identify What Could Be Harmed

3.1 Identify the amount that people and things are exposed to the hazard
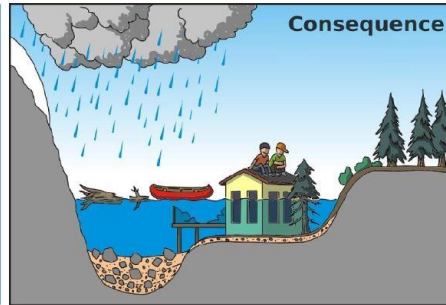
Exposure Inventory

3.2 Determine how much the people and things exposed to the hazard are vulnerable to harm in a hazard event

Vulnerability of the Exposed
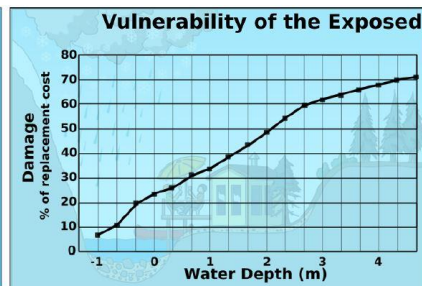
4.0 Calculate Potential Losses

4.1 For probable hazards of concern, determine the amount of losses (consequences) that result from people and things exposed to a potential event
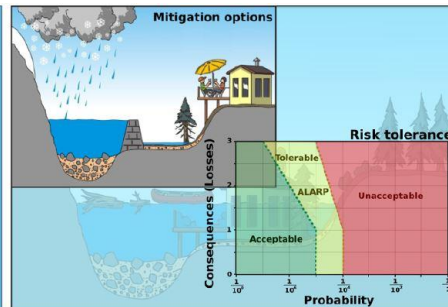

5.0 Recommend Safe Land-use

5.1 Evaluate if potential losses are acceptable
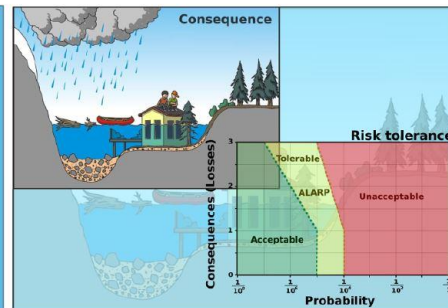
5.2 If necessary, determine how to reduce potential losses to acceptable levels, and evaluate the cost-benefit of those actions
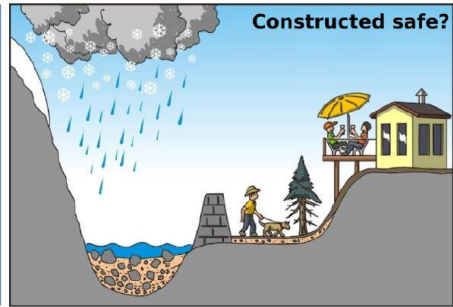

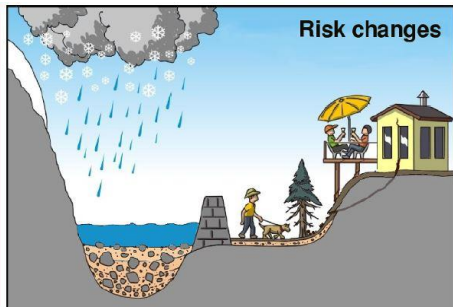**5.3 Make development recommendation that has acceptable risk**

6.0 Monitor Decision Success

6.1 Determine if the completed development actually has acceptable risk as planned

Constructed safe?

6.2 Determine if the completed development continues to have acceptable risk throughout its lifespan, and has not transferred risk elsewhere

Risk changes

6.3 Determine which decisions would have better achieved sustainable acceptable risk, share that knowledge, and incorporate it into future policy

More sustainable?