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Canadian Disaster Management Policy: Moving Toward a Paradigm Shift?

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Compte tenu de l'accroissement des pertes résultant des catastrophes survenues ces dernières années, et du fait qu'on prédise un environnement naturel de plus en plus dangereux, de nombreux pays à travers le monde revoient leurs politiques concernant la gestion des catastrophes naturelles, en vue de mettre davantage l'accent sur l'atténuation des effets et sur la réduction des risques. Dans cet article, nous déclarons que le Canada n'a pas intégré suffisamment l'atténuation des effets dans l'organisation des opérations et nous examinons plusieurs obstacles qui entravent les progrès dans ce domaine.

In light of rising disaster losses in recent years and predictions of a more hazardous natural environment in the future, many countries around the world are revising their policies for disaster management to incorporate a stronger emphasis on disaster mitigation and risk reduction. In this paper, we argue that Canada has not sufficiently integrated mitigation into disaster management and we discuss several barriers that impede progress in this area.

INTRODUCTION: THE DISASTER PROBLEM

Canadians face a wide range of hazards: natural (e.g., floods, tornadoes); technological (e.g., train derailments, chemical spills); and human-induced (e.g., operator error, intentional acts). On occasion, these hazards interact with vulnerabilities to trigger major disasters, such as the 1996 Saguenay flood, the 1997 Red River flood, and the 1998 ice storm. Major

disasters have the potential to impose significant social and economic costs: the 1998 ice storm, for example, was responsible for 28 deaths, over 900 injuries, and over \$5 billion in damages (PSEPC 2003).

Those who research the causes and consequences of disasters believe that the events we have experienced to date do not represent worst-case scenarios (Haque and Kilgour 2000). For example, we have

yet to experience a major earthquake in Vancouver or Montreal, an event that could cause over \$30 billion in damages (Clague 2001). A changing climate, more people and property at risk, increasing economic and technological interdependence and environmental degradation are some of many societal factors which are converging to increase the likelihood, magnitude and diversity of disasters in years to come (Etkin 1999; McBean 2004). Thus, it is argued that programs to manage disasters and to mitigate their impacts must be implemented today, so that we will be prepared for potentially catastrophic disasters in the future (Lichterman 1999; Mulhall 2001).

Researchers around the world have broadened our understanding of the physical and social variables that precipitate disasters and have identified a number of strategies to mitigate disaster losses. While hazards may not be preventable, the damage inflicted by these extreme events can be significantly reduced. Internationally there appears to be a growing consensus that a “paradigm shift”¹ is required to move from reactive, response-based disaster management to a more proactive effort aimed at disaster mitigation and risk reduction. As a reflection of this, many countries have revised their disaster management policies to integrate a greater emphasis on mitigation.

Despite notable past successes and a supportive policy community, Canada has not yet fully integrated mitigation into disaster management. In this paper, we argue that a greater political commitment will be necessary in order to move from a system oriented primarily toward response and recovery to one that emphasizes disaster mitigation and risk reduction. As we discuss below, however, there are several barriers that impede progress in this area.

DISASTER MANAGEMENT AND MITIGATION

Disaster management is a term that encompasses a range of policies and practices developed to prevent, manage and reduce the impact of disasters. It can be conceptually divided into four elements: *preparedness*

(policies and procedures designed to facilitate an effective response to a hazard event); *response* (actions taken immediately before, during and after a hazard event to protect people and property and to enhance recovery); *recovery* (actions taken after a hazard event to restore critical systems and return a community to pre-disaster conditions); and *mitigation* (actions taken before or after a hazard event to reduce impacts on people and property) (Godschalk 1991; Mileti 1999).

Historically, public policy in this area has been heavily concentrated on response, reflecting a belief that disasters are “acts of God” or “acts of Nature” — unfortunate but random calamities beyond our control. This perspective has been widely rejected by disaster researchers, who instead define disasters as social phenomena which stem from interaction between two key elements: *hazards* — triggering agents stemming from nature, as well as from human activity — and *vulnerabilities* — susceptibility to injury or loss influenced by physical, social, economic, and cultural factors (see Alexander 1997; Mileti 1999; McEntire 2001; Paton and Johnston 2001). There are many practical strategies to mitigate the two contributing variables, in order that disaster impacts might be prevented or significantly reduced. Examples of disaster mitigation efforts include structural measures such as dams or seawalls, constructed to control or contain a hazard; land-use management, such as zoning regulations which prohibit or regulate construction in hazardous areas; building regulation, including the enforcement of minimum standards for disaster resistance; and warning systems to inform people of an impending disaster.

In the international community, there is growing recognition that the focus of disaster management must shift from response and recovery toward mitigation. This idea was central to the Yokohama Strategy, a resolution adopted by delegates of the 1994 United Nations World Conference on Natural Disaster Reduction, which stated:

The impact of natural disasters in terms of human and economic losses has risen in recent

years, and society in general has become more vulnerable to natural disasters ... Disaster response alone is not sufficient, as it yields only temporary results at a very high cost. We have followed this limited approach for too long.... Prevention contributes to lasting improvement in safety and is essential to integrated disaster management (UNISDR 1994, 2).

These objectives were reiterated and expanded at the 2005 United Nations World Conference on Disaster Reduction through the Hyogo Declaration, which stated:

We, delegates to the World Conference on Disaster Reduction ... are deeply concerned that communities continue to experience excessive losses of precious human lives and valuable property as well as serious injuries and major displacements due to various disasters worldwide ... We recognize as well that a culture of disaster prevention and resilience, and associated pre-disaster strategies, which are sound investments, must be fostered at all levels, ranging from the individual to the international levels.... We affirm that States have the primary responsibility to protect the people and property on their territory from hazards, and thus, it is vital to give high priority to disaster risk reduction in national policy, consistent with their capacities and the resources available to them (UNISDR 2005a, 1-3).

In response to these challenges, many governments around the world have changed, or are in the process of changing, their disaster management policies to explicitly emphasize mitigation. Some of these initiatives are described below.

New Zealand

Since the early 1990s, disaster management in New Zealand has been transformed from a rigid, response-oriented model to a coordinated, multi-level, all-hazard disaster management system (Jensen 1998; Britton and Clark 2000). Through the Ministry of Civil Defence and Emergency Management,

the New Zealand government has promoted a national strategy that emphasizes intergovernmental cooperation and coordination for disaster management and hazard risk reduction (New Zealand. Ministry of Civil Defence and Emergency Management 2004). In 2002, existing emergency legislation was replaced with the *Civil Defence Emergency Management Act*, which incorporates a broader focus based on principles of risk management. The act requires local authorities to organize into Civil Defence and Emergency Management Groups for the purpose of identifying, assessing, and managing hazards, including the implementation of “cost-effective risk reduction” (New Zealand 2002). Mitigation is one of the primary themes in New Zealand’s National Civil Defence Emergency Management Strategy, which encourages the prevention of hazard risks where possible and mitigation of hazard impacts where prevention is impossible (New Zealand. Ministry of Civil Defence and Emergency Management 2004, 6).

Australia

In 2002, the Council of Australian Governments (COAG) produced a report entitled *Natural Disasters in Australia: Reforming Mitigation, Relief and Recovery Arrangements*, which reviewed the current status of disaster management arrangements and provided a series of recommendations to shift its orientation from response and recovery to anticipation and loss reduction (COAG 2002). In particular, the report highlighted the lack of funding to implement mitigation measures identified in disaster risk management studies. In response, the Australian government has collaborated with state and local governments on the adoption of a five-year Disaster Mitigation Australia Package aimed at reforming the structure of disaster management in the country, including a shift beyond relief and recovery toward disaster mitigation. At the heart of this initiative, the Australian government has budgeted approximately \$45 million for a five-year Natural Disaster Mitigation Programme, which matches federal funds with state and local contributions for approved local mitigation projects, such as “the

purchase of land and/or buildings in high risk areas, disaster proofing prone buildings, installing disaster warning systems and implementing engineering works” (LGA 2004).

United States

In the United States, mitigation is explicitly incorporated into disaster management through the *Robert T. Stafford Disaster Relief and Emergency Assistance Act* (1988) and the *Disaster Mitigation Act* (2000). The *Stafford Act* authorizes the federal government to contribute financial and technical assistance to state and local governments in the development and implementation of comprehensive disaster management plans, which include mitigation. One of the outcomes of this legislation is the Hazard Mitigation Grant Program, which is administered by the Federal Emergency Management Agency (FEMA) and provides federal funds to encourage state and local governments to incorporate mitigation during post-disaster reconstruction (FEMA 2005a).

Disaster mitigation is also promoted through the *Disaster Mitigation Act* (2000), which identifies mitigation as a national priority and authorizes the use of federal funds as an incentive for the development of state and local mitigation plans. The act differs from and complements the *Stafford Act* by encouraging the use of pre-disaster mitigation tools such as hazard assessment and mapping, land-use planning, and building code enforcement. Under the act, FEMA has established the Pre-Disaster Mitigation Program, which provides funding for state and local mitigation projects (FEMA 2005a). In 2005, over \$250 million was available (FEMA 2005b).

Hurricane Katrina has sparked renewed interest in mitigation, but has also raised questions about the adequacy of current efforts. While reductions in funding or poor administration might be partially to blame for the failure of parts of the local flood protection infrastructure in New Orleans, the event’s impacts also illustrate the limits of structural controls and the need for broader thinking about the root causes of disasters.

United Kingdom

A series of major crises in the United Kingdom in the late 1980s and early 1990s sparked greater political interest in reforming disaster management arrangements, which for years were based on the 1948 *Civil Defence Act*. A long series of reviews resulted in only minor alterations, but a major fuel crisis and severe flooding in the autumn and winter of 2000 sparked a more comprehensive review process (Norman and Coles 2003). After several rounds of intergovernmental and public consultations, a new *Civil Contingencies Act* was passed in November 2004. The act organizes disaster management around the concept of resilience, defined as “the ability at every level — national, regional and local — to detect, prevent and, if necessary, handle disruptive challenges” (United Kingdom 2005). Disaster mitigation and risk reduction are seen as core elements of community resilience.

South Africa

For many years, disaster management in South Africa was a local function based on the *Civil Defence Act* (1977). In the mid-1990s, political leaders began to look more closely at organizational problems with disaster management and in 1998 the Department of Constitutional Development issued a White Paper on Disaster Management. The White Paper represented a major shift in the orientation of disaster management in South Africa, replacing a previously reactive, response-oriented policy with “an increased commitment to strategies to prevent disasters and mitigate their severity” (South Africa. Department of Constitutional Development 1998). This policy was the basis for the *Disaster Management Act* (2002), which institutes prevention and mitigation as the core principles of disaster management. The act establishes an Intergovernmental Committee on Disaster Management made up of national, provincial, and municipal officials and outlines the details of a National Disaster Management Framework, through which the provisions of the act are being implemented (South Africa 2002).

Similarities in the ideas, objectives, and instruments which are being incorporated into disaster

management in these and other countries suggest a significant shift from the way governments have approached the disaster problem historically. These cases illustrate gradual acceptance of a new paradigm which recognizes that, while hazards will never be eliminated, there are many things that can and should be done to reduce vulnerabilities and to minimize disaster losses.

Though Canada was officially represented at both the 1994 and 2005 World Conferences, and in both cases endorsed the subsequent resolutions, Canadian political leaders have not yet embraced the proactive, preventative approach advocated in the declarations. Disaster management policies remain primarily oriented toward response and recovery. In the following sections, we offer a number of explanations as to why mitigation has not yet fully permeated Canadian disaster management.

DISASTER MANAGEMENT IN CANADA

Responsibility for disaster management is shared among Canada's three levels of government. At the federal level, Public Safety and Emergency Preparedness Canada coordinates disaster management responsibilities among the various departments and maintains operational links with provincial and municipal officials.² Most disasters fall under provincial jurisdiction, however, and most provinces have a distinct organization that takes the lead role in disaster management (e.g., Emergency Management Ontario, Nova Scotia Emergency Measures Organization). Generally, provincial legislation delegates the responsibility for disaster management to local governments.

Over many decades, federal and provincial officials have encouraged disaster preparedness. Since 1980, the federal government has administered the Joint Emergency Preparedness Program (JEPP), which provides funding to local governments for disaster preparedness projects (PSEPC 2004a). Unlike many other countries, however, in Canada

mitigation seems to be perceived as a part of preparedness, rather than a separate, explicit element of disaster management. In their current form, funding programs and arrangements are not structured to facilitate mitigation projects. For example, after severe flooding in Badger, Newfoundland in early 2003, the local and provincial governments spent about \$1 million on flood mitigation, but this expenditure was not eligible for federal cost-sharing (McGee 2004).

Most public expenditures for disaster management are targeted at recovery. Because many people are ill-equipped to deal with disasters and typically look to government for relief after one occurs, the Disaster Financial Assistance Arrangements (DFAA) were established in 1970 to compensate people for losses not covered by private insurance. Under the DFAA, provincial governments may request federal disaster assistance when recovery costs exceed one dollar per capita. The total federal contribution to disaster financial assistance is calculated as follows:

<i>Eligible Provincial/ Territorial Expenditures</i>	<i>Government of Canada Share %</i>
First \$1 per capita	NIL
Next \$2 per capita	50
Next \$2 per capita	75
Remainder	90

Source: PSEPC (2004b).

Because future disaster losses cannot be easily predicted, the DFAA has no fixed budget. After each event, specific requests for Supplementary Estimates are made and funding is authorized through an Order in Council (PSEPC 2004b). There are two reasons to believe that the costs of disaster assistance will rise in future years. First, it is expected that climate change will trigger more frequent and more intense hazard events (McBean 2004). Second, governments are under increasing pressure to

expand the range of eligible losses under disaster assistance programs. After Hurricane Juan in 2003, for example, eligibility requirements for Nova Scotia's provincial disaster assistance program were expanded to compensate for lost revenues among commercial farmers, fishers, and woodlot owners (Nova Scotia 2003). At the federal level, there is ongoing political debate regarding the definition of a "disaster" under DFAA guidelines, and this debate became particularly heated after losses related to the SARS emergency in Ontario and the BSE crisis in Alberta were deemed ineligible under the DFAA.

In their current form, Canada's disaster assistance programs do not encourage mitigation and fail to address the underlying factors that contribute to disasters in the first place (i.e., hazards and vulnerability). Paying for disaster losses without addressing root causes sets the stage for repeat losses and can create perverse incentives that reinforce high-risk decisions and behaviour. Wright and Rossi argue that

postdisaster relief provisions punish risk-averters and reward risk-takers; the wise and cautious, that is, are made to pay for the folly, shortsightedness, and simple bad luck of others. Thus these policies encourage the rehabilitation of hazardous areas after disaster has struck, because they absolve individuals from any responsibility for the risk (1981, 50).

DISASTER MITIGATION IN CANADA

There are several particularly prominent examples of mitigation in Canada's recent history, two of which are discussed here. First, the Winnipeg floodway is an example of a major structural control project designed to reduce flood damages in and around the City of Winnipeg. After a major flood in the Winnipeg area in 1950, federal, provincial, and local officials partnered to assess options for flood prevention and mitigation. Acting on the recommen-

dations of a 1958 Royal Commission report, these governments jointly undertook the Red River Floodway Project, a 50-kilometre floodwater diversion channel, which was completed in 1968 at a total cost of roughly \$60 million (Shrubsole *et al.* 2003, 30). Since its construction, the floodway has been used many times to divert floodwaters around the city and is estimated to have saved billions in potential flood damages in Winnipeg (MFA 2005).

Canada has also had experience with non-structural disaster mitigation, illustrated through the National Flood Damage Reduction Program (FDRP). Until the 1970s, the Government of Canada contributed to flood management by providing funds for structural flood control works. Despite these efforts, disaster assistance costs related to flood events continued to rise and, after a series of major floods in the early 1970s, the federal government introduced the FDRP in 1975, which represented a new national framework for flood management (Watt 1995). Under the program, the federal government signed bilateral agreements with the provinces to share the cost of a major floodplain mapping effort, which would be used to identify areas at risk of flooding and would serve as the basis for decisions regarding future development on lands designated as flood-risk areas.

The Flood Damage Reduction Program illustrates that the development of a major intergovernmental initiative for mitigation is possible in Canada. Benefits have included the mapping and designation of over 900 communities, a sound basis for local planning decisions regarding the use of hazardous lands, greater protection of wetlands and other environmentally sensitive areas, more green spaces, greater public awareness and acceptance of floodplain restrictions, and increased municipal support for floodplain management (de Loë and Wojtanowski 2001).

At the same time, however, problems associated with the FDRP illustrate that long-term, multi-level commitment for mitigation is difficult to coordinate

and sustain. First, despite FDRP maps and flood-risk designations, numerous local policy exemptions allowed extensive development in floodplains in the Montreal area (Robert, Forget and Rousselle 2003) and elsewhere in Quebec (Roy, Rousselle and Lacroix 2003). Second, ambiguous jurisdiction and problems with enforcement contributed to a lack of compliance with floodplain regulations in Manitoba (IJC 1997) and Ontario (Gardner and Mitchell 1980). Finally, in light of shifting policy priorities, the federal government has chosen not to renew the intergovernmental agreements under the FDRP, leaving further implementation to provincial and local governments (Shrubsole *et al.* 2003, 6).

As a concept, disaster mitigation is widely accepted within Canada's disaster management policy community and is a central theme of Canadian research in this area. For many years, mitigation has been advocated by academic researchers, disaster managers, government scientists, and especially by insurers, through the Insurance Bureau of Canada and the Institute for Catastrophic Loss Reduction (ICLR). Many public officials also endorse mitigation. Federal, provincial, and municipal officials regularly sponsor and participate in venues to promote mitigation, including workshops organized by ICLR, national conferences like the annual Emergency Preparedness Conference in Vancouver and international events like the World Conference on Disaster Management, held annually in Toronto. Moreover, for many years federal officials have been engaged in an ongoing dialogue with provincial and municipal officials, academics, private-sector actors and representatives of non-governmental organizations regarding the development of a National Disaster Mitigation Strategy — a multi-level, collaborative effort to reduce the impacts of disasters (Schneider and Schneider 2002). These discussions have revealed a broad base of support for mitigation as an investment to reduce future disaster impacts.

Despite past successes with mitigation and a supportive policy community, Canadian political leaders have paid less attention to disaster mitigation than

their counterparts in other countries. Though some provincial governments have started to revise disaster management policies to incorporate mitigation (e.g., Ontario, Quebec), Canada lacks the kind of national framework for mitigation that has developed in other countries. Where mitigation happens, it is generally ad hoc and piecemeal and is underfunded relative to other disaster management activities (Etkin *et al.* 2004, 3).

BARRIERS TO MITIGATION

The recent rounds of stakeholder consultations around the idea of a National Disaster Mitigation Strategy have revealed the complexity of designing a national framework for the purpose of disaster risk reduction. While participants agreed that investment in mitigation will be necessary if we are to curb rising disaster losses and to cope with an increasingly hazardous natural environment, they also raised many practical questions, including how priorities should be set, what role each level of government should play, how strategies should be coordinated and how outcomes should be evaluated (PSEPC 2004c). Still, the primary challenge facing the creation of a national strategy is political: disaster management rarely emerges on the policy agenda and mitigation is rarely chosen as a policy approach. Why? In this section, we identify several barriers that impede the development of mitigation strategies.

Uncertainty Regarding Hazards and Vulnerabilities

Moving toward mitigation requires an assessment of the hazards and vulnerabilities that policies are intended to address. Though policymakers can draw on a strong base of Canadian research on hazards and vulnerabilities, considerable uncertainty still surrounds these variables.

Hazards

Broadly defined, a hazard is “any potential threat to something that people value, including one's life,

health, environment or lifestyle” (Mills *et al.* 2001). Canadians face a wide range of natural hazards, including weather hazards such as tornadoes and hailstorms, weather-related hazards like floods, droughts and wildfires, and geophysical hazards such as earthquakes and landslides. Others, such as transportation accidents, fires, and chemical spills, stem from failures in technological systems. Finally, there are hazards caused by other humans, such as sabotage or terrorism.

Burton, Kates and White (1993) identify at least seven distinct characteristics of hazards, each of which adds to the complexity of the disaster problem and complicates policy-making. For example, the *magnitude* of a hazard (its size, relative to past events or to a certain threshold) limits the options available to prevent or mitigate its impacts; its *frequency* (how often a given hazard is expected to occur within a long-run average) influences the urgency of strategies required to deal with it; and its *areal extent* (the space affected) influences the range of stakeholders involved in the policy process.

Furthermore, our ability to predict hazards is limited. There are two types of predictions: *deterministic predictions* — the expected occurrence of a particular hazard with specific characteristics and within a short, defined time interval; and *statistical predictions* — probabilistic predictions of the likely occurrence of hazards within a particular time period, such as a season or a decade (McBean 2000; Sarewitz, Pielke Jr. and Byerly 2000). For weather and weather-related hazards, skill for deterministic predictions is good for several days and decreases to zero by about two weeks. Relatively good statistical predictions can be made for seasons and in response to a changing climate. While there is skill in producing statistical predictions for geophysical hazards such as earthquakes, there is little skill for deterministic predictions (i.e., we can predict whether or not they will happen, but not when they will occur). For the most part, however, we simply do not have a sufficient capability to accurately pre-

dict where and when hazard events will occur or to anticipate their magnitude or intensity.

Vulnerabilities

Though a common conceptualization of vulnerability remains elusive (Weichselgartner 2001), the following definition captures much of its complexity:

Vulnerability to disasters is a function of human action and behaviour. It describes the degree to which a socio-economic system or physical assets are either susceptible or resilient to the impact of natural hazards. It is determined by a combination of several factors, including awareness of hazards, the condition of human settlements and infrastructure, public policy and administration, the wealth of a given society and organized abilities in all fields of disaster and risk management. The specific dimensions of social, economic and political vulnerability are also related to inequalities, often related to gender relations, economic patterns, and ethnic or racial divisions. It is also largely dependent on development practices that do not take into account the susceptibility to natural hazards (UNISDR 2001, 4).

A broad base of research on vulnerability has been developed in fields such as environment and development studies, climate-change science and risk management, but there remains significant conceptual confusion regarding the meaning of vulnerability and the factors that contribute to vulnerability (Brooks 2003). As Weichselgartner (2001) points out, even if we limit the scope to disaster management literature, there are several distinct “themes” of vulnerability. For example, vulnerability can be conceptualized as a product of pre-existing conditions that contribute to the impact of a disaster, such as proximity to hazards or the value of property at risk. In this context, a mitigation strategy would target the myriad factors that make people vulnerable to hazard events, a formidable exercise indeed. Vulnerability can also be seen as the degree

to which people are able to cope with the impacts of hazard events (Blaikie *et al.* 1994). Coping capacity is influenced by a wide range of factors, such as age, socio-economic conditions or level of education, but these variables cannot be used to predict vulnerability consistently; for example, where age may be correlated with higher vulnerability in one context, it may actually reduce vulnerability in other contexts (Paton and Johnston 2001).

The complexity of the vulnerability variable and our limited ability to predict the location and magnitude of future hazard events pose considerable challenges for policymakers. Given the uncertainty inherent in either variable, it is not entirely surprising to find that disaster management policies continue to reflect a perspective of disasters as random, unexpected events, to be addressed only if and when they occur.

Uncertain Benefits and Costs

Disaster researchers generally agree that mitigation is a winning investment (e.g., Mileti 1999). Case studies by FEMA in the United States suggest that mitigation consistently produces savings in post-disaster relief and recovery (FEMA 1999). According to the Government of Queensland, Australia, “every \$1 spent on disaster mitigation saves at least \$3 in economic and social recovery costs” (Queensland 2001). Regrettably, however, policymakers have no Canadian study that comprehensively assesses the costs and benefits of mitigation.

Disaster management in Canada follows a “bottom-up” approach, where policy is presumed to be defined, formulated, and implemented locally. However, the limited discourse on local disaster management indicates that this is a particularly problematic area for local policymakers (Wolensky and Wolensky 1990). Given the uncertainties outlined above, local political actors often have difficulty in seeing the potential benefits of mitigation. In the absence of specific predictions regarding future hazards or evidence of an imminent threat, local

governments are reluctant to invest in preventative measures. Any benefits associated with mitigation (which are only realized in the event of a disaster) must be weighed against immediate and potentially significant costs (Godschalk and Brower 1985). For example, more stringent building codes may ensure greater structural resistance to hazards, but they may also force builders to adopt different methods and utilize different materials, both of which could raise the cost of construction. Prohibiting development in hazard-prone areas like floodplains can reduce the probability of loss, but it can also mean forgoing revenue from development charges and property taxes, two sources of revenue on which many local governments depend.³

Lack of Public Demand

Except in jurisdictions where disasters occur frequently, citizens generally perceive a low probability of loss associated with hazards (Larsson and Enander 1997; Tierney, Lindell and Perry 2001) and thus show little interest in disaster planning or loss reduction (Cigler 1988). As a result, elected officials have few political incentives to allocate scarce time and resources to mitigation, when it is weighed against other competing priorities (Wright and Rossi 1981).

Immediately following a disaster — after vulnerabilities have been starkly exposed through disruption, loss of life and property damage — there is often greater interest in disaster management and this offers policymakers an opportunity to implement mitigation measures (Berke, Kartez and Wenger 1993; Rubin and Popkin 1993). However, the post-disaster policy window is transitory and becomes quickly obscured by the primary goal: to return the community to normalcy as swiftly as possible (Solecki and Michaels 1994). Soon after a disaster, people return to their pre-disaster risk perceptions and behaviour — in most cases, they then tend to underestimate the probability that they will be impacted again (Cigler 1988, 43-44). As people disengage from the issue, the interest of political

actors wanes and disaster management is again relegated down the policy agenda.

Lack of Organized Advocacy

After a disaster, governments often establish a special inquiry or commission to study the nature of the event, assess how it was handled and provide suggestions for improvement. Recent examples include the BC Firestorm 2003 Provincial Review, the Ontario Expert Panel on SARS and Infectious Disease Control, and the US-Canada Power System Outage Task Force. After analyzing data and hearing testimony from people involved before, during, and after the event, members produce a report, usually with specific recommendations (which may or may not be implemented) regarding how similar disasters can be prevented, avoided or minimized. However, the scope of inquiry for these bodies is usually restricted to a particular sector, hazard or even to a single event. As a result, they rarely address wider questions that might emerge from a more aggregate view of the Canadian disaster problem, such as: What is the public interest in the context of disasters? How should governments manage the disaster problem? Are there alternative approaches that could reduce the physical, social, and economic impacts of disasters before they happen? Yet it is precisely this deeper analysis that is required in order to turn “lessons learned” into concrete and effective policy responses.

In the United States, disaster-related research has a strong presence; several universities have well-established research institutes dedicated to the study of hazards and disaster management (e.g., the Natural Hazards Centre at the University of Colorado and the Disaster Research Centre at the University of Delaware). A recent report commissioned by PSEPC reveals that there are many Canadian researchers with an interest in disasters (COMPAS 2003), but interaction within the research community has not evolved to the same extent as it has in the United States. Those who most strongly advocate mitigation in their individual research have yet to form a strong coalition to lobby for more proactive disaster policies.

Fragmented Incentives and Resources and Lack of Political Will

Intergovernmental collaboration is considered essential for the development and implementation of policies for disaster mitigation (Mushkatel and Weschler 1985), but it is difficult to organize and sustain (Wolensky and Wolensky 1990). Local governments are perhaps best positioned to implement mitigation due to their close proximity to hazards and because they control many of the most effective tools to reduce vulnerability to hazards, such as land-use regulation and building-code enforcement (Prater and Lindell 2000; Newkirk 2001). However, because the probability of a disaster in any particular community is low, local officials are least likely to see mitigation as a pressing priority (Wright and Rossi 1981; Cigler 1988). Moreover, because most of the financial costs of recovery after a disaster are shouldered by insurers and senior governments, local governments appear to have weak economic incentives to invest in loss-reduction measures.

The Government of Canada has substantial resources and strong economic incentives to mitigate local disaster losses, but lacks the administrative apparatus to implement mitigation unilaterally. Moreover, Ottawa’s attempts to deal directly with municipalities have often been resisted by the provinces (Canada 2004, 41-42). Thus, it is provincial governments that seem to play a pivotal role in influencing local mitigation, since they are constitutionally empowered to intervene directly or to mandate this responsibility to local governments. Yet provincial politicians also seem reluctant; only a handful of provinces require mitigation as a component of local disaster management.

The recent devastation brought about by Hurricane Katrina in the United States illustrates that mandates passed down from senior governments and mitigation funding programs must also be accompanied by a sustained, multi-level commitment to implementation. In this case, poor organization and administration of state mitigation efforts and insufficient local political will to implement

mitigation measures both appear to have weakened Louisiana's capacity to resist and cope with this type of event, despite the fact that it was predicted well in advance (Schleifstein and McQuaid 2002).

The Context of Disaster Policy-making

Political interest in disaster management is greatest immediately following a disaster and it is in this period that most disaster management policy is formulated. However, in the aftermath of a disaster extensive media coverage creates strong political pressure for elected officials to quickly help disaster victims. As a result, post-disaster policy decisions often involve expanding eligibility parameters for disaster assistance programs, which virtually guarantees higher disaster recovery assistance costs in the future. May and Williams call this the "political dilemma of disaster policy-making":

On the one hand, the politically most popular policy — expanding federal disaster relief assistance — is both costly and does little to control longer-run growth of disaster losses. On the other hand, the policies which are believed to be most effective in these latter respects — preparedness and mitigation — are politically less salient and therefore unlikely to receive much attention (May and Williams 1986, 3).

For this reason, it is better to make policies for disaster mitigation during "normal" periods, where there is less political pressure to act quickly and where policy can be formulated without specific reference to the most recent catastrophic event. As illustrated above, however, it is difficult to get political leaders interested in mitigation in the absence of a recent disaster or an imminent threat.

CHANGES ON THE HORIZON?

Despite these rather formidable barriers, progress in many areas suggests that they may not be insurmountable.

Uncertainty. An expanding body of research on hazards and vulnerabilities in Canada is eroding the uncertainty that frustrates decision-making in the context of disasters. One notable initiative in this area is the Canadian Natural Hazards Assessment Project, a joint effort among the Meteorological Service of Canada, Public Safety and Emergency Preparedness Canada and the Institute for Catastrophic Loss Reduction, which was undertaken to identify natural hazards in Canada and to assess points of vulnerability as a basis for policy-making (Environment Canada 2002). In addition, more information on hazards and vulnerabilities is likely to percolate from the local level, as recent legislation in Ontario and Quebec requires local governments to identify the hazards in their environment, estimate the risk associated with these hazards and assess points at which the community is most vulnerable to these hazards (Ontario 2002; Quebec 2000).

Benefits and Costs of Mitigation. Faced with finite resources and potentially high opportunity costs, the natural inclination of political actors is to demand more evidence that mitigation "pays." There are at least two major international research initiatives underway which aim to comprehensively assess the costs and benefits of disaster mitigation, including *Methodologies for Assessing Natural Hazard Risks and the Net Benefits of Mitigation*, by the ProVention Consortium⁴ and *Future Benefits of Hazard Mitigation*, by the Multihazard Mitigation Council of the US National Institute of Building Sciences. The findings of these research projects will be valuable for policymakers who are asked to justify mitigation investments.

Though cost-benefit analysis is a useful tool for decision-making, choosing whether or not to invest in mitigation on purely economic criteria is an incomplete calculation, because many of the "costs" of a disaster are intangible. For example, disaster victims frequently suffer negative mental health reactions that impede recovery, such as anxiety, nightmares (Wood *et al.* 1992), depression (Ginexi

et al. 2000), post-traumatic stress disorder (Steinglass and Gerrity 1990) and various other stress-related psychopathologies (Rubonis and Bickman 1991). Such psychological stressors among disaster victims are associated with a higher risk of suicide (Krug *et al.* 1998) and an increase in violence, particularly against women and children (Curtis, Miller and Berry 2000; Enarson and Fordham 2001). Because these non-economic impacts are difficult to capture in cost-benefit analysis, there is growing recognition that a full cost accounting is necessary in order to more accurately portray the costs associated with disasters and to estimate the benefits of mitigation (Dore and Etkin 2000; UNISDR 2005*b*).

Organized Advocacy. Major events such as 9/11, the 2003 blackout, and the 2004 tsunami disaster in Southeast Asia have raised the profile of disaster management in Canada in recent years. Moreover, a recent survey of emergency personnel by the Standing Senate Committee on National Security and Defence and studies such as the BC Firestorm 2003 Provincial Review have raised questions about the adequacy of Canadian disaster management.

Research and advocacy within the disaster management policy community is becoming better coordinated through the Canadian Risk and Hazards Network (CRHNet), a not-for-profit organization started in 2003 to promote disaster risk reduction and disaster management in Canada. Federal, provincial, and municipal officials are active participants in the network and generally share the view that disaster management must include a greater emphasis on mitigation. The first annual CRHNet symposium was held in Winnipeg in November 2004 and provided an opportunity for public officials, researchers and practitioners to share ideas and formulate strategies to increase the profile of disaster management and mitigation in Canada.

Public Demand. Despite a general lack of interest in disaster management, citizens nevertheless see major disaster losses as unacceptable and look to

governments to manage disasters (Schneider 1995; Dunlop 2004). Moreover, the imperative for disaster management and mitigation is increasingly cast in terms of citizens' rights. After the 1997 Red River flood, for example, a report by the International Joint Commission stated that residents "have a right to expect that governments at all levels will show leadership and provide guidance in the development and implementation of mitigation measures, including sustained actions to reduce or eliminate long-term risk from flooding and its effects" (IJC 2000, 42). This implies that governments face a higher standard of care in making decisions about disaster management.

In the United States, there have been cases in which disaster-affected residents have perceived that their local government was negligent in mitigating hazard risk and have sought compensation through the courts (Kusler 1985; Hutcheson 2003). Though cases like this have not yet emerged in Canada, Roman (2002) suggests that municipal governments could potentially be found negligent if they fail to implement reasonable measures to prevent or reduce the impacts of hazard events, based on "such factors as the nature and extent of the risk and the ease with which it could have been reduced or eliminated" (Roman 2002, 7-8).

As the climate changes, it is predicted that the frequency and intensity of weather-related hazards like floods will increase. Does not evidence of a changing climate and increasingly hazardous natural environment demand a higher standard of care, obligating governments to do more to protect people and their property *before* a disaster occurs?

FUTURE CHALLENGES

Over many years, Canada has developed effective response systems to ensure that disasters result in few casualties, and disaster assistance programs to facilitate speedy recovery from disaster impacts, but disaster mitigation has not yet been fully integrated

into disaster management. With a long history of experience with disasters and a supportive policy community, Canada has the capacity to be a world leader in disaster mitigation, but a strong, long-term political commitment will be required to shift the orientation of Canadian disaster management toward the prevention or reduction of disaster impacts. From disaster research, we know *how* disaster impacts can be mitigated, but as this paper illustrates, there are a number of political barriers which have delayed the full incorporation of mitigation into disaster management policy.

Recent messages from Public Safety and Emergency Preparedness Canada suggest that new federal emergency legislation may soon be drafted to include mitigation (Cullen 2004); this would be a strong, symbolic first step toward the development of a national disaster mitigation strategy. However, implementing the strategy will require sustained commitment from a wide range of public and private sector actors and organizations, and will be a major challenge in multi-level governance. Encouraging lessons might be drawn from collaborative intergovernmental approaches that are developing in other policy fields such as health care and the environment (Cameron and Simeon 2002). Perhaps the greatest achievement in both the Red River Floodway project and the National Flood Damage Reduction Program was that these projects engaged all three levels of government in a strategy to reduce disaster impacts; lessons from these projects might provide guidance for a more comprehensive disaster mitigation effort.

Each year, Canadians in one region or another are affected by disasters. Changes in the hazard variable (e.g., due to global climate change) and the vulnerability variable (e.g., higher population densities, more property at risk) indicate that the magnitude of disasters we have experienced to date may be exceeded by those in the future. In the international community, a paradigm shift from recovery to prevention is underway in disaster management. How will Canada respond?

NOTES

¹The term “paradigm” was originally used by Thomas Kuhn to describe an enduring set of ideas shared by members of a natural science community. In public policy analysis, the term denotes a relatively long-term set of assumptions, beliefs, values, and attitudes that shapes the way policymakers perceive a public problem and limits the range of solutions that they consider in response (Campbell 1998; Howlett and Ramesh 2003, 232-33). In order for disaster management policy to be expanded to include mitigation, the current, response-centric paradigm must shift to one that defines disasters as a social problem and permits a wider array of possible solutions.

²Public Safety and Emergency Preparedness Canada (PSEPC) was created in 2004. It absorbed the Office of Critical Infrastructure Protection and Emergency Preparedness (OCIPEP), which replaced Emergency Preparedness Canada in 2001.

³For example, consider the City of Richmond, British Columbia: located in the floodplain of the Fraser River, the *entire municipality* is a hazard-prone area.

⁴The ProVention Consortium is a global coalition of governments, international organizations, academic institutions, the private sector and civil society organizations dedicated to increasing the safety of vulnerable communities and to reducing the impact of disasters in developing countries. See <http://www.proventionconsortium.org>.

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