NATIONAL REPORT:
CANADA

Prepared for the International Strategy for Disaster Reduction

World Conference on Disaster Reduction

Kobe, Hyogo, Japan January 18-22, 2005

Government of Canada
July, 2004

Introduction

This report aims to:

- Respond to the International Strategy for Disaster Reduction's (ISDR) request for a national assessment on disaster risk reduction that will conclude the Yokohama Strategy and Plan of Action adopted at the World Conference on Natural Disasters held in 1994 as a mid-review of the International Decade for International Disaster Reduction (IDNDR, 1990-99).

- Reflect key Canadian accomplishments since 1994 in the area of disaster risk reduction, particularly the role that the Government of Canada has played to further collaboration and advance a culture of disaster prevention in Canada.

- Contribute to the proposed outcomes for the World Conference on Disaster Reduction (WCDR) to be held in Kobe, Hyogo, Japan, January 18-22, 2005, and help shape the disaster mitigation agenda for the next decade.

  This assessment is by no means exhaustive as the timeline to prepare national assessments did not permit extensive consultation with Provincial/Territorial governments or with non-governmental and private sector disaster mitigation stakeholders. This report is therefore based largely on feedback received from Government of Canada departments and information received through previous consultations with stakeholders and other levels of government.

  Where appropriate, relevant electronic documents/references that elaborate on specific projects and initiatives are incorporated to augment the responses to each of the seven areas identified in the ISDR's survey. To the extent possible, Provincial/Territorial and non-governmental input has been incorporated to reflect substantial progress in key areas.

NATIONAL REPORT ON DISASTER REDUCTION

Component 1 – Political Commitment and Institutional Aspects

1.1 **Are there national policy, strategy and legislation addressing disaster risk reduction?** Please describe to what extent current national efforts and main priority, and mechanisms to enforce the implementation of the policy and legislation are applied (*and/or attach any relevant documentation*)

Yes, policies and strategies exist. However, existing federal legislation underpinning emergency management does not provide explicit authority for disaster risk reduction or mitigation.

As a result of major natural disasters, the need to protect critical infrastructure and the threat of terrorism, the Government of Canada's emergency management role and structure has undergone significant changes during the last five years. In December 2003, the Government of Canada established a new department of Public Safety and Emergency Preparedness Canada (PSEPC) which brought together under one umbrella traditional emergency management functions with those related to public safety and security. The creation of PSEPC is a reflection of the Government of Canada's commitment to establishing a better nationally integrated system that improves Canadian capacity to manage the consequences of disaster, and reflects the government's dedication to ensuring the safety and security of Canadians from all threats (natural, technological or human-caused). Emphasis is on the adoption of proactive measures to protect, mitigate, better coordinate responses to, and recovery from crises and disasters.

September 2001 and subsequent anthrax letter attacks brought national security and chemical, biological, radiological and nuclear (CBRN) counter-terrorism preparedness into focus. The Government of Canada's CBRN Research & Technology Initiative (CRTI) represents the Canadian federal science community's response and commitment to providing science and technology solutions to national security and CBRN preparedness. CRTI is a joint, interdepartmental initiative between PSEPC, Health Canada, Environment Canada, Agriculture and Agri-Food Canada, Canada Food Inspection Agency, Department of Fisheries & Oceans, National Research Council, Natural Resources Canada, RCMP, Solicitor General Canada, Canada Security and Intelligence Service, Treasury Board Secretariat, Privy Council Office and Defence R&D Canada. (For more information about CRTI visit , http://www.crti.drdc-rddc.gc.ca

Legislation

The *Emergency Preparedness Act* (EPA) serves as the foundation for the Canadian Government's engagement in emergency planning and its emergency management relationship with other jurisdictions in Canada. The Act assigns a wide range of leadership responsibilities to the designated federal ministries relating to: training and education; research and development; and to disaster financial assistance programs. The EPA also mandates each federal ministry to identify areas of accountability and to develop effective emergency plans to address identified contingencies. The *Emergency*

Preparedness Act is currently under review with a view to including reference to mitigation among other significant proposed changes. See http://laws.justice.gc.ca/en/e-4.6/text.html

Additionally, each Province and Territory in Canada has emergency management legislation that governs civil emergency preparedness. The primary objective of the legislation is to prevent loss of life, protect public health and welfare and minimize damage to Canadian communities. Recently, a number of provinces - Ontario, Québec, Alberta, British Columbia - have revised their emergency management legislation to emphasise the need for hazard identification and vulnerability assessment and underscore disaster mitigation as an essential component of comprehensive emergency management . See http://www.ocipep.gc.ca/ep/legisla/index_e.asp for emergency management legislation at the Provincial and Territorial level in Canada.

The Federal Policy on Emergencies (FPE)

The FPE articulates the role and responsibilities of Government of Canada departments, key concepts and coordination mechanisms for dealing with emergencies. It underscores the need for close collaboration and coordination among federal departments and agencies, and between them and the Provinces/Territories. PSEPC serves as the linchpin in this coordination. The policy allows for periodic review and amendment to the FPE to reflect changing relationships among federal government departments or orders of government and to integrate modern emergency management concepts. Such a review is anticipated in conjunction with the review of the *Emergency Preparedness Act*. Further information on the current FPE is located at:
www.ocipep.gc.ca/info_pro/fact_sheet/general/P_fed_policy_e.asp

National Security Policy (NSP)

The Government of Canada's new National Security Policy (May 2004), provides an integrated framework to assess and respond to a wide range of threats (intelligence, emergency management, public health, transportation, border security, and international security) that could affect the health and security of Canadians. The NSP provides a framework to modernize existing emergency management legislation and policies to strengthen activities in all facets of comprehensive emergency management. The NSP will help steer efforts that strengthen inter-governmental coordination and response to emergencies by establishing new national forums and capacities for emergency management co-operation and operational response coordination (including the establishment of a new federal government emergency response coordination center.) The NSP represents a major milestone for the Government of Canada's ongoing efforts to protect the safety and security of Canadians. See
www.news.gc.ca.cfmx/ccp/view/en/index.cfm?articleid=83719&

National Disaster Mitigation Strategy (NDMS)

During the latter part of the 1990s the Government of Canada, led by the Department of Public Safety and Emergency Preparedness (PSEPC, then the Office of Critical Infrastructure Protection and Emergency Preparedness), embarked on a major national initiative to develop a National Disaster Mitigation Strategy. A NDMS would enhance

Canada's capacity to implement long-term measures that reduce risk, limit social disruption and contain economic costs that could result from natural disasters. A NDMS would establish proactive and systematic coordination of mitigative activities and foster disaster resilient communities. Government of Canada approval on the scope and resource requirements for a NDMS is pending completion of options for consideration.

Relevant web sites and publications

- PSEPC NDMS web page - http://www.ocipep.gc.ca/NDMS/index_e.asp
- NDMS Discussion paper – http://www.ocipep.gc.ca/NDMS/consult_e.asp
- NDMS Deliberation Guide for 2002 consultations – http://www.ocipep.gc.ca/NDMS/Files/NDMSDeliberationGuide_e.pdf
- 2002 Consultation Results - http://www.ocipep.gc.ca/NDMS/sum_e.asp
- PSEPC Disaster Mitigation Articles and Reports http://www.ocipep.gc.ca/NDMS/reports_e.asp
- Forthcoming journal publication: *Canada's Experience in Developing a National Disaster Mitigation Strategy: A Deliberative Dialogue Approach*, special issue, The International Journal of Mitigation and Adaptation Strategies, fall 2004 (draft attached).
- NDMS Spring 2004 Update (attached).

National Critical Infrastructure Assurance Program (NCIAP)

The NCIAP is currently under development by the Government of Canada. Critical infrastructure consists of those physical and information technology facilities, networks, services and assets which, if disrupted or destroyed, would have a serious impact on the health, safety, security or economic well-being of Canadians or the effective functioning of governments in Canada. Since the majority of Canada's infrastructure is owned and operated by the private sector, the Government of Canada fosters cooperation and communication to provide the best assurance of a resilient and viable infrastructure. The NCIAP promotes a national partnership among private and public sector stakeholders and provides for national coordination to assure the continuity of services across all sectors and prevent undue interruption of essential services in the wake of disasters.

A National Critical Infrastructure Protection Strategy (NCIPS) will establish a basis for federal, provincial and territorial governments and the private sector to meet the critical infrastructure protection challenge. This Strategy will enhance the reliability and continuity of physical and information technology facilities, networks, services and assets, which, if disrupted or destroyed, would have serious impacts on the health, safety, security or economic well-being of Canadians or the effective functioning of governments in Canada. A position paper will be released in the summer of 2004 that will set out the key elements of a NCIPS Canada (it will be available on the web site at http://www.ocipep.gc.ca/critical/nciap/synopsis_e.asp). See http://www.ocipep.gc.ca/info_pro/fact_sheets/general/CIP_NCIAP_e.asp for further information on Canada's National Critical Infrastructure Assurance Program.

1.2 **Is there a national body for multi-sectoral coordination and collaboration in disaster risk reduction, which includes ministries in charge of water resource management,**

agriculture/land use and planning, health, environment, education, development planning and finance? If yes, please give detailed information (name, structure and functions). *Attach any relevant documentation or indicate source of information*.

Yes.

The Department of Public Safety and Emergency Preparedness (PSEPC) has the overall responsibility to enhance the protection of critical infrastructure, and to safeguard lives and reduce damage to property by fostering better national emergency management and preparedness in Canada. This includes reducing the risk and potential impacts of disasters before they happen through disaster mitigation efforts. In January of 2001, an Interdepartmental Mitigation Coordination Committee (IMCC) composed of all Government of Canada departments and chaired by PSEPC (then OCIPEP) was established to clarify disaster mitigation-related roles and compile information on federal programs and activities that contribute to disaster risk reduction, to assess gaps and priorities for federal government action on mitigation. A parallel Federal/Provincial/Territorial NDMS Advisory Group (FPT NDMS AG) was established in 2001 to engage provincial and territorial jurisdictions in identifying existing mitigation-related programs initiatives that would provide the basis for a more coherent national approach to disaster mitigation in Canada. Both the IMCC and FPT NDMS AG continue to play important roles in shaping the Canadian Government's approach to disaster mitigation and facilitate implementation of mitigation measures. Further information on the role and mandate of PSEPC can be viewed at: http://www.ocipep.gc.ca/whoweare/index_e.asp

1.3 **Are there sectoral plans or initiatives that incorporate risk reduction concepts into each respective development area (such as water resource management, poverty alleviation, climate change adaptation, education and development planning)?** If yes, please indicate some examples and challenges/limitations encountered. If no, does your government have any plans for integrating disaster risk reduction into development sectors? If no, please also specify the major difficulties.

Yes.

Government of Canada – "Levers and Lenses" Approach

The Government of Canada is taking a "levers and lenses" perspective to establish an approach to disaster mitigation that is mindful of the linkages between the social, economic and environmental factors that can contribute to increased disaster risk and vulnerability. The approach takes into account the need for collective action by all levels of Government, stakeholders and from the private and non-governmental sectors. It builds on the knowledge that existing and new programs, initiatives and policies can provide strategic opportunities to encourage the inclusion of mitigative aspects and assist in developing a holistic approach to implementing mitigation measures. This "levers and lenses" approach seeks to integrate sustainability principles with those of hazards mitigation. The interdepartmental and stakeholder collaboration required to advance such

an approach assists in ensuring that mitigation-related activities support the Government of Canada's national objectives. Examples of this approach follow:

Infrastructure Canada - Canada Strategic Infrastructure Fund (CSIF) and Municipal Rural Infrastructure Fund (MRIF)

Through the CSIF and MRIF, the Canadian government is investing in infrastructure projects of major national and regional significance in areas that are vital to sustaining economic growth and supporting an enhanced quality of life for Canadians. The CSIF and MRIF provide a unique partnership opportunity for the federal, Provincial and Territorial, and municipal governments to support the development of disaster resilient communities by incorporating risk reduction measures during the design, building and refurbishing of major infrastructure. It is estimated that the Red River Floodway (in Manitoba), which was built in the 1960s at a cost of about $60 million, prevented approximately $6 billion in potential flood damage during devastating floods that afflicted the southern part of Manitoba 1997. An April 2003 announcement of major funding pertaining to the expansion of the Red River Floodway, that is illustrative of PSEPC's efforts to further disaster mitigation through cost-shared initiatives, may be viewed at:
www.Infrastrcture.gc.ca/csif/publication/newsreleases/2003/20030403winnipep_e.shtml

Relevant web sites

- Infrastructure Canada: http://www.infrastructurecanada.gc.ca.
- Canada Strategic Infrastructure Fund: http://www.infrastructure.gc.ca/csif/publication/newsreleases/2003/20030403winnipeg_e.shtml
- Municipal Rural Infrastructure Fund:
- http://www.infrastructure.gc.ca/mrif-fimr/index_e.shtml?menuD

Natural Resources Canada (NRCan) Canadian Forest Service

Fire plays an important role in most forest ecosystems in Canada. From a socio-economic perspective, however, fire can have undesirable effects on public health and safety, property, and natural resources. The challenge of managing fire in Canada is to find ways to effectively balance the positive ecological aspects of fire with the negative social and economic impacts. The Government of Canada, through Natural Resources Canada's Canadian Forest Service (CFS), makes an important contribution to fire management in two ways. First, the CFS has maintained an internationally recognized research program since the mid-1920s that has resulted in many innovations and new operational tools. Secondly, over the past two decades the CFS has developed information systems that use advanced technologies (e.g., geographic information systems and remote sensing) to monitor and report on forest fire activity at a national scale. These activities have resulted in Canada becoming a world leader in forest fire research and management and have contributed to the overall safety and well-being of Canadians and to the sustainability of our forests. Additionally, NRCan is working with the provinces and territories to develop a national strategy that will integrate the ecological benefits of forestry management with those of comprehensive emergency management (mitigation, preparedness, response, recovery) in order to reduce wild land fire risk and impacts on

Canadians. See http://fire.cfs.nrcan.gc.ca/index_e.php for more information on the Canadian Forestry Service. A post event report highlighting the Government of British Columbia's response to major fires in 2003 is available at: http://www.2003firestorm.gov.bc.ca/firestormreport/toc.html

NRCan Climate Change Impacts and Adaptation

The overarching goal of the Government of Canada's Climate Change Impacts and Adaptation Program is to reduce Canada's vulnerability to climate change. The research program supports cost-shared research to address gaps in knowledge of Canada's vulnerability to climate change and to provide information for adaptation decision-making. NRCan is also the host of the Canadian Climate Impacts and Adaptation Research Network (C-CIARN) which facilitates communication and collaboration among researchers, policy makers, and land/resource managers regarding the vulnerability, impacts and adaptation options related to climate change, forests, and forestry in Canada Further information on the Government of Canada's Impacts and Adaptation Program is located at: http://adaptation.nrcan.gc.ca/home_e.asp

Industry Canada (IC) - Emergency Telecommunication Programs

Industry Canada has the lead role for emergency telecommunications in Canada. It develops and maintains emergency plans and undertakes exercises for telecommunications at the national, regional and district levels. Industry Canada also maintains contact with national telecom service providers, and gives advice and assistance to mitigate and respond to the disruptive effects of disasters on telecommunications. It facilitates through a national inventory of telecommunications resources the provision, repair or replacement of critical telecommunications equipment or services required for emergency response operations. It is currently reviewing ways of enhancing and better coordinating the provision of public alerting services in Canada. Industry Canada develops and manages programs to assure the availability of telecommunications to meet priority government requirements during periods of system overload or degradation (e.g. priority access to dialling and private line restoration). Detailed program descriptions are available at the following web site. http://spectrum.ic.gc.ca/urgent

1.4 **Is disaster risk reduction incorporated into your national plan for the implementation of the UN Millennium Development Goals (MDGs) Poverty Reduction Strategy Paper (PRSP), National Adaptation Plans of Action, National Environmental Action Plans and WSSD (World Summit on Sustainable Development) Johannesburg Plan of Implementation?**

The attainment of the Millennium Development Goals is an overarching objective of Canada's aid program. This is reflected in the large scale increases of resources allocated to sectoral support for the MDGs including investment in social development through education, health and nutrition, HIV/AIDS and child protection.

Canada's aid program also fully supports the Poverty Reduction Strategy Paper (PRSP) process - a key element of which is that these strategies be developed by the developing

country itself. While Canada shares the view that disaster risk and poverty reduction are strongly linked, it is up to the developing country to determine whether this element ultimately forms part of its poverty reduction plan.

Canada takes seriously its WSSD commitments. To meet the water and sanitation goals, Canada has been engaged in numerous international events regarding water and sanitation. To achieve the 2005 Integrated Water Resource Management (IWRM) target Canada is beginning work domestically to ensure that a strong collaborative process will form the basis of IWRM. A Canadian response will incorporate a multi-stakeholder process consistent with IWRM principles and recognize the shared jurisdiction of water management in Canada.

1.5 **Does your country have building codes of practice and standards in place, which take into account seismic risk?** If yes, since when? Which are the main difficulties in keeping the compliances of the codes?

Yes. Since 1941.

The National Research Council has a mandate to develop and update Canada's National Building Codes (CNBC). The CNBC takes into account seismic risk and provides a template for provinces to enact, use and enforce building codes. To keep pace with changes, and to ensure that the latest innovations and applications are applied safely, the CNBC is revised every five years. The NRC's Canadian Codes Centre plays a vital role in this process by providing technical and administrative support to the Canadian Commission on Building and Fire Codes (CCBFC) and its related committees, which are responsible for the development of the national model construction codes of Canada.

The Institute for Research in Construction (IRC), part of the National Research Council, is the leader in research, technology and innovation for the Canadian construction industry, the country's largest industrial sector. Through its research and in partnership with industry, the Institute works to improve the safety, durability and comfort of Canadian workplaces, homes and public infrastructure while helping builders become more competitive. For more information on the CNBC see: http://irc.nrc-cnrc.gc.ca/irccontents.html

See also section 2.1 of this report for information on seismic hazard to the building code.

Relevant web sites and publications

- National Building Code of Canada: http://irc.nrc-cnrc.gc.ca/catalogue/nbc1.html
- National Fire Code of Canada http://irc.nrc-cnrc.gc.ca/catalogue/nfc1.html
- National Housing Code of Canada and Illustrated Guide http://irc.nrc-cnrc.gc.ca/catalogue/housing.html
- Special Issue: Proposed Earthquake Design Requirements of the National Building Code of Canada, 2005 edition, Volume 30, Number 2, April 2003, http://pubs.nrc-cnrc.gc.ca/cgi-bin/rp/rp2_tocs_e?cjce_cjce2-03_30

- Perspective on seismic mitigation for buildings**:** http://www.ocipep.gc.ca/research/resactivites/disMit/seis_mit/2001D006_e.asp

1.6 **Do you have an annual budget for disaster risk reduction?** If yes, is this commitment represented as part of the national budget or project based? Through which institution/s? If no, what other financing mechanisms for risk reduction initiatives are available?

There are no Government of Canada funds earmarked for the proposed National Disaster Mitigation Strategy. Activities that advance disaster reduction are achieved through governmental and non-governmental programs and initiatives with strategic objectives that align with disaster mitigation (e.g. CSIF see above) at all levels of government administration (national, provincial and municipal.)

1.7 **Are the private sector, civil society, NGOs, academia and media participating in disaster risk reduction efforts?** If yes, how? Indicate existing coordination or joint programming between government and civil society efforts in disaster risk reduction, or major difficulties or constraints for this to be effective.

Yes.

Canadian Natural Hazards Assessment Project (CNHAP)
The CNHAP published the first comprehensive assessment on the state and nature of knowledge on Canadian hazards and disasters in the summer of 2003. The outcomes of this project, funded jointly by PSEPC, the Meteorological Service of Canada and the Institute for Catastrophic Loss Reduction (ICLR), will contribute to establishing appropriate mitigation measures for the variety of hazards that occur in Canada. The interdisciplinary publications provide a useful reference for Canadians natural hazards researchers and emergency management practitioners and helps to transfer Canadian experiences to the international community.

Relevant web sites and publications:

- CNHAP http://www.msc-smc.ec.gc.ca/projects/hazards_assessment/index_e.cfm.
- Etkin, Dave; Haque, Emdad C; Brooks, Gregory R (Eds.): 2003, *An Assessment of Natural Hazards and Disasters in Canada*, Special Issue of the Journal of the International Society for the Prevention and Mitigation of Natural Hazards, Kluwer Academic Publishers, 28(2-3):211-593 http://www.wkap.nl/prod/b/1-4020-1179-2.
- Etkin, D., Haque, E., Bellisario, L. and Burton, I: 2004, *An Assessment of Natural Hazards and Disasters in Canada – A Report for Decision Makers and Practitioners (attached).*

Canadian Climate Impacts and Adaptation Research Network (C-CAIRN)
C-CAIRN is a national network that facilitates the generation of new climate change knowledge by bringing researchers together with decision-makers from industry, governments, and non-government organizations to address key issues that improve knowledge of Canada's vulnerabilities to climate change, identify ways to minimize the negative effects of future impacts, and explore opportunities that take advantage of any

positive impacts. A national coordination office housed at Natural Resources Canada manages the operation of the Canadian Climate Impacts and Adaptation Research Network. For additional information, refer to: http://www.c-ciarn.ca/index_e.asp

Canadian Risk and Hazards Network (CRHNet)

The CRHNet is a not-for-profit organization established in the fall 2003 to create an environment in which the natural hazards research, education and emergency management practitioner communities can effectively share knowledge and innovative approaches that reduce disaster vulnerability. PSEPC is an instrumental partner in the establishment of the CRHNet. The CRHNet will host its first symposium focussing on disaster reduction in November, 2004. Additional information on the CRHNet is available at: www.crhnt.ca

The Ouranos Consortium

The Ouranos Consortium is a joint initiative of the Government of Québec, Hydro-Québec and the Meteorological Service of Canada established in May 2002. It pools the expertise of researchers from numerous disciplines in order to advance understanding of the issues and requirements for climate change adaptation affecting Canada and North America. Four universities participate in Ouranos namely: Université du Québec à Montréal, Institut national de la recherche scientifique, Université Laval and McGill University. The Ouranous web site is located at: http://www.ouranos.ca

Canadian Red Cross

The Canadian Red Cross works with governments and other Canadian-based humanitarian organizations to provide basic needs such as food, clothing, shelter, first aid, emotional support and family reunification following a disaster. The Canadian Red Cross also plays an important role in raising the public's awareness activities related to emergencies by distributing self-help pamphlets and checklists on how to prepare for emergencies of all kinds in collaboration with provincial and territorial emergency measures organizations and with volunteer organizations. See http://www.redcross.ca/article.asp?id=000283&tid=025 for additional information.

Fraser Basin Council (FBC)

The FBC is a non-governmental organization established in June 1997 to advance sustainable development within Fraser River Basin (southern British Columbia). In 1998, the FBC established an inter-governmental Joint Program Committee to facilitate the implementation of integrated flood hazard management and to provide a forum for inter-agency collaboration on structural and non-structural options for flood mitigation. The FBC's sustainability charter embraces many of the principles of sustainable hazards mitigation and the concept of disaster resilient communities. Additional information on the FBC and its Charter can be accessed at:

Fraser Basin Council: http://www.fraserbasin.bc.ca/about_us/index.html

Charter of sustainability: http://www.fraserbasin.bc.ca/publications/charter.html

Canadian Telecommunication Emergency Preparedness Association (CTEPA)
CTEPA is an association of telecommunications service providers that facilitates the participation and information exchange on common regional, national and international emergency preparedness issues among it members. CTEPA works in close collaboration with governments via Industry Canada to meet its emergency preparedness objectives.

Institute for Catastrophic loss Reduction (ICLR)
ICLR was established in 1998 as an independent, not-for-profit research institute affiliated with the University of Western Ontario and Canada's property and casualty insurers. It is a centre of excellence for multi-disciplinary research in areas relating to wind and seismic engineering, atmospheric sciences, hydrology, and economics that contributes to the establishment of communities better able to avoid and resist disasters. The ICLR organizes annual workshops and conferences to raise awareness and share research findings with members. In 2002, the ICLR's launched a national day care retrofitting program to promotes the undertaking of simple retrofitting measures (e.g. bolting bookcases and water tanks to walls, and securing ceiling lights and hanging fixtures) that enhance disaster safety in child care centers. The ICLR is also the host centre for the Natural Disaster Health Research Network. The research publications and additional information about the ICLR is available at: www.iclr.org

Component 2 – Risk Identification

Identification of risks is a relatively well-defined area with a significant knowledge base on methods for disaster impact and hazard and vulnerability assessment. Systematic assessment of losses, social and economic impact of disasters, and particularly mapping of risks are fundamental to understand where to take action. Consideration of disaster risks in environmental impact assessments is still to become routine practice. Early warning is increasingly defined as a means to inform public and authorities on impending risks, hence essential for timely actions to reduce their impact.

2.1 **Has your country carried out hazard mapping/assessment?** If yes, please describe for which hazards, when they were updated and for what geographical scale they exist. Do they include characteristics, impacts, historical data, multi-hazards approach? Which institutions are using the results of the hazard assessment? To whom are they available? (attach any relevant documentation)

Yes. Canada has programs and initiatives that allow regular assessments of the Canadian natural hazards. The risk assessments, however, are generally limited to evaluation of the hazard in terms of frequency, magnitude and location and do not take into account vulnerability.

Canadian Natural Hazards Assessment Project (CNHAP) see 1.7 above.

Geologic Hazards
In response to a federal government initiative to foster "Strong and Safe Communities" Natural Resources Canada - Earth Sciences Sector has established the *Natural Hazards*

and Emergency Response Program that will provide the necessary geoscientific and geospatial information expertise to assist in the mitigation of natural hazards in Canada. The program will emphasize work related to earthquakes, volcanoes, tsunamis, landslides and magnetic storms. It will focus on communities and critical infrastructure at risk to strengthen integrated national risk assessments. The program will be integrated with national monitoring and observatory networks. Additional information on this program is available at: http://www.nher.nrcan.gc.ca/

Natural Resources Canada – Earth Science Sector plays a central role in the development of new seismic provisions for the National Building Code of Canada. Canada's earthquake hazard assessment is conducted every 5 years. The last assessment was completed in 2002. The assessments provide the basis for improving Canada's building code in areas of seismic hazard and to raise earthquake awareness among the public. More information on seismic hazard assessment in Canada can be found at this website: http://www.EarthquakesCanada.ca

National Avalanche Centre

The Government of British Columbia is considering options for the development of a public avalanche safety program that will raise awareness about the risks associated with avalanches. The vision includes the establishment of a National Avalanche Center that will serve as a centre for excellence on avalanche safety and expertise. The proposed National Avalanche Center would be supported with funding from federal government departments and the provincial government through a private/public partnership arrangement. The review of the existing public safety program and the options that are being considered under this initiative is available at: http://www.pssg.gov.bc.ca/publications/avalanche/ReviewFinal.pdf

Forest/Urban Interface Fires

See section 1.3 for background on the Canadian Forestry Service and Canada's forest/urban interface fire risk.

The Province of British Columbia (BC) experienced the worst forest fires in its history during the Summer of 2003. The post-event review of the 2003 fires, commissioned by the Government of BC, showed how the natural fire hazard combined with human activities to increase risk and vulnerability to forest fires. The encroachment of urban development and human activity into ecosystems susceptible to forest fires contributed to the increased vulnerability and severity of the interface/forest fires. Among other recommendations, the review highlighted the need for proactive approaches to prevent and lessen the risk and impacts of future forest fires (e.g. raising the awareness of citizens about the fire risks and protection measures and better forestry management programs to reduce the accumulation of combustible material). In response, the Canadian Forestry Service has initiated an assessment of the vulnerability of Canadian forests and forest-based communities to wildfire. The recommendations stemming from the Provincial review of the BC 2003 fires is available at: http://www.2003firestorm.gov.bc.ca/firestormreport/toc.html

Flooding

The Canadian government initiated the Flood Damage Reduction Program (FDRP) in 1975 to curtail escalating disaster costs in areas of known flood hazard and to discourage development in flood vulnerable areas. Between 1975 and 1995 more than 900 communities were mapped and designated under the FDRP including some major urban centres. Although the FDRP is now ended, most flood-prone areas were mapped and the Provinces/Territories and municipalities continue to use the zoning maps that were developed under the program to establish zoning regulations in areas of high flood risk. A summary of the FDRP and its accomplishments is attached. A further study that elaborates on "Flood Risk Management in Canada" is available at: http://www.iclr.org/pdf/ICLR_%20Flood%20Report.pdf

Extreme Weather

The Meteorological Service of Canada (MSC), a branch of Environment Canada, is Canada's source for meteorological information. The Service monitors water quantities, provides information and conducts research on climate, atmospheric science, air quality, ice and other environmental issues, making it an important source of Canadian expertise in these areas. The MSC is undergoing a transition to ensure that Canadians are prepared to respond to high impact weather forecasts. Activities will include: enhanced research capacity under the Canadian Weather Research Program; the establishment of modernized observation systems (e.g. Doppler radar and participation in the international Global Earth Observation effort); creation of five storm prediction centres focusing on detection and prediction of high impact weather; improving public outreach; and strengthening relationships with emergency measures organizations. Meteorological Service of Canada and Emergency Management Ontario (Government of Ontario) have developed a community level Hazard Identification and Risk Assessment (HIRA) process that will assist Ontario municipalities to assess weather-related hazards for emergency management planning purposes. The related web site is located at: www.hazards.ca.

Ontario's Provincial Hazard Identification and Risk Assessment

Province of Ontario's *Emergency Management Act,* proclaimed in April 2003 requires municipalities, ministries, government agencies and commissions to develop emergency management plans. As part of the planning process, local authorities, ministry/agency, commission or branch are required to conduct hazard and risk assessments and identify facilities and other elements of the infrastructure that are at risk and susceptible to disasters. Many of these hazards have been identified in a Provincial Hazard Identification and Risk Assessment Report. This risk management approach to emergency/disaster management is increasingly evident in nearly all Canadian provinces and territories. Further details on activities under way at the provincial and territorial level can be accessed via the PSEPC web site under emergency management. See http://www.ocipep.gc.ca/

British Columbia's Hazard Risk and Vulnerability Tool Kit

Conducting a hazard risk and vulnerability assessment is critical part of every emergency program. In BC, this is a requirement mandated by the British Columbia *Emergency Program Act* which requires local authorities to prepare emergency plans. To assist

municipal authorities in the regard, the BC through its Provincial Emergency Preparedness program has developed an online hazard, risk and vulnerability analysis tool (HRVA). The purpose of HRVA is to help communities make risk-based decisions that augment disaster mitigation, preparedness, response and recovery.
The online HRVA can be viewed at: www.pep.bc.ca/hrva/toolkit.html

2.2 **Has your country carried out vulnerability and capacity assessments?** If yes, please describe the methods used and major social, economic, physical environmental political and cultural factors considered in the assessment (s). Who are the main contacts for these assessments (or attach any relevant documentation or contact information).

Vulnerability and capacity assessments have not been carried out on a comprehensive or systematic basis.

2.3 **Does your country have any mechanisms for risk monitoring and risk mapping?** If yes, who is responsible?

Yes.

Wildfires
For background on the Canadian Forest Service (CFS) see section 1.3. The CFS developed and operates the Canadian Wildland Fire Information System that is used to monitor, map, and model forest fire danger and activity in Canada on a daily and annual basis. More information is available at http://fire.cfs.nrcan.gc.ca/

Flood Monitoring
The Provinces and Territories maintain 24-hour flood forecasts centres which monitor flooding risk and flood levels prior to, and during a flooding event. They also have the mandate to issue flood alerts and warning.

2.4 **Is there a systematic socio-economic and environmental impact and loss analysis in your country after each major disaster?** If yes, are the results available?

There is no systematic assessment of socio-economic and environmental impact and loss assessment. However, post disaster assessments conducted following major Canadian disasters reflect the social and economic costs associated with disasters. For example, Province of Québec's post event analysis of the ice storm that affected most of eastern Canada in 1996 included in depth sector-based analysis of the storm's impact ranging from social and economic to environmental impacts. The full report can be accessed at: http://doc.gouv.qc.ca

The International Joint Commission's 2000 report on Red River Flooding in Manitoba in the Spring of 1997 provided an indication of the social/economic costs of the flooding. A copy of that IJC's 2000 report and subsequent reporting on progress being made on the

IJC's recommendations can be found at:
http://www.ijc.org/php/publications/pdf/ID1536.pdf

The Government of British Columbia's review of the Summer of 2003 forest fires also revealed the tremendous social and economic impacts of the fires on BC's communities. British Columbia's review of the 2003 fires located at:
http://www.2003firestorm.gov.bc.ca/firestormreport/toc.htm

A Canadian Disaster Database (CDD) provides a basic disaster costs tracking system that is maintained by PSEPC. The database, which contains detailed disaster information on Canadian natural and technological disaster events was created in 1990. Since then the CDD has evolved into an internet-based resource for Canadian disaster information. Users can search the database by disaster type, region or decade of occurrence. The web site for the CDD is: http://www.ocipep.gc.ca/disaster/search.asp

2.5 **Are there early warning systems in place?** If yes, for what hazards and for what geographical scope. Do you have any example when the system was activated lately? Which are the main institutions Involved? Please indicate any relevant lessons-learnt from the use and public reaction to early warnings issued.

Yes.

Severe weather
Canada has a comprehensive national weather warning system for a wide range of meteorological hazards. Environment Canada (Meteorological Service of Canada) issues severe weather warnings, watches, and advisories to the public via the media, weather outlets and weatheradio.

Relevant web sites

- http://www.smc-msc.ec.gc.ca/cd/brochures/warning_e.cfm
- http://www.smc-msc.ec.gc.ca/cd/brochures/forecast_e.cfm.
- http://www.weatheroffice.ec.gc.ca/canada_e.html
- http://www.msc-smc.ec.gc.ca/cd/factsheets/weather_radar/index_e.cfm
- http://www.weatheroffice.ec.gc.ca/warnings/warnings_e.html
- http://www.atl.ec.gc.ca/weather/hurricane/index_e.html
- http://www.msc-smc.ec.gc.ca/contents_e.html
- http://www.msc-smc.ec.gc.ca/education/index_e.cfm

Extreme Heat/SMOG
City of Toronto has an elaborate extreme heat warning system that was developed in coordination with the Province of Ontario's emergency preparedness system. http://www.city.toronto.on.ca/ems/safety_tips/hot_1.htm. For SMOG Alerts see: http://www.city.toronto.on.ca/health/smog/healthsmog.htm

Magnetic Storms

Canada operates a network of 13 magnetic observatories that monitor magnetic field variations. Data are transmitted in real time to the Space Weather Forecast Centre, operated by GSC. The Centre uses these data and additional data on solar activity to provide public information on the current state of the magnetic field and predictions of future activity. Large magnetic storms and associated space weather phenomena can negatively impact a variety of critical infrastructure systems such as electrical distribution systems, pipelines, satellites and radio communications. The website for the Space Weather Forecast Centre is http://www.spaceweather.gc.ca/

Earthquakes/Tsunamis

The Geological Survey of Canada (GSC) operates a Canada-wide network of more than 100 seismographs, as part of its earthquake alerting system. The earthquake alerting system is based on the automatic processing of the GSC's national network of real-time seismographs together with real-time data from other institutions. The system provides rapid information on significant earthquakes for 29,000 km of railway track, 822 dams and 3 nuclear power plants across Canada. The GSC also has a tsunami warning system in place. The website for earthquake information in Canada is http://www.EarthquakesCanada.ca

Wildfires

The Canadian Forest Fire Danger Rating System (CFFDRS) is used in all regions of Canada and is one of the primary elements used in all decisions related to forest fire management. The CFFDRS is internationally recognized and has been used or adapted for use in a number of other countries. Provincial and territorial fire management agencies all have policies and programs to inform stakeholders and the public of potential danger from forest fires.

Public Alerting

Public alerting is primarily the responsibility of public officials authorized to give public direction in emergencies under municipal by-laws and provincial or federal legislative authority. Industry Canada assists as the federal government lead for coordinating the provision of an emergency broadcasting service, based on the facilities and services of the Canadian Broadcasting Corporation. Recently, Industry Canada assumed a lead role to coordinate the development a broad-based strategy for the dissemination of severe weather and all-hazard alerts using existing cable, radio and television infrastructure. Options being considered include developing systems to deliver warnings via unmanned radio stations, development of a Radio Data System to deliver warnings to new model cars and National Public Broadcaster-led field trials to demonstrate the feasibility of launching a national public broadcast alerting system in Canada.

PSEPC, issues alerts and advisories to communicate information about potential, imminent or actual threats, affecting Canada's critical infrastructure. See http://www.ocipep.gc.ca/opsprods/index_e.asp for additional information.

Component 3 – Knowledge Management

Information management and communication, education and training, public awareness and research are all parts of improving and managing knowledge on disaster risks and their reduction. Inclusion of disaster reduction at all levels of education, effective public awareness and information campaigns, media involvement in advocacy and dissemination, availability of training for communities at risk and professional staff, and targeted research are the ingredients to support the knowledge base for effective disaster reduction.

3.1 **Does your country have disaster risk information management systems (governmental and/or non-governmental)?** If yes, what kind of information on disaster reduction is available how is it collected, how is the information disseminated and who are the main users? (indicate relevant sources of information, if applicable)

No.

3.2 **Are the academic and research communities in the country linked to national or local institutions dealing with disaster reduction?** If yes, please describe the mechanisms for information sharing and indicate any example of usefulness and effectiveness. Which are the main research and academic institutions dealing with disaster reduction related issues (please list, if available, and indicate how their research work is related to the country's disaster risk reduction needs.)

Yes.

Several academic institutions teach courses related to natural hazards and disasters that have bearing on disaster reduction. Select examples include the University of Toronto, University of British Columbia, University of Western Ontario, University of Manitoba, University College of Cape Breton and Université de Sherbrooke.

The University of Western Ontario, through the Institute for Catastrophic Loss Reduction (ICLR), facilitates the development of Canadian disaster prevention knowledge and dissemination of these research findings through annual research workshops and conferences. See www.iclr.org

Brandon University, in conjunction with the Manitoba Emergency Services College, established the Applied Disaster and Emergency Studies Program (A-DES) in 2000. The Program takes an interdisciplinary approach to train students for a career in emergency management. Further information on the A-DES program is available at: http://www.brandonu.ca/academic/ADES/Index.htm

The Canadian Risk and Hazards Network (CRHNet) (see section 1.7) is based at the University of Manitoba. The Network seeks to provide a forum in which the hazards research and the emergency management practitioner communities can effectively share knowledge and work towards developing innovative approaches that reduce disaster risk

and vulnerability. Further information on the CRHNet and its upcoming Symposium is available at: www.crhnet.ca

PSEPC's Research and Development Division facilitates Canadian research into natural, human-induced and cyber-related hazards that could impact Canadians through an annual funding program. The Division stimulates the creation of new emergency management and critical infrastructure protection-related scientific tools, risk models and other resources that enhance risk assessment, disaster prediction, emergency response and disaster mitigation capacities. The Division also provides advice and interpretation of scientific issues related to the management of emergencies and protection of Canada's critical infrastructure. Several publications dealing with a wide range of Canadian disaster risk reduction issues are located at: http://www.ocipep.gc.ca/research/index_e.asp.

3.3 **Are there educational programs related to disaster risk reduction in your public school system?** If yes, for what age-range? Do you have any educational material developed to support the teachers in this area? (please attach any relevant documentation)

Yes.

The Canadian Red Cross in collaboration with provincial and territorial emergency measures organizations and other partners supports activities, and distributes public awareness and self-help pamphlets to schools on how to prepare for emergencies of all kinds. See http://www.redcross.ca/article.asp?id=000286&tid=025

British Columbia's Provincial Emergency Program has developed grade-appropriate earthquake preparedness teaching aids (distributed to schools) that help students to develop life skill practices that enhance safety during or following an earthquake or other disaster. For more information see http://www.pep.bc.ca/schools/schools.html

The federal Department of Public Safety and Emergency Preparedness develops and disseminates a series of self-help advice brochure to assist individuals and communities build emergency preparedness plans to cope with most natural disasters. See http://www.ocipep.gc.ca/info_pro/self_help_ad/index_e.asp

3.4 **Are there any training programs available?** If yes, please list (if available indicate scope and target audiences of the courses). Do you have any indication on how these courses have been useful to change any practices at local or national scale?

Yes.

As part of its responsibility to foster enhanced critical infrastructure protection and emergency preparedness in Canada, PSEPC delivers a training and education program through the Canadian Emergency Preparedness College (CEPC). The courses offered by the CEPC focus on the management of a multi-service/agency response to an emergency.

The many aspects of emergency planning and management are addressed through courses, seminars and workshops. The CEPC introduced a disaster mitigation component to their basic emergency management course in 2002. See http://www.ocipep.gc.ca/ep/college/cepc_e.asp for more information.

Nearly all provincial/territorial emergency management organizations offer emergency management training. The course content and eligibility criteria for emergency management training that is available at the provincial level can be accessed via the PSEPC website at: http://www.ocipep.gc.ca/home/index_e.asp.

3.5 **What kind of traditional indigenous knowledge and wisdom is used in disaster-related practices or training programs on disaster risk reduction in your country?**

The Climate Change Arctic Net uses traditional ecological knowledge to contribute the knowledge needed to formulate impact assessments, national policies and adaptation strategies to help Canada face the environmental and socio-economic consequences of an Arctic meltdown. The direct involvement of aboriginal knowledge in the scientific process is a primary goal of the network. See http://www.arcticnet.ulaval.ca/index_en.asp

3.6 **Do you have any national public awareness programs or campaigns on disaster risk reduction?** If available, who are the main players for raising public awareness? How are the mass media and schools involved? Who are the targeted groups and how do you evaluate the programs?

Emergency Preparedness Week
Each May, PSEPC coordinates Emergency Preparedness Week activities in conjunction with provincial and territorial officials, and other stakeholders. The main objective is to increase awareness and reinforce the idea that preparedness can reduce the risks and lessen the consequences of disasters. In 2002 and 2003, disaster mitigation was a featured theme for Emergency Preparedness Week activities. More information on Emergency Preparedness Week activities can be located at: http://www.emergencypreparednessweek.ca/

FireSmart Program
NRCan collaborates with other federal, provincial, and municipal governments and organizations in the development of the FireSmart program, which provides information and guidelines for protecting communities from wildfire. Over 15,000 copies of a comprehensive manual have been distributed across Canada and internationally. See http://www.partnersinprotection.ab.ca/assess/site.cfm for more information on the FireSmart program.

Component 4 – Risk Management Applications/Instruments

For effective disaster risk reduction, synergies are needed between sustainable development and disaster risk management practices. Moving from analyzing of and knowing about risks to taking concrete actions to reduce their impacts is a demanding

step. Ideas and practices coming from different disciplinary areas will complement what is already practiced in disaster risk management. For example, instruments for risk management have proliferated especially with the recognition of environmental management, poverty reduction and financial management. Environmental and natural resource management is among the best-known applications to reduce flood risks, control landslides (Through reforestation) and control droughts (through ecosystem conservation). Physical and technical measures, such as flood control techniques, soil conservation practices, retrofitting of buildings or land use planning, are effective in hazard control. Financial instruments in the form of insurance, calamity funds, catastrophe bonds are useful to lessen the impact of disasters.

4.1 **Is there any good example of linking environmental management and risk reduction practices in your country** (key areas of environmental management may include coastal zone, wetland and watershed management, reforestation and agricultural practices, amongst others)? If yes, please indicate in what areas. (Attach any relevant documentation ore references).

Yes.

Climate Change Adaptation

Ouranos (a consortium that pools the expertise and disciplines of numerous researchers) has a mandate to promote the acquisition of knowledge that advances the understanding of regional climate change and its environmental, social, and economic impacts. To this end, it adopts a holistic approach to developing the tools necessary for effective climate change adaptation for decision-makers. For additional information see: http://www.ouranos.ca/intro/intro_e.html

Coastal Management

In the context of climate change and coastal management, the Province of New Brunswick completed a remapping of the entire coast of the province that identifies several natural features that contribute to resilience of the shore-zone by providing ecological buffers, including coral reefs, salt marsh, and mangrove forest and morphological protection in the form of sand and gravel beaches, barriers, and coastal dunes. A study by Environment Canada on the "Impacts of Sea Level Rise on the Coastal Zone of Southeastern New Brunswick is attached. For more information on New Brunswick's coastal zone land use planning, see http://www.grida.no/climate/ipcc_tar/wg2/301.htm

Forestry Management

Over the past 15 years Natural Resources Canada has managed an extensive program of forest fuel management using prescribed burning and mechanical fuel treatments in Banff National Park. The objective is to reduce the risk to life and property in the national park as well as increase the health and diversity of the forest ecosystem.

Flood Management

Designating high flood risk areas as "green corridors" in many Canadian towns and cities areas has contributed to the creation of urban parklands and the preservation of shorelines.

4.2 **Are financial instruments utilized in your country as a measure to reduce the impact of disasters** (e.g. insurance/reinsurance, calamity funds, catastrophe bonds, micro-credit finance, community funds, etc)? If yes, please describe what these instruments are and when they were established, who manages them and who are eligible to them.

Insurance

In Canada, personal and commercial insurance is widely available for most natural hazards (fires, tornadoes, windstorms, hailstorms and earthquakes) though residential flooding is excluded and the rates used for earthquakes vary widely. Earthquake insurance appears to provide some incentives and influence on the construction standards for major infrastructure projects. For additional information on insurance and disaster risk reduction, see Insurance Bureau of Canada at: http://www.ibc.ca/pdffiles/publications/brochures/consumer/home_insurance_Explained.pdf

Disaster Financial Assistance

As part of developing a National Disaster Mitigation Strategy, consideration is being given as to how the Disaster Financial Assistance Arrangements (DFAA) can be adjusted to augment the objectives of disaster mitigation. Consideration is currently being given to enhancing disaster assistance delivery mechanisms that would help reduce the financial impact of disasters on Canadians. More information on the existing DFAA can be located at: http://www.ocipep.gc.ca/fap/dfaa/faqs_e.asp

Under the now defunct Flood Damage Reduction Program, the federal and provincial/territorial governments had agreed not to support development on flood vulnerable areas. Also, the federal agency that insures mortgages – the Canada Mortgage and Housing Cooperation - would not fund or insure mortgages in areas designated as high risk.

4.3 **Please identify specific examples of technical measures or programs on disaster risk reduction that have been carried out in your country (case studies).**

Flood Mitigation

The Red River Floodway, which was built at a cost of about $60 million in the 1960's, is Canada's best known example of structural mitigation. It is estimated that the floodway prevented approximately $6 billion in potential flood damage during the 1997 Manitoba floods and is now being enhanced through a federal/provincial cost-sharing program (see section 1.3).

Earthquake Mitigation

British Columbia has established a Seismic Mitigation Program that is aimed at reducing risk to personal safety and buildings during an earthquake. It includes draft guidelines for non-structural and structural mitigation and upgrading. See http://www.fin.gov.bc.ca/pt/rmb/smp.shtml. Based on information in the National Building Code, BC has also developed earthquake seismic hazard maps. See http://www.pep.bc.ca/hazard_preparedness/NBC_Seismic_Zones-1990.pdf

Forest Fires

The Government of the Northwest Territories has initiated an innovative forest fire protection program that involves community participation to construct and maintain fire breaks and improve fuel load management by planting deciduous trees with low flammability in place on coniferous trees.

Component 5 – Preparedness and Contingency Planning

Preparedness and emergency management has been used as a means for reducing life losses from direct and indirect effects of disasters. A well-prepared system is expected to be effectively informed by early warning, endowed with regularly rehearsed national and local contingency and evacuation plans, fitted with communications and coordination systems, as well as adequate logistical infrastructures and emergency funds. Local-level preparedness, particularly at community level, including training, deserves special attention as the most effective way of reducing life and livelihood losses.

5.1 **Do you have disaster contingency plans in place? Are they prepared for both national and community levels?** If yes, please describe their main components, who is responsible for activating the plan(s) that was or were developed? If yes, what was the result?

Yes.

The structure of Canada's emergency management system is shaped by Canada's legislative, regulatory, and policy framework (see section 1.1). The *Emergency Preparedness Act* outlines the emergency preparedness roles and responsibilities of federal government departments and establishes the federal government's relationship with Provincial/Territorial governments which in turn delegate responsibility to local-level authorities.

The National Support Plan is a comprehensive emergency plan that involves critical functions from every federal department in Canada and was designed in collaboration with the Provinces and Territories. PSEPC is responsible for the National Support Plan, however, every federal government department is responsible for identifying the emergency contingencies that fall within their respective areas of accountability and developing civil emergency plans. Each Province/Territory has emergency plans and all Provinces/Territories encourage local-level authorities to develop emergency plans since local authorities typically provide the first level of emergency response.

The Provincial/Territorial emergency plans can be accessed via the PSEPC web site at: http://www.ocipep.gc.ca/ep/legisla/index_e.asp

5.2 **Has your government established emergency funds for disaster response and are there national or community storage facilities for emergency relief items mainly food, medicine, tents/shelters?** If yes, please provide some details.

Yes.

The Disaster Financial Assistance Arrangements (DFAA) are administered by PSEPC. The Government of Canada provides financial assistance to provincial and territorial governments through the DFAA to assist them in meeting extraordinary expenditures resulting from a major disaster. The Government of Canada may, on an ad hoc basis, establish disaster assistance programs to cater for circumstances that do not fall within the normal DFAA criteria. See http://www.ocipep.gc.ca/info_pro/fact_sheets/general/FA_df_assist_e.asp for more information on the DFAA.

The Office of Emergency Services within the Centre of Emergency Preparedness and Response (Health Canada) is responsible for the National Emergency Stockpile System (NESS), which consists of medical and social services supplies, and equipment for distribution to Provinces/Territories in the event of a natural or human-induced disaster. NESS maintains a national 24-hour response capacity through stockpiling of emergency health supplies at a central depot in Ottawa, seven federal warehouses across Canada, and 1,600 pre-positioned supply centers (the latter under the combined management of the provinces and the federal government).

PSEPC has the federal lead in developing Canada's capacity to rescue victims from major building collapse and to enhance Canada's capability to more effectively respond to earthquakes and other emergencies that result in building collapse. A Canadian Urban Search and Rescue (USAR) model that will establish guidelines and standards, operational plans, and agreements for deployment of USAR teams in crisis is currently under development in collaboration with province/territories, their local authorities and non-governmental organizations.

5.3 **Who is responsible for the coordination of disaster response preparedness and is the coordination body equipped with enough human and financial resources for the job?** Please comment on the effectiveness of the coordination work done so far.

PSEPC is responsible for disaster preparedness and response. See section 1.2. More detailed information PSEPC activities is available at: http://www.ocipep.gc.ca/whoweare/index_e.asp

Through the Joint Emergency Preparedness Program (JEPP), the Government of Canada provides financial contributions to provinces and territories to assist in meeting the costs of projects that enhance the national emergency response capability. The objectives of JEPP are to: facilitate an appropriate and reasonably uniform level of national civil preparedness for emergencies; encourage and support provincial/territorial civil preparedness and through the provinces/territories, community civil preparedness;

provide education and training related to civil preparedness for emergencies; enhance public awareness and understanding of matters related to civil preparedness for emergencies; and analyze and evaluate civil preparedness for emergencies and conducting related research. The Program, administered by PSEPC, establishes a series of co-operative ventures with each party (federal/provincial/municipal) assuming its emergency responsibilities through appropriate contributions. For more information on the JEPP see http://www.ocipep.gc.ca/fap/joint_emerg/en_jepp1_e.asp

Component 6 – Call for good practices in disaster risk management

Based on the above analysis and information provided, please provide at least two examples of any successful implementation of disaster reduction activities in your country (could be of local, national or regional scale); any project or community based experience, national policy, interaction between sectors, etc., would be welcome. Provide maximum one page on each example, indicating area of work, institutions and actors involved, duration, impact of the activities, lessons-learnt and if the example have been replicated. You may also kindly direct us to relevant web-based information/organization.

FireSmart Program

The FireSmart program brings together 22 government and non-governmental organizations to raise awareness, provide information and develop multidisciplinary forums to address fire risk and enhance safety in the wild land/urban interface. The program assists individuals and communities to reduce losses from interface fires by providing residents, municipal officials, land use planners, and emergency response personnel with tools and information on fire risk mitigation strategies. The Program, which has been in existence for over 10 years, is now being adopted by other Canadian provinces. New Zealand, South Africa, Australia and Portugal have expressed interest in the FireSmart program. Further information in the FireSmart program is located at: http://www.partnersinprotection.ab.ca/assess/site.cfm. A substantive analysis of the FireSmart program is provided in a report: "An Investigation of Efforts to Create Safer Communities – the Experience of Canada and the United States" that is available at: http://www.ocipep.gc.ca/research/resactivites/disMit/Newton/Newton_2000-D016_e.pdf

Canadian Lightning Detection Network

In Canada, lightning kills several people every year and seriously injures 60-70. Thunderstorms are always accompanied by lightening and may produce damaging and dangerous weather such as tornadoes, hail, high winds and heavy rainfall. The implementation of 81-sensor Canadian Lightening Detection Network increases public safety by allowing meteorologists to detect and monitor thunderstorms at and early stage in their development. This assists forest services in fighting forest fires caused by lightning and helps utilities in power outage planning.

Using information from the Lightning Detection Network and other data such as Doppler Radar, meteorologists are able to detect thunderstorms earlier, and track them more accurately and if necessary, issue severe weather warnings sooner – in some cases, one to three hours before the storm hit. Early warnings give Canadians more time to take appropriate steps to protect themselves, such as canceling outdoor recreational activities, getting out of the water or sailing to shore before a storm strikes and taking shelter if working out doors. More information can be viewed at: www.weatheroffice.ec.gc.ca/lightning/index_e.html

Component 7 – Priorities you want addressed at World Conference on Disaster Reduction

What do you think are the priority topics to be agreed upon at the World Conference to enhance and strengthen national policy and practice to reduce risk and vulnerability to natural and technological hazards? Please list any other thematic areas or specific topics of discussion that you consider of importance to increase the effectiveness of disaster risk reduction for your country. Please also indicate any particular experience or project that your country would like to exhibit or present at the Conference.

- Methods for changing human response to disaster/emergency management from reactionary (downstream) to proactive (upstream).
- Risk and vulnerability assessment developed for various scales.
- Methodologies for systematic tracking of social aspects of disaster impacts and economic costs.
- How to engage citizens, local authorities and multi-disciplinary stakeholders in hazard and risk identification processes to create a culture of prevention, resilience and sustainability.
- How to ensure that climate change is taken into account during planning and decision-making processes in order to reduce vulnerability.
- How to implement effective financial mechanisms for funding disaster reduction activities.
- Applicability of transferring successful disaster risk approaches and models from one country to another (operational, scientific, public education/awareness etc.)

Conclusion

The objective of the IDNDR was to reduce, through concerted international action, the loss of life, property damage, and social and economic disruption caused by natural disasters. The intention was that by 2000, all countries would have in place:

1. Comprehensive national assessments of natural hazards and risks and would be incorporated into national assessment plans;

2. Mitigation plans at the national and/or local levels, involving long-term prevention and preparedness and community awareness; and

3. Ready access to global, regional, national and local warning systems and broad dissemination of warnings.

In 1994, the Canadian National Committee for the IDNDR submitted a mid-term report that evaluated Canada's participation in the IDNDR and which also identified several areas and new initiatives that would be carried out by the Committee to meet the Decade targets namely: the need for a Canadian assessment of natural hazards, vulnerability and risk; review of existing disaster mitigation-related programs (e.g. the flood damage reduction program, earthquake preparedness and loss prevention programs and Canadian emergency management and disaster assistance programs; and the need for more effective warnings systems).

Canada has made progress in meeting some of the targets approved by the UN General Assembly for the IDNDR and those proposed for a Canadian Program of Action. The first assessment of Canadian Natural Hazards and Disasters published by the CNHAP in 2003 advanced understanding of Canadian naturals hazards. This understanding is an essential advancement to informing disaster risk-based decisions at all levels (individuals and all levels of government) and across all stakeholders (researchers, academia, non-governmental organizations and the private sector). It has also helped to identify the knowledge gaps, priorities and investments required to support disaster mitigation activities in Canada. Further effort however, is required to systematically evaluate disaster vulnerability and enhance Canada's capacity to predict the impact of natural hazards by examining community (or sector's) susceptibility to, and capacity to withstand the perils of nature. Further research and data collection in this area could assist in demonstrating the benefits of mitigating risks and increase commitment to disaster risk reduction.

Canada is fortunate that relatively few lives have been lost due to natural disasters but the costs related to personal property and public infrastructure damage are substantial and seem to be increasing. Significant Canadian disasters during the last ten years, including the Saguenay River flood (1996), the Red River flood (1997), and the Eastern Canada ice storm (1998) and most recently forest fires in British Columbia's interior (2003), have resulted in increased pressure on the Canadian government to develop a National Disaster Mitigation Strategy (NDMS). Since 1998, the Government of Canada has been working

on a the development of a NDMS that would provide a broad-based policy framework within which mitigative measures can be evaluated, prioritized and implemented in a coherent and complementary manner. The proposed NDMS aims to reduce the risks, impacts and reoccurrence of disasters, save lives, minimize property damage, protect the environment and support the development of disaster resilient communities. In doing so, it would reduce costs associated with disaster recovery. Through collaboration with other federal government departments and levels of government, and with stakeholders representing the non-governmental and private sector, it would support systematic coordination of national policy frameworks/initiatives in the areas of infrastructure development and protection, early warning systems, adaptation to climate change and urban communities among other initiatives.

The enactment of legislation at the Provincial/Territorial level (notably Québec, Ontario and British Columbia) that places emphasis on risk assessments as the cornerstone for emergency planning at the local level suggests greater consideration and inclusion of disaster mitigation – long-term actions taken to reduce risk associated with natural disasters – in the development of local emergency plans. Since the undertaking of disaster mitigation measures occurs primarily at the community/local-level, these legislative changes have the potential to shift the current emphasis in Canadian emergency management on preparedness, response and recovery to one that better reflects disaster mitigation as an integral part of comprehensive emergency management.

The establishment of a national Doppler weather radar network has improved Canada's capacity to detect high-impact weather conditions such as hail, blizzards, tornadoes, freezing rain, strong winds and heavy snow and to issue warnings that allow more time for people and decision-makers to take precautionary measures.

The type and magnitude of Canadian natural disasters, scope and resource requirements for achieving sustainable disaster mitigation is such that implementing a NDMS will be an evolutionary process. Both structural (e.g. construction of levees, dams, water diversions, and retrofitting buildings) and non-structural mitigation approaches (e.g. legislation, zoning ordinances, insurance rates, tax policies, building codes, weather and flood forecasts and warnings, community alerting systems) would be encouraged using the "levers and lenses" approach to ensure that disaster risk reduction considerations are taken into account in future infrastructure projects and mitigation-related policy initiatives. Canada continues to undertake a holistic approach to disaster mitigation that is compatible with sustainable development goals and aims to ensure that a NDMS is underpinned by high-quality research, technical expertise and a systems approach based on multi-sectoral and multi-disciplinary collaboration.

Shortened Title: Canada's Approach to Disaster Mitigation

Full Title: Canada's Experience in Developing a National Disaster Mitigation Strategy: A Deliberative Dialogue Approach

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Abstract

Canada is vulnerable to a wide range of natural and human-induced disasters. Recent experience with major natural disasters demonstrated that more needs to be done to protect Canadians from the impacts of future disasters. The Government of Canada, through the Department of Public Safety and Emergency Preparedness Canada, has conducted consultations with provinces, territories and stakeholders to develop a National Disaster Mitigation Strategy aimed at enhancing Canada's capacity to prevent disasters before they occur and promoting the development of disaster-resilient communities. This paper provides an overview of Canada's emergency management and hazards context. It reports on the preliminary findings of consultations with stakeholders and evaluates the usefulness of the deliberative dialogue methodology that was used to facilitate the consultations. Examples that are illustrative of recent Canadian efforts on disaster mitigation and the challenges respecting the development and future implementation of a NDMS are also discussed.

Key Words:

Consultations, deliberative dialogue, disasters, emergency management, hazards, mitigation, prevention, risk reduction

1. Introduction

One of the key roles and priorities for the Government of Canada is to promote quality of life for, and ensure the safety and security of, individual citizens and their communities. A new Department of Public Safety and Emergency Preparedness Canada (PSEPC) that incorporates the former Office of Critical Infrastructure Protection and Emergency Preparedness (OCIPEP), the Department of the Solicitor General of Canada, the Canada Border Services Agency, the Crime Prevention Secretariat of the Department of Justice, and enforcement components of Citizenship and Immigration Canada and the Canadian Food Inspection Agency, was created by the Prime Minister of Canada in December of 2003. In assuming the responsibilities of the former OCIPEP, PSEPC is now the Government of Canada's department with lead responsibility for integrating national security and emergency preparedness partly through coordinating responses to national emergencies and protecting Canada's national critical infrastructure. This includes activities that reduce disaster vulnerability, support emergency preparedness and response efforts, and supplement disaster recovery, in part through financial assistance to provincial and territorial governments after disasters. Other federal government departments play important roles to mitigate potential hazards or their consequences based on delegated authorities and departmental expertise.

Canada is fortunate that relatively few lives have been lost due to natural disasters but the costs related to personal property and public infrastructure damage are significant. The Disaster Financial Assistance Arrangements (DFAA), established in 1970, are the primary mechanism by which the Government of Canada provides

assistance to Canadians affected by disaster through *ex post facto* payments to provincial and territorial governments. Since 1996, Canada has experienced a significant escalation in DFAA costs. The physical devastation and economic losses resulting from the Saguenay River flood (1996), the Red River flood (1997), and the Eastern Canada ice storm (1998) exposed the susceptibility of Canadians to major natural hazards. Together, these events affected approximately 20% of the Canadian population and cost the Canadian government an average of $366 million each in disaster financial assistance payments. Notably, prior to 1996, the Canadian government's disaster assistance costs per incident did not exceed $30 million.

Mitigation receives comparatively less attention than preparedness, response, or recovery making it the least developed component of Canada's emergency management system. The three major natural disasters mentioned above prompted the Government of Canada to embark on a major initiative to develop a National Disaster Mitigation Strategy (NDMS) and consider explicitly the need for pre-event mitigation measures to limit Canada's vulnerability to disasters. A NDMS would enhance Canada's capacity to implement measures that reduce risk, limit social disruption, and contain the economic costs that result from disasters. It would replace a piecemeal approach with a proactive and systematic coordination of mitigative activities that foster the development of disaster resilient communities.

In 1998, and again in 2002, the Canadian government undertook a collaborative and multi-disciplinary approach to consult with stakeholders that focused attention

on disaster mitigation as a vital component of comprehensive emergency management. This paper provides an overview of Canada's hazards context and disaster trends, shares the experience of the deliberative dialogue consultative process that was utilized to facilitate the 2002 NDMS consultations, and reports on the progress that Canada has made to advance the concept and practice of disaster mitigation.

2. Canadian Natural Hazards Context

Canada's immense size, varied climate and extensive geography expose it to numerous natural hazards. The geologic characteristics of western Canada make it susceptible to rock falls, snow avalanches, and earthquakes. Approximately 1500 earthquakes are recorded in Canada each year with potential risk to several major Canadian cities on Canada's west coast, the Ottawa-Montréal corridor, and the St. Lawrence Valley (Natural Resources Canada, 2004). Since older buildings (pre-1970) are not subject to the seismic provisions stipulated in the 1995 National Building Code of Canada, the potential for severe damage due to a moderate or severe earthquake is high (Foo and Davenport, 2003).

Approximately eighty percent of Canadian disasters are due to weather and weather-related hazards such as tornadoes, hurricanes, hail storms, blizzards, storm surges, ice storms, and floods. Hail storms, and as many as eighty tornadoes, are recorded annually in southern Ontario, southeastern Québec, and in the Prairie provinces of Manitoba, Saskatchewan, and Alberta (McBean and Henstra, 2003). Canada's Atlantic coast is susceptible to hurricanes and storm

surges (Bruce, 2002) and severe winter storms occur frequently across parts of the country. In the summer months, high temperatures and low humidity often create conditions ideal for wild fires that typically threaten rural settlements on the Prairies, in British Columbia, Ontario, and Québec. Flooding, which is Canada's most frequently occurring disaster, affects all provinces and territories with the highest frequency in Ontario, New Brunswick, Québec, and Manitoba (Canadian Disaster Database, 2004; Shrubsole et al, 2003).

A population is made more vulnerable by characteristics within the built, natural, and socio-economic environment that make it susceptible to harm. The array of natural hazards highlights the likelihood that Canadians could suffer loss due to natural hazards. What makes Canada vulnerable is the concentration of its population in regions of high risk. Canada's population is concentrated in 25 census metropolitan areas (McCrea-Logie, 2003), some of which are located in seismically active regions, on coastal plains, or river basins that have a higher risk. For example, Vancouver, with a metropolitan population of 2.1 million, faces risks from earthquakes, tsunamis, flooding, and rising sea levels. Canada's northern territories, which by comparison are sparsely populated, are less vulnerable to the same perils. Furthermore, the urban infrastructure in many Canadian communities is aging and its ability to withstand the impacts of extreme events is increasingly uncertain.

In Canada, as in other parts of the world, the tendency towards more disasters and escalating disaster costs seems inevitable. Processes such as urbanization,

globalization, climate change, and reliance on technologically-based and interdependent infrastructure have the potential to significantly increase risks, direct and indirect costs, and the complexity of managing disasters that Canadians could face in the future – including establishing an efficient national emergency management system that encompasses mitigation, preparedness, response and recovery. Canadians experienced an array of disasters in 2003: flooding in Manitoba, British Columbia, Newfoundland, and New Brunswick; destructive tornadoes and hailstorms in Manitoba and Alberta; major forest fires in Alberta, British Columbia, Manitoba and Ontario; hurricanes in Ontario, Nova Scotia and Prince Edward Island are illustrative of what the future could entail should the climate change predictions of scientists materialize. Using the Canadian Disaster Database (2004), Dore (2003) developed statistical profiles of major Canadian disasters that occurred between 1900-2000 to estimate conditional probabilities and approximate preliminary costs due to natural disasters. He concluded that Canadians can anticipate that at least one geophysical disaster and as many as twelve hydro-meteorological disasters to occur annually with costs estimated at $29 million (CDN) and $1.8 billion (CDN) respectively. Curtailing this escalating trend begets a need to focus on reducing disaster vulnerability and protecting Canada's economic and social assets through concerted efforts in disaster mitigation.

3. Canada's Emergency Management Framework

The structure of Canada's emergency management system is shaped by Canada's legislative, regulatory, and policy framework. The *Emergency Preparedness Act* (1988) outlines the emergency preparedness roles and responsibilities of federal departments and establishes the federal government's relationship with provincial and territorial governments which in turn delegate responsibility to local-level authorities. This jurisdictional relationship demands a "teamwork" approach to managing Canadian emergencies that is based on three key principles outlined below.

First, those closest to the emergency are considered best placed to provide emergency services. Local-level authorities provide the first level of response and are supported by provincial or territorial governments when a disaster exceeds local-level capacity to cope. The Government of Canada provides support when provincial or territorial resources are exhausted, when specialized support residing in federal government institutions is required, or in areas that fall exclusively under federal jurisdiction (e.g., National Parks and First Nations' reservations). Notably, the vast majority of Canada's natural disasters are managed at the local or provincial level.

Second, an *all-hazards* approach is taken to deal with a broad range of emergencies and disasters. This generic approach encourages emergency management organizations to plan for, and reduce vulnerability from, potential

adverse consequences regardless of the source thus avoiding the duplication planning efforts across the range of hazards.

Finally, a comprehensive approach integrates four interrelated, but not necessarily sequential, pillars of emergency management: mitigation, preparedness, response, and recovery. These pillars are defined as.

- Mitigation – sustained measures to reduce or eliminate risks and impacts associated with natural and human-induced disasters.
- Preparedness – development of effective policies, procedures and plans for how best to manage an emergency.
- Response – actions taken immediately before, during or directly after an emergency occurs.
- Recovery – efforts taken to repair and restore a community after an emergency.

There are two commonly held views of disaster mitigation in Canada. One that considers mitigation as occurring during all stages of the emergency management continuum (Pearce, 2003) and another that views mitigation as the "upstream" cornerstone of action taken before a disaster occurs on which comprehensive emergency management is predicated. In terms of Canada's ongoing efforts to develop a NDMS, PSEPC's conceptualization of mitigation is pragmatic. This approach recognizes that the emergency management system operates in a continual feedback loop that is essential to improving the capacity of Canadians to manage future events. Particular emphasis is placed on the need to strengthen

and integrate pre-event disaster mitigation into the broader practice of Canadian emergency management.

Until now, pre-event mitigation has been an implicit requirement despite evidence that “an ounce of prevention is worth a pound of cure.” Disaster mitigation undertaken well in advance of a disaster is arguably the most critical and effective intervention for risk reduction. Its scope, unlike the other three pillars, is more closely linked to sustainable development and the ongoing everyday activities of a community. By contrast, the other three pillars are reactive and primarily seek to diminish the severity of impacts following the onset of an event or facilitate recovery efforts, rather than proactively reduce susceptibility to future harm.

Canada’s current emergency management approach remains overtly response-focussed. Recurrent natural disasters, anticipated increases in hydro-meteorological disasters due to climate variability, and potential costs to society are placing pressure on all levels of government to modernize the existing emergency management system. Placing greater emphasis on disaster risk reduction measures would help to address an “emergency centric” orientation and reduce growing fiscal and social demands associated with response and recovery.

4. National Consultations on Mitigation

A first round of consultations co-hosted by the former Emergency Preparedness Canada (predecessor to OCIPEP and now PSEPC) and the Insurance Bureau of Canada were held with stakeholders in 1998. The results of those consultations indicated that a strategy was needed to re-orient Canada’s response-focussed

emergency management system and to foster a culture of disaster prevention. The consultations also highlighted the need for strategic partnerships and shared responsibility among all levels of government, the private, and non-governmental sectors, to enable communities to work together to strengthen their resilience to the negative consequences of hazard events.

Subsequently in spring 2002, PSEPC (then OCIPEP) used the recommendations stemming from the 1998 consultations to consult on six proposed elements of a NDMS (Appendix 1). The objectives of these consultations were to clarify the potential roles and responsibilities of all levels of government and stakeholders; learn about progress being made concerning mitigation measures developed locally or regionally; provide a forum for dialogue that would help shape policy direction; recommend priority areas for action; and model the kinds of collaborative behaviour that would be required to implement a national mitigation policy.

PSEPC embarked on a consultation process using a publicly accessible Web site, bi-lateral discussions with provincial and territorial governments, and six regional consultation workshops with stakeholders representing academia, the private and not-for-profit sectors, and industry, to solicit their input on disaster mitigation. The preliminary results of the regional consultation workshops and the utility of the deliberative dialogue process used to facilitate them are the focus of this paper.

4.1 Deliberative Dialogue

Deliberative dialogue is a structured facilitation process that engages stakeholders in a way that helps draw out important values and trade-offs associated with pursuing a particular strategic policy direction. Through a shared exploration of different perspectives, participants thoughtfully discuss a complex issue in potentially new ways that tend to break away from habitual positions or "stuck" and pre-determined solutions. Deliberative dialogue builds on participants' knowledge and experiences to find common ground from which alternative strategies or policies can be pursued (Dale, 2002). In contrast to other public involvement processes, such as town hall meetings that emphasize debate or advocacy of positions, deliberative dialogue is founded on collaboratively exploring underlying values and assumptions, sharing of collective views, and building on the perspectives of others to arrive at a shared solution (Dale 2001; Mathew and McAffee, 2003).

The usual application of deliberative dialogue is for citizens' groups (Mathews, 1999). In this case, deliberative dialogue was used with stakeholders as a first step toward creating a long-term relationship among diverse stakeholders with ownership and commitment toward shared outcomes and responsibilities for disaster mitigation. The process brought together informed stakeholders to develop approaches for advancing disaster mitigation in Canada and to conceptualize potential roles and responsibilities for a nationally coordinated mitigation strategy.

4.2 Deliberative Dialogue Methodology

An “issue framing” session was held in January of 2002 with a small group of selected subject matter experts and mitigation-relevant stakeholders from government and non-governmental sectors to initiate the deliberative dialogue consultation process. During this session, participants considered various approaches to disaster mitigation as the basis for developing a deliberation (consultation) guide which provided an overview of disaster mitigation, and explained the deliberative dialogue process. It also and outlined three objective approaches: risk management; research; and empowerment for pursuing disaster mitigation that provided the “springboard” for discussion in the subsequent dialogue workshops.

The risk management approach supported a NDMS in which comprehensive all-hazard risk assessments would be conducted as the first step to ensuring that mitigation measures do not postpone, transfer risk to other areas, or inadvertently increase risk/losses from other hazards. The research approach envisioned a NDMS oriented primarily towards creating and disseminating knowledge to emergency management practitioners and decision-makers. Under the empowerment approach, a NDMS would focus on establishing a supportive context by raising awareness of disaster mitigation and empowering citizens and stakeholders to undertake proactive measures within a framework that facilitates a greater degree of coordination and effective allocation of limited resources.

In May of 2002, approximately 170 participants with diverse experience and views regarding emergency management, hazards research, and risk management attended regional consultation workshops in Toronto, Halifax, Montréal, Winnipeg, Edmonton, and Vancouver. Participants included representatives from the private sector, non-governmental organizations, academia and professional associations representing the engineering and construction industry, Canadian municipalities, First Nations groups, emergency preparedness associations, police services, urban planners, and the transportation sector. Federal government and provincial officials participated as observers and information resources. Workshop participants explored each approach with the assistance of a facilitator trained in the deliberative dialogue method. The purpose of the process was to identify alternative approaches and key elements for a NDMS as well as to develop common ground that included establishing a goal, principles, and scenario ideas considered essential to the development of a NDMS. The outcomes of the consultation sessions are discussed in further detail in this paper.

4.3 Deliberative Dialogue and Disaster Mitigation

Deliberative dialogue corresponds suitably with the sustainable hazards mitigation paradigm. Sustainable hazards mitigation is premised on six essential components: environmental quality; quality of life; disaster resiliency; economic vitality; inter- and intra-generational equity; and participatory processes (Mileti, 1999). The sixth component and the consensus-based approach of deliberative dialogue have similar conceptual underpinnings and intentions. In both, the involvement of local participants – people who have a stake in an issue

and its outcome – is considered essential for identifying concerns and issues, generating solutions for addressing them, reaching agreement on how they could be resolved, and in recommending measures to be undertaken. Both challenge stakeholders to raise first their awareness of their own assumptions and then to suspend those pre-existing biases in order to consider new ways of seeing and resolving issues that are significant to society. Stakeholders are forced to think beyond the facts and "preferred" options and consider fully the implications of the decisions being made and whether or not they represent the interests and values of society.

According to Mileti, a participatory process should be utilized for the information it generates and distributes, for the sense of community it can foster, for the ideas that grow out of it, and for the sense of ownership that it creates. How deliberative dialogue can contribute to participatory processes within the sustainable hazards mitigation framework and the building of a culture of collaboration among stakeholders is discussed as part of the outcomes of the consultations.

4.4 Preliminary Results of the NDMS Stakeholder Consultations

The most significant result of the consultations was that substantial interest and common ground exists among government and non-governmental stakeholders. They agreed that disaster mitigation should be an emergency management priority of the Government of Canada. Overall, stakeholders were supportive of the six proposed NDMS elements and participants appreciated the use of the deliberative dialogue methodology to gather their views on disaster mitigation. Participants re-

affirmed the need for Government of Canada leadership to address the existing piecemeal approach to disaster mitigation across the country by facilitating systematic coordination of these initiatives at all levels (i.e., government, private and non-governmental stakeholders). Given the multi-sectoral and inter-disciplinary nature of disaster mitigation, participants advised that specific cooperative arrangements that assign responsibilities for disaster mitigation are needed. They also recommended that a NDMS should involve and empower communities to ensure that risk reduction measures do not inadvertently transfer risk to other areas or potentially increase risk from other hazards. Inter-disciplinary research enhancing Canadian knowledge about hazards and disasters should be encouraged and used to inform decision-making. It was acknowledged that there is an information gap; unless a concerted effort is made to inform citizens about the risks they face, and how they may be resolved, misconceptions and resistance to disaster mitigation would persist.

Participants recommended a “carrot and stick” approach using both financial incentives (e.g., tax breaks, reduced insurance premiums, grants and loans) and non-financial incentives (e.g., awards and recognition) to encourage progress on disaster mitigation. There were varied views on the use of penalties to discourage some risk-taking behaviour. The insurance sector, for example, noted that individuals who choose to live in risk-prone locations should not be “rewarded” for the risk they deliberately assume. Others said that a NDMS should balance the ethical and normative values of Canadian society and seek to ensure the greatest good for the greatest number – not all individuals have a choice in the risks they

assume. Evidence exists that social-economic and cultural factors such as employment, income, education, disability, and ethnicity are positively correlated with the degree of hazard exposure, individuals' risk-taking behaviour, and their ability to cope with hazard impacts or undertake mitigative measures (Blaikie et al 1994; Ferrier and Haque, 2003; Mileti, 1999).

A range of other ideas for strengthening disaster mitigation were suggested. A NDMS should incorporate sufficient flexibility to accommodate the varying risks as well as regional and local circumstances that exist across the country. Many participants strongly advocated an incremental approach to implementing a NDMS – to start modestly with what we have, and what we know, and sustain the evolution of the work over the long-term. This approach would facilitate the requirement to link a NDMS to other relevant government initiatives such as reform of the federal Disaster Financial Assistance Arrangements (DFAA), climate change adaptation, critical infrastructure protection (i.e., energy and utilities, communications and information technologies, finance, health care, food, waste and water, transportation, safety, government, and manufacturing), and non-governmental initiatives. First Nations groups spoke compellingly on the need for a "seven generation" perspective linking a NDMS with a principle that underpins sustainable development – mitigation is an investment in our future and the decisions taken today should benefit, not burden, future generations.

Input from workshop participants was used to develop a vision for a NDMS including a draft goal and set of policy principles (Table 1) that could guide a

nationally coordinated mitigation strategy and facilitate the creation of disaster-resilient communities.

Table 1: Draft National Disaster Mitigation Strategy

Goal and Principles

Goal	Principles
Protect lives while maintaining sustainable and resilient communities by fostering disaster mitigation as a way of life.	Preserve Life – protect lives through prevention. Safeguard Communities – enhance economic and social viability by reducing disaster impacts. Fairness – equity and consistency in implementation. Sustainable – balance long-term economic, social and environmental considerations. Flexible – responsive to regional perspectives. Shared – shared ownership and accountability through partnership and collaboration.

4.5 Utility of Deliberative Dialogue to NDMS Consultations

Stakeholders acknowledged the value of the deliberative dialogue methodology. In particular, participants found that the method was preferable to other consultation approaches because it enabled a deeper and more meaningful exploration in the time allocated. Dialogue tended to be generative rather than argumentative or fixed in pre-determined positions. In terms of the three approaches that were advanced in the deliberation guide, research was viewed as an essential tool – not a strategy in itself; risk assessment was seen as the starting point but not a complete strategy on its own; and empowerment was viewed as the over-arching approach to reach long-term and sustainable change. Each approach embodied

important prerequisites for a NDMS, however, pursued individually, neither would provide a solid foundation for a NDMS. Participants also noted that pursing each approach individually would perpetuate the existing piecemeal approach to mitigation.

In many ways, the deliberations supported the consensus-building thrust which is integral to the sustainable hazards mitigation paradigm. The dialogue workshops brought a significant number of instrumental participants into the process to but who, until then, had not been actively engaged. By bringing together diverse and "non-traditional" stakeholders to discuss disaster mitigation policies and goals, the deliberative dialogue methodology raised the level of understanding and enriched the collective intelligence among stakeholders. This assisted the identification of priority areas for action and the development of new insights on disaster mitigation. Although "citizens" (i.e., individuals unaffiliated with any particular organization) were excluded from the deliberations, the significance of key stakeholders in supporting the aspirations of local communities cannot be overlooked (Fiskin, 1992). The success of local-level planning and implementation of risk reduction initiatives by community stakeholders cannot be achieved without strong leadership from all levels of government (Geis, 1996; Mileti, 1999; Pearce, 2003). The stakeholders' deliberations on goals, policy principles, and approaches to disaster mitigation generated a sound body of knowledge and constructive ideas. These results of the consultations will influential in formulating recommendations to the Government of Canada. Provinces and territories have reviewed the outcomes

of the deliberative dialogue process and have expressed general support for the thrust of the proposed NDMS vision, goal, and principles.

There appears to be momentum, in part due to the 1998 and 2002 consultations and the efforts of the Canadian Natural Hazards Assessment Project (Etkin et al, 2003), to strengthen the links between the emergency management practitioner community and the hazards research community. In 2002, the deliberative dialogue consultations re-affirmed the need for knowledge generation, stronger networks of researchers and practitioners, and the creation of mechanisms to help inform the decisions of policy-makers and the actions of individual Canadians. A nationally coordinated, multi-stakeholder Canadian Hazards and Risk Network (CHRNet) is evolving and key players within this network are planning to host the first Canadian symposium on disaster mitigation in November 2004.

The deliberative dialogue process was evaluated by participants and some shortcomings were identified. The view of some participants was that three approaches presented in the deliberation guide were not distinct. Based on that, there was some unease that the deliberative discussions were superficial as there were no “real choices” to be considered. It is acknowledged that participants’ familiarity with the dialogue process and more time during the “issue framing” workshop could have aided the development of more discrete approaches that more accurately reflected the intent and values of the process. Despite this shortcoming, the stakeholder deliberations were constructive and the richness and

diversity of the views generated are useful for directing policy and action on disaster mitigation in Canada.

It was noted that not all stakeholders were represented at the workshops and even among those involved, not all participants became fully engaged in the deliberations despite the method's explicit goal of opening "space" and allowing all views to receive fair and equal consideration. This limitation was partly overcome by establishing parallel consultation mechanisms. For example, a publicly accessible Web site augmented the deliberations to encourage the broadest representation of all views.

In the view of the majority of participants, the one-day dialogue sessions stimulated thought-provoking discussions on disaster mitigation in Canada. A relatively small percentage felt that the process was unfamiliar and did not provide sufficient time to fully deliberate the policy and practical implications of pursuing any particular approach to disaster mitigation.

A final but key observation was that additional resources and commitment are required to understand and further develop alternative ideas raised through the dialogue deliberations.

5. Progress on Disaster Mitigation

A NDMS is yet to be approved as of February 2004. Despite this, existing programs and new initiatives continue to provide the Government of Canada with a basis upon which to move forward on significant structural and non-structural

aspects of disaster mitigation. A long standing committee of Senior Officials Responsible for Emergency Preparedness (SOREP), a Federal/Provincial/Territorial Advisory Group, and a Government of Canada Inter-departmental Mitigation Coordination Committee (IMCC) that were established by PSEPC in 2001, presently serve as the primary coordination mechanisms for governments to discuss mitigation issues. Through these bodies, mitigation-related initiatives within the Government of Canada and at the provincial and territorial levels are being identified as the basis for determining priority areas for action and future collaboration on disaster mitigation. PSEPC is also trying to find concrete ways to collaborate with non-governmental stakeholders to identify projects and initiatives that complement the government's efforts.

The process and the means by which community needs are met during recovery have a bearing on disaster mitigation. The PSEPC review of Canada's Disaster Financial Assistance Arrangements (DFAA) includes consideration of ideas relating to post-event mitigative enhancements that could augment the pre-event emphasis of a national mitigation strategy. Alignment of any DFAA modifications and a NDMS will be considered as PSEPC moves forward on both initiatives.

In addition to PSEPC's work related to disaster mitigation, other Government of Canada departments and agencies have existing programs and initiatives that lend themselves to the strategic objectives of a NDMS. For example, Environment Canada, through the Meteorological Service of Canada, plays a significant role in

predicting and informing the public about weather-related risks. Environment Canada's completion of the National Dopplar Rader Project (Environment Canada, 1997) and funding support for research related to high-impact weather will provide more accurate and timely weather forecasts, potentially reducing personal injury and property damage that could result from extreme weather events.

Recent initiatives within Natural Resources Canada to implement a Natural Hazards Action Plan, and to develop detailed hazard and risk assessments along with the proposed development of a Canadian Disaster Management Information System, contribute to disaster mitigation planning and emergency response, potentially diminishing risks from earthquakes, tsunamis, and landslides. Through the Climate Change Impacts and Adaptation Directorate, Natural Resources Canada is also providing leadership of Canadian efforts to anticipate and plan for the impacts of climate change relating to extreme weather events.

The Canadian government is investing substantially in the renewal of Canada's public infrastructure through the Canada Strategic Infrastructure Fund (CSIF). The CSIF provides a unique partnership opportunity for the federal, provincial and territorial, and municipal governments to reduce disaster vulnerability and to support the development of disaster resilient communities by incorporating risk reduction measures during the design, building and refurbishing of major infrastructure. The National Research Council has a mandate to develop and update Canada's National Building Codes, providing another area linked to the

proposed NDMS goal and principles which may be further enhanced to strengthen national efforts in disaster mitigation.

PSEPC also promotes a “levers and lenses” approach that allows it to strategically influence and coordinate disaster risk reduction efforts through horizontal collaboration with key federal departments. In the case of major infrastructure initiatives, for example, the use of an analytical “mitigation lens” would encourage better foresight at an early stage to incorporate risk reduction measures when developing or upgrading major public infrastructure. Such steps would help encourage more effective use of resources and adoption of development policies that are aligned with the objectives of disaster mitigation. PSEPC’s success in establishing linkages with other federal initiatives was reflected in an April 2003 announcement by the Government of Canada (concerning the Canada Strategic Infrastructure Fund) and the Government of Manitoba to cost-share the first stages of a major expansion of the Red River Floodway which will further protect the City of Winnipeg from devastating floods. The current “levers and lenses” approach, stems from advice advanced during the Spring 2002 round of disaster mitigation consultations and is aimed at maximizing the use of existing limited resources, programs and initiatives of other federal and national agencies.

Provincial and territorial governments have embarked on important initiatives that enhance disaster mitigation. In the Northwest Territories, the government has initiated an innovative forest fire protection program that involves community participation to construct and maintain fire breaks and reduce fuel loads by planting

deciduous trees with low flammability. *Québec's Civil Protection Act* of December 2000 and *Ontario's Emergency Readiness Act* of November 2002 (both of which require municipalities to undertake hazard identification, risk assessment, and adopt preventive measures to reduce disaster vulnerability), are further examples of forward-looking provincial measures that help strengthen Canada's emergency management system through disaster mitigation.

In the summer of 2003, the Canadian Natural Hazards Assessment Project, jointly funded by PSEPC, the Meteorological Service of Canada, and the Institute for Catastrophic Loss Reduction, published Canada's first comprehensive assessment on the state and nature of knowledge about Canadian hazards and disasters (Etkin et al, 2004). The joint funding approach and the voluntary technical input provided by Canadian hazards research experts and emergency management practitioners are illustrative of new partnerships that are generating knowledge, informing the public, and supporting policy-makers and emergency management practitioners with improved risk management information.

6. Challenges

Thus far, the process of developing Canada's NDMS has highlighted a number of areas to be addressed. Governance, for example, could be a complex area depending on the eventual scope of a NDMS. What should be the proper balance and type of leadership on the part of the federal, provincial and territorial, and municipal governments? Provincial and territorial emergency management organizations (EMOs) have the legislative authority to support a range of

emergency management efforts, but current laws do not necessarily position EMOs to influence action on pre-event mitigative measures. For example, the enforcement of building codes or land use regulations are delegated to municipal authorities or overseen by provincial ministries as non-emergency management responsibilities. The pressing issue is not whether, but how, to best integrate disaster mitigation into the evolving emergency management framework. Municipalities are unlikely to welcome any increased responsibility related to disaster mitigation planning without corresponding increases in resources. Fiscal pressures have led to further questions about how municipalities and other stakeholders could be involved in the decision-making process and, in particular, whether a NDMS should be implemented on a voluntary basis, through legislation, or by using a “bottom-up” or “top-down” approach.

Funding remains a fundamental and on-going challenge. No decisions on the scale of investment, if any, for a NDMS have been made at the time of writing. Some stakeholders noted during consultations that a credible NDMS would need to be sufficiently funded up-front to strengthen capacity in identified areas of significant weakness. Other stakeholders noted that obtaining additional resources was important, although significant initial progress could be made with modest incremental resources. Questions were also raised on how to estimate new resource needs for disaster mitigation. For example, should funding mechanisms be separate or linked to existing programs? How should cost-sharing with the private and non-governmental sector be explored? There were mixed views on these questions, particularly on whether to link a NDMS to

resources available through the CSIF. In the absence of nationally consistent cost/benefit methodologies, quantifying disaster costs and making the business-case for additional resources to support disaster mitigation efforts remains an ongoing challenge.

Recent terrorist events (e.g., September 11, 2001) and the new security environment, animal diseases (e.g., Bovine Spongiform Encephalopathy), human diseases (e.g., Severe Acute Respiratory Syndrome), and a widespread power failure (August 2003) that affected Ontario and parts of the United States have demanded immediate attention and resources from affected sectors across all levels of government. While the social and economic costs associated with these disasters have once again highlighted the need to take action before disaster strikes, these compelling and urgent priorities may have drawn the focus of decision-makers and practitioners away from the NDMS development process.

7. Future Direction on Disaster Mitigation

With the creation of PSEPC in December 2003, the Government of Canada signaled its intent to renew Canada's emergency management system through a new "whole-of-government" approach to public safety and emergency preparedness. This new approach clearly places emphasis on the need for a robust and comprehensive emergency management system. With respect to disaster mitigation, building a NDMS is an evolutionary process integral to the enhancement of the current emergency management system. A NDMS may best be initiated through existing programs and resources at the outset, and be built up

as more resources become available. Future areas of focus for a NDMS should build on the six proposed elements (Appendix 1). Targeted initiatives would be implemented by all levels of government, private, and non-governmental sectors to influence public attitudes pertaining to risk reduction. Efforts could be directed toward ensuring that a NDMS is underpinned by high-quality research and technical expertise, and to takes advantage of new technologies to improve risk management decisions and disseminate knowledge about hazards.

It is envisaged that a NDMS would encourage cost-shared efforts and partnered initiatives to ensure that mitigation activities are implemented and monitored at the most appropriate level. The Government of Canada will continue to promote a "whole-of-government" approach to disaster mitigation. Both structural and non-structural mitigation approaches will be encouraged using "levers and lenses" to incorporate risk reduction criteria in future infrastructure projects.

8. Conclusion

Stakeholders strongly supported the concept of a NDMS as part of the need to create a robust national emergency management system. They agreed that mitigation would be a wise investment in Canada's future. The existing commitment is supported by the fact that governments at all levels continue to make meaningful, albeit modest, investments in disaster mitigation in the absence of a fully-developed NDMS. An overarching framework for disaster mitigation would address the current shortcomings associated with a piecemeal approach to

mitigation. Greater attention to mitigation would also strengthen the broader emergency management framework in Canada.

While progress on disaster mitigation has been made during the last two years, more work is required to collate, quantify, and assess mitigative capacities across the country and help build a compelling business case for a NDMS. The right mix of incentives and "disincentives", balanced legislation, regulations, and policies could augment local-level responsibility and investment in disaster mitigation. Participatory attributes of deliberative dialogue are relevant and complementary to the prevailing emergency/disaster management paradigm because they bring into focus essential knowledge and expertise to inform and support effective decision-making.

Recent dialogue with key stakeholders has advanced the determination of a common vision, goal, and set of principles for a NDMS and the potential roles of governments and stakeholders are also taking shape. The motivation for finding effective mitigation solutions that will help renew Canada's national emergency management system is a society better able to withstand and manage the consequences of disasters.

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Appendix 1: Proposed Elements of a National Disaster Mitigation Strategy

Element	Description
Leadership and Coordination	Coordination of disaster mitigation activities occurring at all levels of government, the private sector, non-government organizations and communities to ensure an integrated approach to managing mitigation.
Partnership and Shared Responsibility	Encouraging partnerships among all levels of government, professional groups and academia, and the private and voluntary sectors to develop consensus on disaster mitigation matters.
Hazard Identification and Risk Assessment	Ensuring that measures to reduce the impact of probable disasters are taken based on sound hazard identification and risk assessment.
Research, Information Dissemination, and Decision Support Systems	Ensuring that research provides current, accessible, coordinated, and complementary tools that assist informed decision-making on disaster mitigation.
Public Awareness, Training, and Education	Ensuring that governments and the public perceive and understand the risks and the range of contingencies for reducing the risk or impact.
Incentives and Resources	Incentives for disaster mitigation are required if mitigation is to become a consideration for all stakeholders.

Department of Public Safety and Emergency Preparedness

National Disaster Mitigation Strategy Update

Spring 2004

Background

- On December 12, 2003, the Prime Minister created the Department of Public Safety and Emergency Preparedness (PSEPC). PSEPC incorporates the former Office of Critical Infrastructure Protection and Emergency Preparedness (OCIPEP), the former Department of the Solicitor General, the National Crime Prevention Strategy Group from the Department of Justice Canada, the Canada Border Services Agency and enforcement elements from both Citizenship and Immigration Canada and the Canadian Food Inspection Agency.

- PSEPC is composed of five branches: Emergency Management and National Security; Portfolio Relations and Public Affairs; Policing and Law Enforcement; Community Safety and Partnerships; Corporate Management.

- PSEPC – Emergency Management and National Security has responsibility to develop a National Disaster Mitigation Strategy (NDMS). The objective of a NDMS is to establish long-term solutions that reduce or eliminate the risk and impacts of all types of disasters on Canadians.

- PSEPC (then OCIPEP) undertook consultations with provinces/territories, federal government departments and agencies and key mitigation stakeholders in the Spring of 2002.

Progress on Disaster Mitigation

- There are still no identified funds for a NDMS and decisions on the scope and scale of a NDMS are yet to be made.

- PSEPC is employing a "levers and lenses approach" to strengthen collaboration and encourage incorporation of disaster reduction measures into existing and new Government of Canada programs and initiatives. Some examples of this collaboration are cited below:

    - PSEPC participates on ADM-level and Director-level Committees managed by Natural Resources Canada's Climate Change Impacts and Adaptation Directorate which was set up to anticipate and plan for the impacts of climate change, including extreme weather events.

- PSEPC continues to play a key role by encouraging the incorporation of mitigative considerations in the design, construction, and retrofitting of major infrastructure through Infrastructure Canada's Canada Strategic Infrastructure Fund and Municipal Rural Infrastructure Fund. An April 2003, $80 million contribution provided by the Government of Canada towards expansion of the Red River Floodway is emblematic of PSEPC's efforts. A further $40 million towards flood protection in Manitoba was announced by the Government of Canada in August 2003.

- The Canadian Natural Hazards Assessment Project (CNHAP), which was jointly funded by PSEPC, the Meteorological Service of Canada, and the Institute for Catastrophic Loss Reduction, published Canada's first comprehensive assessment on the state and nature of knowledge on Canadian hazards and disasters in June 2003 and will soon publish "An Assessment of Natural Hazards and Disasters in Canada – A Report for Decision Makers and Practitioners" that provides decision-makers with compelling reasons to invest in, and take action respecting disaster mitigation and address the shortcomings identified in the assessment.

- PSEPC continues to collaborate with and support the Canadian natural hazards and emergency management community. PSEPC has agreed in principle to help coordinate broader Government of Canada partnership and participation at the inaugural Symposium of the recently established Canadian Risk and Hazards Network that will be held in Winnipeg, November 18-20, 2004. In February, 2004 PSEPC submitted a paper on "Canada's Experience in Developing a National Disaster Mitigation Strategy: A Deliberative Dialogue Approach to the Journal of Adaptation and Mitigation Strategies special issue on "International Perspectives on the Mitigation of Natural Hazards and Disasters" that will be published in the Fall, 2004.

- PSEPC is also working closely with Foreign Affairs Canada (FAC) in planning for, and establishing the Government of Canada's position on natural disaster risk reduction at the World Conference on Disaster Reduction to be held in Kobe, Japan from January 18-22, 2005.

- Improving Canada's emergency management framework to emphasize the principles and practice of mitigation is an element of current discussions in the context of planning for transition to a new government. PSEPC is committed to the establishment of an integrated and systematic approach to reducing the risks and consequences of disasters.