

Citizen participation in post-disaster
flood hazard mitigation planning:
Exploring strategic choices in
Peterborough, Ontario

by

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Author's Declaration

I hereby declare that I am the sole author of this thesis. This is a true copy of the thesis, including any required final revisions, as accepted by my examiners. I understand that my thesis may be made electronically available to the public.

Abstract

This thesis explores the role of citizen participation in a post-disaster flood hazard mitigation planning program in Peterborough, Ontario. Recognizing that citizen participation is an integral element of hazards mitigation planning, a review of the relevant literature identifies six strategic planning choices that should be considered in the design of a citizen participation program. The study applies this framework to the Flood Reduction Master Plan (FRMP) study and planning process in Peterborough, undertaken following the July 2004 flood event, to analyze citizen participation in hazard mitigation planning practice. Existing documentation, including the FRMP, and fifteen key informant interviews provided the main sources of research data. Data were analyzed in terms of the framework and other hazards mitigation theory found in the literature to produce the findings of the study. There existed many strengths and several weaknesses of the citizen participation aspect of the planning program. Many of the decisions made regarding citizen participation in the FRMP process can be considered successful by the standards set in the literature.

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Dedication

*For Mom, Dad and Laura,
and Becky,
for your love, support and encouragement.*

Table of Contents

Author’s Declaration	ii
Abstract.....	iii
Acknowledgements	iv
Dedication	v
Table of Contents	vi
List of Figures.....	x
List of Tables	xi
Chapter 1 Introduction.....	1
1.1 Heavy rainfall events in Peterborough	1
1.2 Flood Reduction Master Plan.....	3
1.3 Research Gap: Hazards mitigation literature	3
1.4 Problem statement.....	6
1.5 Purpose and objectives of thesis.....	6
1.6 Organization of thesis.....	7
Chapter 2 Review of Literature.....	8
2.1 Introduction	8
2.2 Traditional methods of hazard mitigation	10
2.2.1 Why past methods are inadequate	10

2.3 A new approach.....	13
2.4 Integrating hazard mitigation and land use planning	15
2.4.1 Community involvement	17
2.4.2 The problem with top-down approaches	20
2.4.2.1 Two examples of misguided top-down approaches.....	21
2.4.3 The shift in disaster management strategies	22
2.5 Citizen participation research.....	23
2.5.1 Rationale for citizen participation in planning	25
2.5.2 Brief history of citizen participation.....	27
2.5.3 Some problems with citizen participation	29
2.6 Citizen participation in hazard mitigation planning.....	30
2.6.1 Six Strategic Planning Choices.....	32
2.7 Summary	37
Chapter 3 Research Methods and Background of Case Study	38
3.1 Introduction	38
3.2 Research methods.....	38
3.2.1 Existing Documentation	39
3.2.2 Key Informant Interviews.....	40
3.2.2.1 Interview methods.....	41
3.2.2.2 Key informants.....	42
3.2.2.3 Conducting and transcribing interviews	43
3.2.3 Direct Observation.....	45
3.2.4 Data Triangulation	46
3.3 Limitations of the research program	47
3.3.1 Discovery of six strategic choices framework.....	48
3.3.2 Limitations of the framework	49
3.3.3 Difficulties of key informant interviews	49

3.4 Description of Case Study and Study Area.....	51
3.4.1 Study Area	51
3.4.2 Severe rainfall events in Peterborough.....	53
3.4.3 Water, topography and infrastructure in Peterborough	54
3.5 July 2004 flood causes: FRMP study.....	55
3.6 Summary	58
Chapter 4 Findings and Analysis.....	59
4.1 Introduction.....	59
4.2 Analysis of decisions.....	60
4.2.1 Choice 1: Program administration.....	60
4.2.1.1 Project Team	61
4.2.1.2 Environmental Assessment Process.....	62
4.2.2 Choice 2: Objectives to guide citizen involvement	63
4.2.3 Choice 3: Stage of the planning process when citizens first become involved.....	65
4.2.4 Choice 4: How many and which types of groups to target.....	68
4.2.4.1 Flood Relief Committee.....	69
4.2.5 Choice 5: Techniques for obtaining citizen input.....	70
4.2.5.1 Citizen Advisory Panel	74
4.2.6 Choice 6: Providing citizens with information.....	75
4.3 Flood Reduction Master Plan identification of public priorities.....	77
4.4 Summary of case study findings	78
Chapter 5 Discussion and Implications	80
5.1 Introduction.....	80
5.2 Aspects of the process that improved the plan.....	81
5.2.1 Participation early in planning process.....	81

5.2.2 Freedom in creating plan	84
5.2.3 Public Facilitation and Media Relations consultants.....	86
5.2.4 Participation techniques.....	90
5.2.5 Honesty to build trust in working relationship	93
5.2.5.1 Avoiding a mistrust of statistics: calculation of storm intervals.....	96
5.3 An aspect of the process that did not affect the quality of the FRMP.....	97
5.4 Aspects of citizen participation that hurt the quality of the FRMP.....	98
5.4.1 Perceived level of participation that existed.....	99
5.4.1.1 Language of participation	101
5.4.2 Role of the Technical Review Committee.....	102
5.4.3 Targeting as a strategy to generate citizen participation	103
5.5 Summary	107
Chapter 6 Recommendations and Conclusion	109
6.1 Recommendations	109
6.2 Future research	113
6.3 Evaluation of success	116
6.4 Conclusion.....	117
Appendix A List of key informants	118
Appendix B Interview question themes	120
Bibliography	123

List of Figures

Figure 1. Arnstein's Ladder of Citizen Participation	19
Figure 2. The shift in disaster management strategies	22
Figure 3. Map of Peterborough, Ontario.....	52
Figure 4. Map of Peterborough showing floodplains and flood paths.....	56

List of Tables

Table 1. Summary of findings	79
Table 2. Evaluation of citizen participation success	116

Definitions

Hazard: A naturally occurring or human-induced process, or event, with the potential to create loss, that is, a general source of future danger (Smith, 2001).

Hazard Mitigation: Measures taken to minimize the destructive and disruptive effects of hazards and thus lessen the magnitude of a disaster (Maskrey, 1989).

Sustainable Hazard Mitigation: Hazard mitigation that attempts to achieve the broader goals of sustainability, including environmental, social and economic resiliency. Mileti (1999) identifies six objectives that must be reached to mitigate hazards in a sustainable way:

- Maintain and enhance environmental quality
- Maintain and enhance people's quality of life
- Foster local resiliency and responsibility
- Recognize that vibrant local economies are essential
- Ensure inter- and intra-generational equity
- Adopt local consensus building

Disaster: The realization of a hazard. More specifically, an event, concentrated in time and space, in which a community experiences severe danger and disruption of its essential functions, accompanied by widespread human, material or environmental losses, which often exceed the ability of the community to cope without external assistance (Smith, 2001).

Chapter 1

Introduction

Floods are ‘acts of God’, but flood losses are largely acts of man.

Gilbert F. White, 1945

1.1 Heavy rainfall events in Peterborough

On June 11, 2002, the city of Peterborough, Ontario was struck by a heavy rainfall event that caused extensive flooding in low-lying areas of the City. The storm generated approximately 73 mm of rainfall within a 24-hour period (Lacey, 2005; UMA, 2005; Sandink, 2006). This rainfall caused damage to several residential and commercial properties due to overland flow flooding and sewer backup. Provincial disaster relief was provided to property damage victims but many Peterborough residents and business owners were vocal about their dissatisfaction with the actions taken by the City to protect citizens from flooding. The heavy rainfall was estimated to be a 1 in 100 year event (UMA, 2005), which may explain the lack of urgency following the storm to take steps to reduce future flood damage. Citizens and City officials may have thought they had just suffered the flood of their lifetime. It would not take their lifetime to be proven wrong.

Exactly twenty-five months later, across the country, a severe summer thunderstorm pounded Edmonton, Alberta on July 11, 2004. The storm brought large hailstones and 150 mm of rain to the city (CBC, 2004) causing extensive property damage from hail and flooding, and forcing the evacuation of the West Edmonton Mall. Peterborough citizens could sympathize with the residents of this western Canadian city. Just three days later

however, the same weather system would move eastward across the country and create for them their own set of problems (Globe and Mail, 2004).

On July 14, 2004, this weather system stalled above the City of Peterborough and produced a severe storm that generated 229 mm of rain in 24 hours. An incredible 87 mm of rain fell in one hour during the peak of the storm (Lacey, 2005; UMA, 2005). The storm began overnight and many Peterborough residents awoke to find their streets, yards, and basements flooded. Extensive flood damage was sustained and an estimated 6000 to 8000 properties were affected. Direct physical damages to private and public property were reportedly in excess of \$100 million (UMA, 2005). A state of emergency was declared by the City of Peterborough in the days after the storm, qualifying citizens for provincial financial aid. This heavy rainfall event was estimated to be a 1 in 290 year event (Hammond, 2004).

The citizens of Peterborough were devastated by the enormous impacts of this second flood in just over two years. Many residents and business owners had just recovered from damages caused by the June 2002 flood, and they considered it unacceptable to be subject to more flood damages. The days and weeks after the July 2004 flood were a difficult and emotional time for many members of the community, and the desire to assign blame for the damages suffered was strong. Many people directed their anger and frustration at the City for not being adequately prepared for such an event, despite experiencing similar consequences of heavy rainfall so recently. Citizens demanded that the City take action to reduce future flood losses.

1.2 Flood Reduction Master Plan

The City of Peterborough responded to the demands of the community by initiating efforts to discover the causes of the July 2004 flood damage and the steps that should be taken to reduce future potential flood damage. The City commissioned UMA Engineering Ltd. (UMA) to conduct a study and create a master plan that would address these issues. UMA commenced the study in August 2004 and eight months later, in April 2005, released the Flood Reduction Master Plan (FRMP). Citizen participation was emphasized as an important element of the study and planning process. The local knowledge and experience, and the interest to reduce future flood losses, that existed within the Peterborough community was used to inform the study and influence planning and decision making.

1.3 Research Gap: Hazards mitigation literature

There exists a significant body of literature pertaining to hazards mitigation, land use planning, and the inclusion of citizen participation in these processes. The literature that provides the foundation from which this thesis has developed has evolved and matured over recent decades. A current focus of this literature examines hazard mitigation planning efforts that include citizen participation, such as the flood reduction planning program in Peterborough, Ontario. A gap in this literature, explained briefly in this section, paired with a practical application of theory found in the literature provides the justification for conducting thesis case study research.

Much of the literature relevant to this thesis originated from the work of eminent American geographer Gilbert F. White (including White, 1945; 1974; White and Haas,

1975). His early study at the University of Chicago was influenced by the human ecology perspective, a school of thought first philosophically explored at that university by John Dewey (Mileti, 1999). White's dissertation (1945) examined the use of floodplains and asked questions that remain fundamental to hazards research today: Why are certain adjustments to hazards preferred over others? Why, despite investments in those adjustments, are social losses from hazards increasing? (cited in Mileti, 1999).

White continued to explore these questions and collaborated with sociologist Eugene Haas, with contributions from other scholars, graduate students and practitioners, to undertake the first assessment of natural hazards research in the US (White and Haas, 1975). This assessment argued that the social sciences should have a greater role in hazards research and that increasing importance should be placed on non-structural hazard mitigation measures (White and Haas, 1975). The assessment promoted an integrated approach to reducing disaster losses and a shift away from reliance on engineering or structural mitigation measures.

The years following the first assessment saw an emergence of research and literature based on human adjustment to hazards. Several authors championed this philosophical shift to non-structural hazards mitigation measures (including Burton, Kates and White, 1978; Godschalk, Brower and Beatley, 1989; Maskrey, 1989; Smith, 1991; Blaikie, Cannon, Davis and Wisner, 1994, and; Burby, 1998). This literature was reassessed two decades later by leading hazards scholars and practitioners in the second assessment of research on natural hazards US, culminating in the book *Disasters by Design*, authored by Dennis S. Mileti (1999). This work further advanced the shift in hazard mitigation philosophy and proposed a

strategy to accomplish this, called sustainable hazard mitigation. This concept employs comprehensive land use planning as a key method of hazard mitigation while achieving the broader goals of sustainability.

At the same time that the hazards mitigation literature was developing, a trend emerged in urban planning literature and practice that called for an increasing emphasis on citizen participation in decision making. Over time, citizen participation in planning has evolved from a token commitment to the principles of democratic governance to an accepted, and expected, part of planning and decision making (Brody, 2003b; Godschalk, Brody and Burby, 2003). This development is due, in part, to the contributions of several key authors (including Arnstein, 1969; Burke, 1979; Day, 1997; Fagence, 1977; Fainstein and Fainstein, 1985) who have argued the importance and value of including citizen input in government land use planning and advocated wider citizen representation in decision making. Thus, sustainable hazard mitigation theory was influenced by the wider trend toward greater citizen participation in urban planning, and such participation is now widely recognized as an integral part of hazard mitigation practice (Mileti, 1999).

During the past decade, a growing base of literature has focused on community involvement in hazards mitigation planning. Authors have taken varied research backgrounds and experiences in land use planning, environment and resource management, and citizen participation in governmental decision making, and attempted to contribute to furthering sustainable hazard mitigation theory. Three such authors, Brody, Godschalk and Burby (2003), have identified six 'strategic choices' that should be considered in the design

of citizen participation initiatives within hazards mitigation planning¹. These six choices form a useful analytical framework for existing hazards mitigation planning efforts.

1.4 Problem statement

Although sustainable hazards mitigation is recognized as a promising approach to reducing the human and economic costs of natural hazards, there has been a lack of research on the extent to which citizen participation has been included in post-disaster flood hazard mitigation planning as a critical element of implementing this approach.

1.5 Purpose and objectives of thesis

Additional research is required to determine ways in which citizen participation can effectively be included in land use planning decisions for hazards mitigation. I intend to contribute meaningfully to this gap in knowledge by conducting a research program involving a case study in Peterborough, Ontario. The case study investigated the role of citizen participation in a post-disaster flood hazard mitigation planning program conducted in Peterborough over the July 2004 to April 2005 period. The objectives of this research included:

1. **Objective One:** To conduct a review of literature relevant to sustainable hazards mitigation, land use planning, and the role of citizen participation in these processes.

¹ These choices are described in section 2.6.1.

2. **Objective Two:** To review existing documentation regarding the July 2004 flood event in Peterborough and subsequent hazard mitigation planning efforts made by the City.
3. **Objective Three:** To conduct key informant interviews of individuals involved in the creation of the City of Peterborough Flood Reduction Master Plan.
4. **Objective Four:** To compare literature and documentation with the information gained through key informant interviews to develop findings of the case study.
5. **Objective Five:** To analyze the findings of the case study in terms of a proposed framework of six strategic choices from the literature.
6. **Objective Six:** To apply this analysis to extend sustainable hazards mitigation theory.

1.6 Organization of thesis

This thesis is organized into six chapters. The first chapter serves as an introduction to the thesis, case study and relevant literature. Chapter 2 reviews the relevant literature and introduces a framework proposed in the literature. Chapter 3 provides a background of the case study and a description of the case study research methods, including limitations of the research. The fourth chapter presents the findings of the case study and an analysis of those findings. Chapter 5 provides a discussion of the findings and identifies some implications to the literature and hazards mitigation practice. The sixth and final chapter offers recommendations and a conclusion, and includes suggestions for further study.

Chapter 2

Review of Literature

A sustainable community selects [hazard] mitigation strategies that evolve from full participation among all public and private stakeholders. The participatory process itself may be as important as the outcome.

(Mileti, 1999)

2.1 Introduction

In their seminal work *The Environment as Hazard*, Burton, Kates and White (1978) recognize that in a time of extraordinary human effort to control the natural world, the global toll from extreme events of nature is increasing. The authors state that the economic cost of natural hazards is rising in most regions of the world, and high loss of life is continuing or increasing in the developing countries of the world. The reality of this statement remains true almost thirty years later and, many authors contend, has only increased in significance and consequence (see for example Blaikie, Cannon, Davis & Wisner, 1994; Burby, 1998; Burton, Kates & White, 1993; Hyogo Framework, 2005; Mileti, 1999, White, 2005). The approaches used in many societies faced with losses from hazards have had limited success and are thus not satisfactory.

Humanity has responded to the devastation caused by natural hazards with varying degrees of success. The international community has reacted generously to help meet the needs created by some disasters², while people affected by countless other disasters have not

² A disaster can be defined as ‘a situation or event, which overwhelms local capacity, necessitating a request to national or international levels for external assistance’ (CRED, 2006), or as ‘an unforeseen and often sudden event that causes great damage, destruction, and human suffering’ (EM-DAT, 2007). For an event to be considered a disaster, at least one of the following criteria must be fulfilled: ten or more people killed; one

been so fortunate. Although responding to disasters with humanitarian aid is often necessary and can reduce losses, this method cannot save the lives or property lost during the disaster event itself. There is a better way to manage for disasters than by simply reacting to them.

This chapter provides a review of the existing academic literature that is relevant to this thesis. The primary contention of the literature is that that the current approach to planning for hazards is not acceptable and must change. To support this argument, the chapter will identify methods used now and in the past to manage the impacts of hazards, and discuss the reasons that these methods are inadequate to reduce disaster losses to acceptable levels. A new approach in the philosophy of how best to manage for hazards, referred to as sustainable hazard mitigation (Mileti, 1999), is proposed and described. The value of community involvement as an integral component of this new approach is explained, and an ideal arrangement of participation in decision making is outlined. The chapter identifies that the incorporation of citizen participation in the planning and decision making processes, either in a pre- or post-disaster setting, is widely accepted as a critical element of sustainable hazards mitigation.

The literature review proceeds to examine in detail the role of citizen participation in sustainable hazards mitigation and connects this to the process of comprehensive land use planning. To accomplish this, the chapter discusses citizen participation in land use planning as one element of democratic governance. The concept of citizen participation is defined and the relevant academic literature is reviewed and synthesized. The rationale, a brief history, and some problems with citizen participation in planning are all discussed. The chapter goes

hundred or more people affected; a declaration of a state of emergency; or a call for international assistance (UN/ISDR, 2006).

on to argue that citizen participation is a critically important element of hazard mitigation planning. The focus of the chapter narrows to present and describe an existing framework, recently proposed in the relevant literature, of six strategic choices that should be considered in the design of a citizen participation program for planning or policy making.

2.2 Traditional methods of hazard mitigation

Research in recent decades has called for a shift in focus from disaster response and recovery to proactive measures to mitigate the effects of natural hazards on humans. Hazard mitigation has traditionally referred to measures that can be taken to minimize the destructive and disruptive effects of hazards and thus lessen the magnitude of a disaster (Maskrey, 1989). Mitigation measures can take a variety of forms, ranging from physical or structural measures such as dams or levees to control flooding, to earthquake proof building designs, to controlling development in hazardous areas through land use planning and policy-making. Efforts during recent decades have largely been focused on physical or structural mitigation measures. Experience has proven time and again that these types of measures alone are inadequate (Blaikie *et al.*, 1994; Burby, 1998; Burton *et al.*, 1993; Godschalk, Kaiser & Berke, 1998; Maskrey, 1989; Mileti, 1999; White & Haas, 1975).

2.2.1 Why past methods are inadequate

Governments have traditionally tried to cope with disasters in three ways: by issuing warnings and evacuation orders before a hazard occurs; by relying on emergency relief and

insurance protection after a disaster occurs; and by physical/structural hazard reduction measures such as levees to reduce the likelihood of a future disaster (Burby, 1998). None of these approaches have proven to be adequate in reducing losses from disasters to acceptable levels. Furthermore, each of these general approaches is very expensive.

Warning *is* an essential part of hazard mitigation strategy, since no method of mitigation can completely eliminate risk. People need to be made aware of the risks they face – both long-term and immediate – so they can make well-informed decisions based on their own calculations of costs and benefits (Burby, 1998). However, based on past experience, people often do not heed warnings or calls to evacuate their homes for a variety of understandable and legitimate reasons. Reasons for not evacuating may include the lack of financial resources required to evacuate, lack of mobility due to health, age or disability, not taking warnings seriously because warnings have been issued in the past with no adverse effects, or simply not wanting to leave home or family behind.

Emergency relief and insurance, which take effect after disaster losses are incurred, reduce the impacts of a hazard by spreading losses, and easing reconstruction and recovery. However, there are two main problems with this method. The first is that no matter how good insurance protection and emergency relief may be, neither will save the lives that may potentially be lost in a disaster. These methods are often necessary to help survivors of a disaster, but are simply supplementary mitigation measures and cannot be relied on to reduce overall human or economic losses. The second is that emergency relief and insurance protection can foster complacency and reduce individual responsibility in risk-taking (Burby, 1998). If people and communities believe someone else will cover the costs of a disaster,

they may not be willing to take the necessary steps to reduce their own vulnerability. This can result in people knowingly living in a hazardous area because it is an attractive location or property, with the confidence that the burdens of a disaster will not be theirs alone to bear.

Physical or structural hazard mitigation measures are used to attempt to control natural hazards and reduce the likelihood of a disaster occurring. Dams and levees built to provide flood protection are clear examples of structural hazard mitigation measures. These structures offer some control over rivers and waterways but can create a false sense of safety to the people living nearby, and can simply postpone a disaster or induce flooding downstream (Mileti, 1999), or can actually increase losses when a future extreme event surpasses design specifications. Because people often do not understand that structural protection has limits, development is often intensified instead of minimized in the hazardous area. If those structures fail, or a hazard occurs that is larger in magnitude than what was designed for, communities often have more to lose and the disaster is more catastrophic (Mileti, 1999). Recent examples of situations where these circumstances have resulted in tragedy are the flood damages caused by breached levees in the upper Mississippi and Missouri River basins in 1993 (see for example Platt, 1998), and in New Orleans in 2004 (see for example Burby, 2006; Comfort, 2006).

The failure of these methods to adequately reduce hazard impacts has challenged researchers to further investigate the problem. Within the movement that has called for a shift in focus from disaster response and recovery to proactive measures, there has also been a change in thinking of how to best mitigate the effects of natural hazards on humans. This

change in thinking has led to a new approach in research efforts and in the adoption and application of different proactive measures for hazard mitigation.

2.3 A new approach

Dennis S. Mileti (1999) has contributed to the understanding of why many disasters occur and the reasons that the impacts of hazards are increasing. He is the author of *Disasters by Design*, which, as the title suggests, reflects the understanding that human design decisions (e.g. location of human settlements, structural design decisions) are a key component of disaster losses. This publication is the culmination of the second assessment of natural hazards in the United States undertaken by many leading hazards scholars and practitioners during the 1990's and builds upon the seminal *Assessment of Research on Natural Hazards* by White and Haas (1975). Mileti argues,

Many disaster losses – rather than stemming from unexpected events – are the predictable result of interactions among three major systems: the physical environment, which includes hazardous events; the social and demographic characteristics of the communities that experience them, including where and how well people live; and the buildings, roads, bridges, and other components of the built environment. Growing losses result partly from increasing human populations and economic value of the built environment, but they also stem from the fact that all these systems – and their interactions – are constantly becoming more complex. (Mileti, 1999, p. 3)

Other authors echo this argument, including Canadian hazards researchers Etkin, Haque and Brooks. They note that it is now well understood in the hazards community³, and

³ The “hazards community” includes people from many fields and agencies who address the myriad aspects of natural disasters. Hazards research now encompasses disciplines such as climatology, economics, engineering,

increasingly so in government and non-government organizations, that “disasters largely result from human-created vulnerability, as a consequence of the way in which we interact with our environment, design and locate our buildings and infrastructure, and concentrate our population” (Etkin, Haque, & Brooks, 2003, p. viii). Furthermore, disasters are related not only to development decisions and other socio-economic factors, but also to our use and abuse of the earth’s natural environment and resources. The exploitation of natural resources can increase the frequency and magnitude of some hazards, or eliminate natural buffers in the landscape, which can directly result in greater disaster impacts. Etkin *et. al.* (2003) provide examples of this ranging from slope failures triggered by deforestation, storm surges uninhibited by mangrove swamps or sand dunes, the loss of wetlands and flooding, to fossil fuel consumption resulting in climate change.

This recognition has led to an emerging understanding of the need to integrate disaster management planning with community or land use planning⁴, an approach which has come to be known as sustainable hazard mitigation (Mileti, 1999). This concept links wise management of natural resources with local economic and social resiliency, viewing hazard mitigation as an integral part of the larger concept of sustainability. Although the concept of sustainable hazard mitigation was popularized in Mileti’s *Disasters by Design* (1999), many aspects of this strategy were implicit in the recommendations formulated by White and Haas in their first assessment of natural hazards in the United States in 1975.

geography, geology, law, meteorology, planning, seismology and sociology. Professionals in these and other fields investigate how engineering projects, warnings, land-use management, planning for response and recovery, insurance and building codes can help individuals and groups adapt to natural hazards, as well as reduce the resulting deaths, injuries, costs, and social, environmental and economic disruption (Mileti, 1999).

⁴ Herein referred to as land use planning.

The concept of sustainable hazard mitigation has evolved and been refined over the last half-century. Beginning with the pioneering work of eminent geographer Gilbert F. White (1945), who first studied the control of land use in floodplains as a means of reducing flood loss rather than the reliance on structural flood mitigation (such as dams and levees), the concept has matured due to the contributions of several key authors (White, 1974; White & Haas, 1975; Burton, Kates & White, 1978, updated 1993; Godschalk, 1989; Burby, 1998; Mileti, 1999). Consistent in these works is the conviction that no single approach to achieving sustainable hazards mitigation shows more promise at this time than appropriate land use management. The integration of hazard mitigation planning as an integral part of comprehensive land use planning is considered essential to achieving sustainable hazards mitigation.

2.4 Integrating hazard mitigation and land use planning

Hazard mitigation and land use planning have many similar qualities that warrant and inspire the integration of these two fields. “They share a future orientation... they are concerned with anticipating tomorrow’s needs, rather than responding to yesterday’s problems... [and] both are proactive rather than reactive” (Godschalk, Kaiser & Berke, 1998, p. 85). Hazard mitigation and land use planning both aim to employ immediate actions to achieve longer term goals and objectives. Together they can be used to reduce the costs of disasters while increasing the sustainability of communities (Godschalk *et al.*, 1998).

Sustainable hazard mitigation can be integrated into land use planning decisions to create safer, more resilient⁵ communities. Land use planning, environmental protection, hazards mitigation, and sustainable communities are related concepts that have a similar objective; that is, communities where people and property are kept out of harm's way from natural hazards, where the mitigating qualities of the natural environment are not destroyed, and where the built environment is designed to withstand natural hazards (Godschalk *et al.*, 1998; Mileti, 1999). Achieving this vision requires an understanding of the way in which the values underlying the concept of sustainability can be integrated into the practice of local land use and hazard mitigation planning. In order to be more sustainable, communities must integrate hazard risk reduction with other social, economic and environmental goals (Godschalk *et al.*, 1998). An integrated, comprehensive community plan ties hazard mitigation, land use, and the goals of sustainability together and sets guidelines for when and how these tools are to be used. Local governments can reduce disaster losses while accomplishing environmental and other community objectives (Mileti, 1999).

The integration of hazard mitigation planning and land use planning can provide a number of benefits, some of which are outlined by Mileti (1999). First, plans can provide information about the location and potential impact of various hazards, ensuring that the risks of developing hazardous areas are known to elected officials, government staff, developers, and citizens. Secondly, by formally recognizing the most appropriate uses of land through zoning regulations, plans make it possible for local governments to restrict development in hazardous areas. Third, land use planning can be used as a means to involve members of the

⁵ In this thesis, the use of the term 'resilience' means the ability of a community to recover from hazards (Olshansky & Kartez, 1998).

community in government decision making. In fact, as will be argued, community involvement in the hazard mitigation planning process provides many benefits and should be considered invaluable.

Widely accepted as a critical element of the call to integrate hazard mitigation and land use planning is the incorporation of citizen participation in the planning and decision making processes. Citizen participation must be recognized as a fundamental component of sustainable hazards mitigation, and increasing emphasis must be placed on this important element (Godschalk *et al.*, 1998; Mileti, 1999). Effectively including and using public input in planning for sustainable hazard mitigation has been a subject of recent study within the field and may help contribute to the general aim of reducing the human and economic costs of natural hazards.

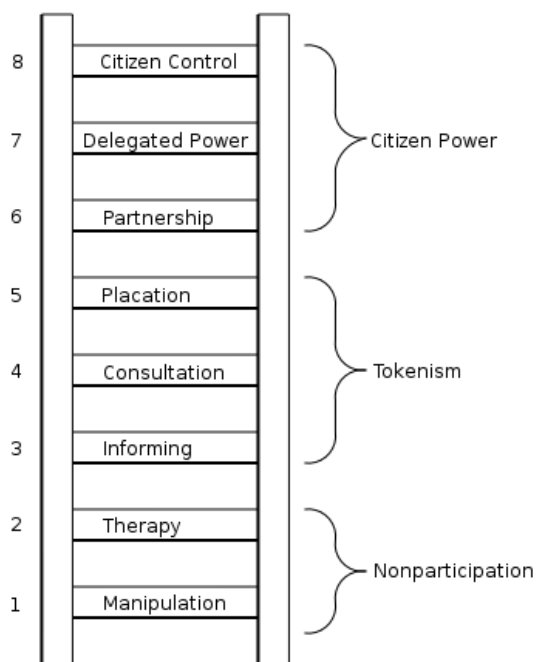
2.4.1 Community involvement

Collaborative planning, in which citizens and stakeholders are given significant roles and degrees of power, has been well documented for some time (Arnstein, 1969; Godschalk, Brody, & Burby, 2003). In the collaborative planning approach, stakeholders are not just responders to plans but also are engaged in the planning and decision making process. Local governments can build planning and implementation capacity through decentralizing and sharing decision making (Godschalk *et al.*, 2003). As will be discussed, in the practice of land use planning, and environmental and natural resource management, the concept of public participation or community involvement is well recognized and generally valued.

The inclusion of community involvement and citizen participation in formulating a hazard mitigation plan as part of a comprehensive land use plan is an essential step in planning for sustainability. Mileti (1999) advocates for communities to adopt a consensus-building approach to hazard mitigation, by seeking participation from all of the people who may be affected by the plan and attempting to reach agreement in decision making. “What is important is that the participatory process be engaged in, 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 it creates” (Mileti, 1999, p. 34).

The collaborative planning approach may fit most appropriately into the ‘partnership’ rung of Arnstein’s (1969) ladder of citizen participation, which is shown on the following page as Figure 1. At this sixth of eight rungs (with the eighth being citizen control), power is distributed through negotiation between citizens and stakeholders, and an agreement is reached to share planning and decision making responsibilities (Arnstein, 1969). Partnership is perhaps the ideal level of public involvement in planning for sustainable hazard mitigation given that all stakeholders, including government officials, consultants and citizens, can make valuable contributions to decision making.

Figure 1. Arnstein's Ladder of Citizen Participation



Source: Arnstein, 1969

While the concept of collaborative planning has been practiced and largely accepted in land use planning and natural resource management, the same is not necessarily true for its role in hazard mitigation planning. Policy leadership and decision making in hazard mitigation planning have traditionally come from high levels of government or international agencies – from the top-down (Maskrey, 1989; Pearce, 2003). This could be attributed to the common practice of our society to plan for hazards after they have caused a disaster – after the events have become of national or international concern. The involvement of governments and international aid agencies in hazard mitigation planning is essential, but the tendency for their decision making to come from the top-down may not be the most effective method of planning.

2.4.2 The problem with top-down approaches

Pearce (2003) states that while top-down mitigation policy is needed, it is really local-level, bottom-up policy that provides the impetus for a successful hazards mitigation planning process. Both in North America and internationally, there has been a growing criticism of top-down hazard mitigation programs that plan for, and not with, communities (Laughy, 1991). Often these top-down programs are managed by governments or other large, centralized agencies without any real participation in decision making by those affected by potential hazards (Maskrey, 1989).

One criticism of top-down mitigation is that it only deals with mitigating the risks of specific hazards and not with reducing vulnerability. As such, top-down mitigation often attempts to address only the damages that result from a disaster and not the underlying causes of a disaster (Maskrey, 1989). Top-down mitigation measures often do not consider the real needs of those affected by hazards. These measures can often be irrelevant and even counterproductive in many local situations. Additionally, Maskrey (1989) draws upon several case studies to argue that top-down mitigation is often subject to political pressure and may benefit some people at the expense of others. Without local influence on the decision making process, some mitigation programs can actually reinforce the underlying causes of vulnerability (Maskrey, 1989). Two examples are provided of top-down mitigation programs that, while having good intentions, justify these criticisms.

2.4.2.1 Two examples of misguided top-down approaches

When a community has not been included in the planning and decision-making processes, many problems become apparent during disaster and post-disaster situations. The community may find itself caught between differing opinions in decisions regarding planning, preparedness, evacuation, relief and rebuilding. This can lead to the public challenging the decisions and actions of those who have created policy. The following anecdote was reported following the Mezzogiorno earthquake in Italy, November 1980, and exemplifies what may happen when a community is left out of the post-disaster planning process.

And in Calitiri, a town of 3400 persons, an old man politely stopped a convoy of vans that had arrived to take villagers out of the storm-battered highlands and to hotels along the Amalfi coast. “You are a good and capable man, but don’t come again,” the old man said to the young police captain who was in charge of the relocation job. “This is where we lived, and this is where we want to die” (Pearce, 2003, p. 217).

Another example, recounted by Maskrey (1989) who reviewed post-1983 flood recovery in Chiclayo, Peru, demonstrates that reliance solely on top-down hazard mitigation can lead to well meaning and technically sound mitigation programs becoming irrelevant to the needs and priorities of local people when they have not been involved in the design of the program. Financial and technical support for rebuilding the village was provided by several outside aid agencies. The rebuilding project consisted of the reconstruction of the houses in the village with brick in order to mitigate the effects of future floods. The aid agencies supplied local people with building materials and technical assistance, and the local people

were to build the houses. People were sceptical of the new technology and did not like the design of the houses which were drafted without their participation, and the result was that the rebuilding project was only partially completed. Perhaps most importantly, people gave more priority to recovering agricultural production and repairing irrigation infrastructure than to rebuilding houses (Maskrey, 1989). The implementation of rebuilding projects can be extremely difficult when authority is not vested in local peoples' own legitimate interests.

2.4.3 The shift in disaster management strategies

Both of these examples are situations where hazard mitigation planning has been conducted for, not with, communities. Experiences like these however, have been valuable learning tools, and have contributed to the current and ongoing shift in disaster management philosophy that has been discussed in this literature review. This shift in philosophy is summarized and illustrated in Figure 2.

Figure 2. The shift in disaster management strategies

From	→	To
Hazards	→	Vulnerability
Reactive	→	Proactive
Single Agency	→	Partnerships
Science Driven	→	Multidisciplinary Approach
Response Management	→	Risk Management
Planning for Communities	→	Planning with Communities
Communicating to Communities	→	Communicating with Communities

Source: Disaster Preparedness Resources Centre (1998) cited in Pearce, 2003, p. 213

Community involvement as part of planning for sustainable hazards mitigation is a critical element of the process and a cornerstone of the shift in disaster management philosophies. This shift may help facilitate the necessary action required to reduce the human and economic costs of natural hazards. The following sections explore research on the ways in which citizen participation can effectively be included in land use planning decisions for hazards mitigation.

2.5 Citizen participation research

Traditional democratic theory assumes that the public interest will be achieved through the participation of citizens in government decision making (Godschalk, Brody & Burby, 2003). The well-documented global shift in concern over government to 'governance' (Stoker, 1998) and the complexity of today's society have created opportunities for stakeholders who have been excluded from policy making in the past (Taylor, 2007). These opportunities have been reflected in the growing emphasis on government policies related to citizen participation (Taylor, 2007). This ideal has been increasingly reflected in recent decades in one practical application of governance: land use planning and policy making.

Citizen participation in plan making was initially supported by local governments to show commitment to the principles of democratic governance (Brody, 2003b). Over time, this commitment has been built into the planning and policy making practices of municipalities in Canada and the US, resulting in acceptance of citizen participation in community plans and project proposals (Godschalk *et al.*, 2003). Several key authors have

argued the importance of including citizens in government land use planning decisions and have contributed to the foundation of the understanding of the principles of citizen participation. Arnstein (1969), Burke (1979), Day (1997), Fagence (1977), and Fainstein and Fainstein (1985) have argued that these principles include the rights of citizens to be informed, to be consulted, and to have the opportunity to contribute their opinions to government decisions. These authors also stress the need for better representation of the interests of disadvantaged and powerless groups in governmental decision making, as well as the contributions of participation to citizenship (Brody, 2003b).

Citizen participation in the planning process has been the subject of a great amount of both theoretical and empirical research by these and many other authors. Day (1997) provides a very useful and thorough review of an “untidy” citizen participation literature. Although the subject has attracted much scholarly activity, the literature has been plagued by confusion about what participation looks like in practice and what exactly it is supposed to accomplish. For this reason it is important to clarify the meaning of citizen participation.

For the purposes of this thesis, citizen participation refers to the direct involvement of the public in decision making through a series of formal and informal mechanisms (Schatzow, 1977). This is different than “public influence”, which refers to the effect of the public on decision making, in that although participation may occur, the input and opinions of citizens may be ignored by decision makers (Day, 1997). In other words, citizen participation is when members of the public are given the opportunity to participate in decision making, and actually use that opportunity to add their input to the process. It does not necessarily mean that decision makers will let public input influence their decisions.

Arnstein (1969) defines citizen participation differently in her influential and oft-cited article *A Ladder of Citizen Participation*. This important article influenced a generation of planners and citizens at a revolutionary time in history, through its radical call for the transfer of decision making power to citizens. Arnstein defines participation as:

“A categorical term for citizen power. It is the redistribution of power that enables the have-not citizens, presently excluded from the political and economic processes, to be deliberately included in the future... It is the means by which they can induce significant social reform which enables them to share in the benefits of the affluent society” (Arnstein, 1969, p. 216).

2.5.1 Rationale for citizen participation in planning

Much has been written about the intrinsic value and inherent goodness of citizen participation in government policy and decision making over the years. Day (1997) notes the ideas of several key authors in her review of the relevant participation literature. According to Day, many scholars believe that participation is “essential for individuals to fully realize their potential as humans” (Kweit and Kweit, 1990 in Day, 1997, p. 424). Barber (1981) and Williams (1976) insist that active citizen participation can be a means of affirming democracy and of giving citizens more faith in themselves and their governments (in Day, 1997). Fagence (1977 in Day, 1997, p. 424) argues that citizen participation “can serve as a means towards power equalization and reinterpretation of the democratic ethic”, and observes that denying opportunities for citizen involvement in government decision making is often criticized as dishonouring the democratic tradition. It has also been argued that democratic theory suggests that participation itself breeds more participation, and that the more an individual participates, the more that person develops the attitudes of a good citizen.

These attitudes include open-mindedness and recognizing that the best interests of the community are also in one's own best interest (Day, 1997).

Citizen participation is widely viewed as a key component in the land use planning process, as one application of government policy and decision making. For the most part, planners accept the idea that participation is an essential element of producing enduring plans (Brody, Godschalk & Burby, 2003). Citizen participation can be an important factor in generating the trust, credibility, and commitment between the public and government that is required to adopt and implement successful plans and policies (Brody *et al.*, 2003; Burby, 2003). Including citizens in decision making early in the planning process gives participants a sense of ownership of the final plan, which may result in a higher quality plan.

Participation early in the process also ensures that all necessary information is made available at the outset of the process so that unexpected participation by other potential stakeholders does not cause unnecessary delays during the implementation of the plan (Day, 1997). A sense of ownership may also reduce conflict over the long term, because those involved feel responsible for making the plan work (Brody *et al.*, 2003). Perhaps most importantly for the purposes of this thesis, the literature recognizes that citizen participation in the planning process “makes an important and positive contribution to the cornerstone of planning activity: the formulation of the comprehensive plan” (Day, 1997, p. 425). If it is important that hazard mitigation planning be incorporated into comprehensive planning, and it is widely accepted that participation is a key part of comprehensive planning, citizen participation should thus be recognized as a critical element of hazard mitigation planning.

2.5.2 Brief history of citizen participation

Citizen participation in land use planning in the United States⁶ is arguably the most extensive and intensive in the world (Godschalk *et al.*, 2003). Supported and encouraged by federal, provincial and municipal legislation and policy, citizen involvement has become an established part of planning practice. Godschalk *et al.* (2003) give a good summary of the three main models of citizen participation that are seen to have evolved in the US and Canada during the 20th century.

In the early 1900s, the good government reform movement in the US implemented a model of participation based on public hearings and advisory committees. The public hearing was created to give citizens the formal opportunity to comment on plans and development proposals to planners and local elected officials. This participation device is still widely used, although public hearings are sometimes criticized for occurring late in the planning process and for encouraging organized opposition to proposed plans rather than collaborative problem solving from the start of the process (Godschalk *et al.*, 2003). The advisory committee was designed as a means for citizen representatives with specialized knowledge or a significant interest in the planning process to provide ongoing advice to municipal planners and councillors on behalf of the public. It is also still in widespread use, even though it is sometimes criticized for failing to include representatives of all community interests (Godschalk *et al.*, 2003).

During the 1960s, the popularity of this advisory model was surpassed by a model of collaboration and power-sharing which was popularized in Arnstein's aforementioned A

⁶ The similarities between US and Canadian planning traditions are such that this historical review, while based on US sources, is broadly relevant in Canada (Hall, 1996; Hodge, 1991; Ward, 1999).

Ladder of Citizen Participation (1969). In this approach, citizens and stakeholders are given significant roles and power in decision making in the planning process. “They are not just responders to staff plans but also are engaged in creating and selecting plan alternatives” (Godschalk *et al.*, 2003, p. 734). Day (1997) notes that in the US, the War on Poverty during the 1960s and the Model Cities Act of 1966 both helped to change participation requirements in land use planning. It was during this decade that the belief really began to take hold that citizens should be able to contribute to and influence planning programs that affect them, rather than participation existing simply as a means to obtain citizen cooperation (Burke, 1979; Day, 1997).

The 1980s saw an increase in the use of conflict management and dispute resolution models to attempt to find solutions when participation brings stakeholder groups into opposition. This approach often relies on a neutral third party with specialized skills and training to facilitate negotiation and mediate disputes. These mediators often use techniques of consensus building and dispute resolution to reach a solution that satisfies all involved parties (Briassoulis, 1989; Godschalk *et al.*, 2003). Grant (1994) notes that the recession of the early 1980s caused citizen participation to become less of a priority, as planners were instead most concerned with strategic planning and economic development (Day, 1997).

In current US and Canadian planning practice, the advisory, collaborative, and conflict management models of citizen participation usually overlap. Rather than choosing one model or another, planners and decision makers often use the most appropriate techniques of each model when designing a participation program. This strategy allows for

mutual learning and active collaboration by all stakeholders to be built into the process from the start, and may result in a better final plan (Godschalk *et al.*, 2003).

2.5.3 Some problems with citizen participation

Despite the recognition and general acceptance of the benefits of citizen participation in planning and policy decision making, citizen participation remains a difficult aspect of the planning process for several reasons. Day (1997) uses two examples from the literature that perhaps best sum up the difficulties associated with citizen participation. Arnstein (1969) reflects that “the idea of citizen participation is a little like eating spinach: no one is against it in principle because it is good for you”. This sentiment is later echoed by Benevise (1989) who observes that one of the dilemmas of planning is that while it cannot succeed without some participation, it cannot afford to be dominated by the process of participation. He refers to citizen participation as the “Achilles heel of planning” (Benevise, 1989).

A potential problem that exists is that the outcomes of participation may not accurately reflect the true preferences of the general public, because only a small number of people actually take advantage of opportunities to participate in planning (Day, 1997). If the will of those people is different than that of the rest of the population, decisions that are made may represent the concerns of participants instead of the whole community. The reason for this problem could be that participation a luxury in modern societies because it requires skills, resources, money, and time that many citizens do not have (Day, 1997; Grant, 1994). Since citizens cannot afford to invest as much time on a planning issue as a professional planner, most citizens will not be as knowledgeable as the professional about the planning

issue at hand. Kweit and Kweit (1990) argue that this disparity in preparedness perpetuates the idea that citizens are not qualified to make meaningful contributions to decision making (Day, 1997).

Another disconcerting reality of participation is that citizens are usually not interested in participating in policy making unless they think the outcome will have a direct effect on them or is in their immediate interest. This is related to the NIMBY (Not In My Back Yard) phenomenon and is an outgrowth of the general tendency for citizens to act in their own best interest rather than that of the wider community. It is often easier, and therefore more likely, for citizens to focus their energy and rally together to oppose a threatening development than it is to be involved in proposing potential solutions to a problem which is perceived to pose little threat to the individual. Day (1997) captures the essence of the NIMBY problem nicely, stating “When citizens value stability and fear uncertainty, they may consider known injustices less threatening than the unpredictability of reform” (Day, 1997, p. 426). Other problems that exist in citizen participation are that some types of plans fail to receive public attention and that governments do not always use public input and contribution meaningfully (Godschalk *et al.*, 2003). Involving citizens in planning and policy decision making remains a formidable challenge to governments. This challenge has proven to be especially difficult in hazards mitigation planning.

2.6 Citizen participation in hazard mitigation planning

Godschalk, Burby, and Brody are American scholars who have written extensively about citizen participation in land use planning for hazards mitigation, and have provided a

good foundation of research and literature in this subject area. They note that it has been particularly difficult for governments to generate high levels of citizen participation in hazard mitigation planning. Despite the increasing economic costs associated with hazards such as floods, hurricanes and earthquakes, planners have not had much success in attracting substantial citizen involvement in creating plans to reduce the effects of these hazards (Burby, 2003; Godschalk *et al.*, 2003).

Godschalk *et al.* (2003) offer three explanations for an apparent lack of interest of citizens to be involved in hazards mitigation planning. The first is that many citizens, and even planners, believe that hazard mitigation and emergency response are sufficiently addressed by the mandates and plans of other government departments and agencies. The second reason is that citizens often feel that they lack the knowledge to provide competent input on technical issues (i.e. engineering measures, building codes, zoning regulations) involved in hazards mitigation planning. The third explanation is that most citizens do not believe that natural hazards have a direct impact on their daily lives, and are more interested in being involved in neighbourhood issues that affect their immediate interests, such as protection from unwanted development or relief from traffic congestion (Godschalk *et al.*, 2003).

Hazards researchers identify two main types of plans that exist in the natural hazard mitigation field: specialized, stand-alone emergency management or hazard mitigation plans; and comprehensive community or land use plans that contain hazard mitigation elements (Godschalk *et al.*, 2003). In the past, the field of emergency management has traditionally relied on stand-alone plans. While both types of plans have advantages, Burby (1999) and

Godschalk *et al.* (2003) strongly advocate for incorporating hazard mitigation into comprehensive land use planning. They argue that decisions regarding land use, as well as transportation, infrastructure, environment and other components of comprehensive planning, are good opportunities to integrate hazard mitigation policy. Furthermore, comprehensive planning is a practice that is already established with government and elected officials and exists as a way to generate citizen participation (Godschalk *et al.*, 1998; Godschalk *et al.*, 2003).

2.6.1 Six Strategic Planning Choices

Brody, Godschalk and Burby (2003) have identified six critical choices that should be considered in the design of the citizen participation element of a planning program.

Decisions about these choices may be made by municipal planners, consultants involved in the planning project, or elected officials, or a combination of these individuals. They are constructs that have been created by the authors from their experience conducting citizen participation and hazards mitigation research. The choices are as follows (from Brody *et al.*, 2003) and will be described below.

1. *Administration* – whether or not to include participation in the planning process and how to staff citizen involvement efforts;
2. *Objectives* – whether to simply educate citizens, seek their ideas and preferences, or actually grant them influence in decision making;
3. *Stage* – when to start encouraging and allowing citizen participation in the planning process;
4. *Targeting* – which types of stakeholder groups and segments of the population to invite to participate in the planning process;

5. *Techniques* – what types of approaches are employed to generate citizen participation; and
6. *Information* – what types of information and dissemination processes are used to inform participants.

The first decision that should be made is in regards to the administration of citizen participation in the planning program. This involves allocating the resources that will be committed to ensuring participation in the program. Municipalities may decide to adopt or create an official participation plan that is shared with the public. Setting guidelines for citizen participation helps to establish equal opportunities for involvement and ensures that stakeholders each have a chance to express their opinions during the planning process. The municipality should determine if they have the resources available to appoint a planner or hire an outside consultant to facilitate the participation program. An individual with special training in citizen involvement techniques can greatly benefit the decision making process and the quality of the final outcome of the plan (Brody *et al.*, 2003).

The second choice to be made relates to the overall objective of the planning program in regards to citizen participation. This can range from simply educating and informing citizens about what is being proposed, to seeking their ideas and preferences for possible solutions, or to actually granting citizens influence and power in decision making. This choice can be looked at as deciding which “rung” or rungs on Arnstein’s “ladder of citizen participation” is most appropriate or ideal (see *Figure 1*). This ladder illustrates that the empowerment of citizens that occurs in a collaborative planning approach (the higher rungs) is seen as superior to the one way communication of informing and educating citizens (the

middle rungs) since the latter does not actually involve them in decision making (Arnstein, 1969; Brody et al., 2003). It is exceedingly rare in current planning literature or practice to refer positively to the lowest “nonparticipation” rungs of Arnstein’s ladder. Many authors argue that “increasing collaboration will help citizens better understand information, generate new ideas for dealing with problems, lead to greater consensus on courses of action, and produce greater long-term support for policy recommendations proposed in plans” (Brody *et al.*, 2003, p. 250).

Deciding the stage of the planning process when citizens first become involved is a third key choice that should be made about a participation program. Brody *et al.* (2003) note that most authors generally agree that to ensure meaningful stakeholder involvement, participation must occur “early, often, and [be] ongoing” (Wondolleck & Yaffee, 2000, p. 103). Incorporating participation early in the planning process allows local knowledge and expertise to be gathered and used when it is most needed, before decisions have been made. Decisions can then truly reflect the interests and preferences of the community. Planners must keep in mind, however, that during the early stages of the process, the issues raised by the proposal may still be quite general and therefore may not elicit accurate responses from all potentially affected stakeholders. On the other hand, participation that begins at a later stage in the process may come too late to have much of an actual impact on the final plan, as resources have already been invested in creating that plan and the difficulty in discarding a completed plan. Also, participation that begins with public meetings near the end of the planning process can create an adversarial reaction from the public that can dominate the process and hamper support for the implementation of the plan (Brody *et al.*, 2003).

The fourth key choice to be made by planners is deciding how many and which types of stakeholder groups to target for participation. Although some citizens and stakeholder groups will likely become involved without being invited to participate in the process, many will not. Individuals or groups may not be aware that the proposal exists, be unaware how the proposal will affect them, or lack the interest or organization to be involved in the process. Planners must recognize who will potentially be affected by the plan being created and the specific contribution to decision making that can be made by those individuals or groups. These individuals or groups should then be aggressively targeted for participation, as “targeting inevitably leads to a higher degree of citizen participation and added planning capacity in the form of resources and knowledge” (Brody *et al.*, 2003, p. 252). Planners must make an effort to target all stakeholder groups that may be affected by the plan, regardless of their size or stature in the community. For example, environmental or conservation organizations and groups representing disadvantaged people should be considered to be as important as local businesses and developers.

The fifth key choice, the techniques that will be employed to generate and use citizen input, should be another consideration for planners when designing a participation program. Techniques that could be used range from formal public meetings, community forums, open houses and facilitated workshops, to citizen advisory committees or creative methods that most appropriately suit the community or proposal. The appropriateness of the techniques will affect the success of public involvement and therefore the final plan itself. It is important for planners to have a good understanding of what they want citizen participation to accomplish, in order to select the proper involvement techniques to realize those

objectives. Brody *et al.* (2003) point out that some techniques are often used to accomplish multiple objectives, such as subcommittees or workgroups, educational workshops, and talks to community groups. These techniques have a wide focus and can be used to serve a number of purposes. Other techniques will only accomplish a limited number of aims. For example, household surveys and visioning exercises will at best serve only to clarify citizen preferences. However, if this is the aim of participation, these techniques may be perfectly suitable. Again, employing a planner, or hiring a consultant, with skills and experience in facilitating citizen participation will help in deciding which techniques are most appropriate for the situation.

The sixth decision to be made in the design of a participation program is in regard to the information that participating citizens are provided with and how this information is communicated to them. The common expression, ‘information is power’ serves as guidance and thus, access to adequate information is vital if participants are to make worthwhile contributions to the decision making process (Brody *et al.*, 2003). For this reason, information relevant to the plan should be easily accessible at all stages of the planning process. Often however, plan making involves dealing with complex ecological, engineering, or political issues that members of the community may find difficult to understand. Providing technical information to lay people is a challenge for planners, but is essential if citizens are to make educated and informed contributions to the decision making process. It is necessary for planners to provide adequate information in order to empower citizens and level the playing field between stakeholder groups.

2.7 Summary

This chapter has reviewed the academic literature relevant to this thesis. A shift in the philosophy of disaster management to a new approach called sustainable hazards mitigation has been identified and described. The literature argues that citizen participation is a fundamental element of the integration of hazards mitigation and land use planning, as called for in this new approach. The chapter closes by presenting a detailed explanation of a framework of six strategic choices that should be considered in the design of a citizen participation program for hazards mitigation planning. Analyzing an existing hazards mitigation planning program involving citizen participation in terms of the six strategic choices proposed by this framework will serve to apply theory in the current literature to planning practice in order to better understand sustainable hazards mitigation.

Chapter 3

Research Methods and Background of Case Study

3.1 Introduction

More research is required to determine ways in which citizen participation can effectively be included in land use planning decisions for hazards mitigation. It is with the intention of meaningfully contributing to this gap in knowledge that a research program involving a case study in Peterborough, Ontario was undertaken. The case study investigates the role of citizen participation in a post-disaster hazard mitigation planning program.

This chapter provides a description of the case study research methods, some limitations of the research program, and background information of the case study area. The event that created the flood damage and the subsequent actions taken by the City of Peterborough are explained. The causes of the flood, determined by the Flood Reduction Master Plan study, are identified.

3.2 Research methods

In order to discover how citizen participation has or has not influenced planning and decision-making for sustainable hazards mitigation, a case study of a community experiencing previous flood damages, Peterborough, Ontario, was thought to be the most appropriate research strategy. Yin (2003) states that case studies are the preferred strategy when “how” or “why” questions are being asked, when the researcher has little control over events, and when the focus is on a recent issue within a practical context. The research

conducted of the situation in Peterborough meets each of these criteria. Furthermore, the case study is a common research strategy in community planning (Yin, 2003). As noted in the previous chapter, hazards mitigation planning has not traditionally embraced community involvement to the same degree as land use planning. This assertion and the call to integrate hazard mitigation with land use planning further support the case study method as the most appropriate strategy of research for this situation.

The case study's unique strength is its ability to deal with a variety of evidence, including existing documents, archival records, interviews, direct observation, participant-observation, and physical artifacts (Yin, 2003). For the purposes of this case study research program, existing documentation, semi-structured key informant interviews, and direct observation were most heavily relied upon.

3.2.1 Existing Documentation

Existing documentation was consulted at the beginning and throughout the research program. Three main sources of documentation were consulted for background and in-depth information about the flood reduction program in Peterborough. The Flood Reduction Master Plan (and Appendix A of the FRMP) created by UMA Engineering Ltd. (2005), the City of Peterborough's official municipal website, and the Peterborough Public Library files dedicated to local flood issues were the main sources of existing documentation used to inform this research program. Approximately one hundred (n=100) separate documents, web sources and items in library files were consulted throughout the research program.

The City of Peterborough retained UMA Engineering Ltd. after the July 2004 event to conduct a study leading to the creation of the Flood Reduction Master Plan. The FRMP identifies the causes of the flood damage and recommends the broad first steps required to realize priorities and potential solutions. The City of Peterborough's website (COP, 2008) contains a large amount of information that was consulted in order to become familiar with the structure of the municipal government, senior staff and elected officials, and flood reduction measures that have been taken by the City.

The Peterborough Public Library has created and kept files that include most of the newspaper articles written about the July 2004 flood and the subsequent flood reduction program. This thorough collection proved to be an invaluable resource for learning the details of the disaster and post-disaster responses as this progressed, and for gaining a sense of the feeling in the community at the time of the events and throughout the following weeks and months. Most articles that were examined (n=approx. 85) were published in the *Peterborough Examiner*, the local daily newspaper, and *Peterborough This Week*, a local twice-weekly newspaper. Some articles in the files were from major newspapers *The Globe and Mail* and *Toronto Star*.

3.2.2 Key Informant Interviews

The most critical element of this research was key informant interviews (n=15). These interviews were conducted in order to gather new and up to date insight from individuals whose perspectives may not have been previously documented. Yin (2003) states

that key informant interviews are one of the most important sources of information in a case study, and often critical to its success. Key informants not only provide a researcher with insights into a matter but can also suggest other sources of corroboratory or contrary evidence, and may initiate access to those sources (Yin, 2003).

3.2.2.1 Interview methods

I conducted in-person, semi-structured interviews with fifteen (15) key informants. These individuals were chosen because of their involvement in one or more aspects of the flood reduction program, or because they had a vested interest in the outcome and success of the flood reduction program. I began this part of my research program with a number of potential interviewees in mind. I learned of these individuals and their role in the flood reduction program from preliminary research of existing documentation found on the City of Peterborough's website, the Flood Reduction Master Plan, and articles published in local and Toronto newspapers.

In addition, I also relied on the snowball method of sampling, whereby I asked interviewees to suggest other potential key informants whose knowledge and experience would benefit my study (Babbie, 2004). This proved to be a very effective method of gathering information and identifying potential informants. Toward the end of the field research, many interviewees suggested that I speak to informants who I had already interviewed, and this reassured me that I had contacted the most crucial key informants. Some interviewees suggested that I speak to a person that no one else had mentioned, and

again, this was very helpful in that it expanded the range of the perspectives and experiences of my informants, and provided me the contact information of someone whom otherwise I would not have known about. In most cases I was able to follow up on these suggestions and arrange an interview with the recommended key informants. Often these informants would suggest other individuals to interview and thus my method of snowball sampling continued. In a few cases, I did not pursue some suggested informants because I felt that their experience or expertise did not at all relate to my study, even though the individuals who suggested them were trying to be helpful.

After completing fifteen key informant interviews, I became convinced that my snowball method of sampling was close to becoming exhausted for the scope of my research. One of the classic indicators that a snowball sample should draw to a close is when the researcher has already interviewed the individuals that are suggested by other key informants (Babbie, 2004) and this happened for the case under examination here. Another sign that convinced me to cease interviewing was when the information that I gathered during interviews ceased to be new or novel: such information was repeated *ad nauseam* by many of the later interviewees and at that point I was satisfied that I had a solid grasp on the information.

3.2.2.2 Key informants

Semi-structured interviews conducted with the fifteen key informants can be divided into five categories based on the interviewee's role or interest in the Flood Reduction Master

Plan process. The categories and the number of key informants interviewed in each category are as follows:

1. City of Peterborough senior staff (n=4)
2. Private consultants involved in creating FRMP (n=2)
3. Otonabee Region Conservation Authority staff (n=3)
4. Representatives of citizen or community groups (n=4)
5. Other (n=2)

In the “Other” category, two people were interviewed. The first individual was a recent former graduate student who wrote a Master’s thesis about initial flood perceptions in Peterborough shortly after the July 2004 flood. The second individual was a University Environmental Studies professor who lived in Peterborough during the July 2004 flood, and whose personal property was directly affected by flood damages. While neither of these key informants were able to comment on direct experience with the Flood Reduction Master Plan process, both provided valuable advice and guidance on how best to proceed with my research program.

3.2.2.3 Conducting and transcribing interviews

I asked key informants to share with me their knowledge of the Flood Reduction Master Plan process as well as their opinions on its successes and shortcomings. I created a standard set of question themes (see Appendix ‘B’) to be followed in all interviews and

referred to this guide to maintain the focus of the interview and not miss any themes. I attempted to keep the interviews as much like a conversation as possible, and allowed the key informant to digress and provide unsolicited information if he or she was willing to do so. I felt that this was an ideal strategy for encouraging the maximum amount of information to come out during the interview. Many key informants readily offered the information that is most important from their perspective. This willingness was helpful in that it gave me a clear idea of what information was considered most important from each perspective. I then asked key informants questions from each question theme that had not yet been addressed. The knowledge that I gained from each interview further guided my research program to more appropriately adapt to the case. Throughout the research the question themes were modified and extended as new information came to light: this allowed me to more accurately explore the topic areas most relevant to the FRMP process.

The interviews were conducted in-person by the author. Most of the interviews (thirteen out of fifteen) were conducted in Peterborough. Of the other two interviews, one was in Toronto and the other in Waterloo, Ontario. The average length of time of the interviews was approximately fifty (50) minutes. A few were significantly longer than that at approximately one hour and twenty minutes, and some were shorter at approximately thirty minutes. All interviews were tape recorded so that the details of the interviewees' responses could be captured and so the author could concentrate on the conversation and asking appropriate questions rather than on taking notes. The recordings of the interviews were then transcribed verbatim in order to have a written record of the interviews. The transcriptions

were then analyzed and referred to during the remainder of the research stage and throughout the writing process.

Each transcription was analyzed in three ways. The first method was to look for original or unique content and particularly compelling quotes that described the case study situation. These were then extracted from the document. The second method was to look for specific themes that were mentioned by many key informants and extract what each of them said about that theme. Responses for each theme were then pooled for the five different stakeholder groups, and these pooled responses were then compared across the different stakeholder groups (e.g. City staff, consultants, ORCA staff, community group representatives, or 'other' informants). The third method was to extract information that specifically addressed the six strategic choices outlined by Brody et al. (2003) and summarized in section 2.6.1 of this thesis.

3.2.3 Direct Observation

I attended one Public Information Meeting in Peterborough in October, 2007. This meeting was not part of the Flood Reduction Master Plan process, but was held as part of one of the Environmental Study Reports that were undertaken as a result of FRMP recommendations. Attending this meeting gave me an opportunity to witness first-hand how citizen participation is incorporated in the planning process. I was able to observe how a public information meeting is conducted, how citizens were listened to, and how the project team communicated to the public about how citizen input would influence decision making.

Although this meeting was not part of the original FRMP process, observing this meeting was a valuable experience that gave me a better insight to my research topic.

3.2.4 Data Triangulation

The opportunity to use many different sources of evidence is a major strength of case study data collection (Yin, 2003). The use of multiple sources of data allows the researcher to address a broad range of historical, attitudinal, and behavioral issues. The most important advantage of multiple sources of evidence is the development of converging lines of inquiry, which is when evidence from two or more sources come together on the same set of facts or findings (Yin, 2003). This method of research is known as data triangulation. Any finding or conclusion in a case study is likely to be much more accurate and convincing if it is based on several different sources of information that support each other (Yin, 2003).

To analyze the case study data, I relied largely on comparison to theoretical propositions in existing literature, namely the six strategic choices framework in Brody et al. (2003). According to Yin (2003), this is the most preferred strategy of analyzing data because the objectives and design of this case study are based on propositions that reflect the theory and knowledge gaps found in the existing literature. Yin (2003) states that theoretical propositions about causal relations – answers to “how” and “why” questions – can be very useful in guiding case study data analysis. These types of questions were relied upon and were most common in key informant interviews during the case study.

The most appropriate method of analysis for this case study may be a specific technique known as pattern matching (Yin, 2003). Case study data were analyzed for themes, and comparisons of these themes were made between different sources of information. For example, the use of information generated from the involvement of citizens in planning for hazard mitigation may be regarded and accepted differently by municipal officials and community members, which may lead to distortions of this information in subsequent City plans and policies. It was speculated that this may, in fact, be the case for the Peterborough Flood Reduction Master Plan process.

3.3 Limitations of the research program

Some limitations of the research program may have affected the final quality of this thesis. The experience of conducting an original research program gives the researcher plenty of opportunity to learn what is working and what is not throughout the process. Ideally, the researcher corrects or modifies those elements of the program that seem to be flawed or unsatisfactory. Some elements however, may not become apparent until after the research is complete, when it is too late to make modifications due to time restrictions. Others may be known to the researcher but are beyond the researcher's control to change and thus must be worked with as best as possible. Both of these types of limitations existed within this research program.

3.3.1 Discovery of six strategic choices framework

One limitation that existed was the result of not discovering the Brody *et al.* (2003) article that presented the six strategic choices framework until after I had conducted interviews with my key informants. I was very familiar with the authors and some of their work but this particular article had escaped my background research until after my interviews were completed. The article appealed to me because it proposed a clear, organized framework for examining many of the themes that I was interested in and had already questioned my key informants about. The framework fit nicely with my research and helped to extract and organize ideas that existed within the research data. The authors are leading American scholars in the fields of land use and environmental planning, natural hazards mitigation and citizen participation, so a proposed framework based on their research and experience should be considered reliable and transferable to other situations.

Although the framework served my existing research well, if I had been familiar with the article before conducting interviews I perhaps might have framed my questions to key informants differently, to more directly address the six strategic choices. Many of my questions to key informants aimed to gather general information that later fit into the framework, but more accurate questions may have resulted in extracting additional and clearer information from the informants. It would have saved time in conducting my research as I could have asked fewer, but better questions to interviewees. I also could have avoided some of the time spent attempting to discover themes myself and the initial confusion about what to do with my research data.

3.3.2 Limitations of the framework

Another possible limitation in the research is in regards to the framework of six strategic choices itself. The framework proposed by Brody *et al.* (2003) divides the decisions that must be made in the design of a participation program into six separate categories, but in reality it is nearly impossible and somewhat impractical to separate these choices so neatly. The result is that there exists some apparent overlapping of information when the framework is applied to the flood reduction planning process in Peterborough. This overlapping of information may make the categories appear blurred and less than distinct, and give the impression that there are too many categories that attempt to distinguish between choices that may be inherently mutually related. I would suspect that most planning programs involving citizen participation present decisions or choices that are difficult to pull apart and put into six different categories without missing or overlapping some of the information. This difficulty is due to the fact that most aspects of a planning program are related to one another and all decisions that are made affect other aspects of the program.

3.3.3 Difficulties of key informant interviews

Other possible limitations of my research are a product of the difficulties that arise in gathering data by conducting interviews with key informants. One of the difficulties that may have been encountered was determining whether key informants were genuinely honest and forthright during the interviews. There were instances when I, as the interviewer, had suspicions that key informants were speaking to me solely from a professional standpoint and not offering their personal opinions. I felt that some informants were occasionally overly

concerned with representing their organizations in a professional manner and answered some of my questions in a politically correct manner. This is understandable, but unfortunate. I interviewed most key informants at their workplace, so answering questions with a professional mindset is a natural inclination and not surprising.

Additionally, most key informants were, and many remain, very involved in the flood reduction study and planning process. They dedicated considerable time and energy to achieving the success of the program and are attached to the hard work that was done and the reputation of the program. Considering this, it is appreciable that some key informants would not deviate from their professional interests and the standard responses that they have been giving on behalf of their organizations for several years. It is unfortunate, and frustrating, however, that some key informant responses to objective research questions that were to be used anonymously in an academic study may not have been candid or totally genuine. The purpose of this academic study being to add to the base of knowledge in order to benefit future planning efforts, such responses serve only to hide potential findings and reduce the quality of the research. These responses hinder the ability and potential to transfer what is learned from this case study to other similar planning situations where a community may be going through similar circumstances and would benefit from this knowledge. That being said, I felt that most key informants gave responses that they truly believed in, whether they were their own opinions or the position of their organization that they fully supported.

Another difficulty faced in conducting interviews with key informants was that some individuals who may have had an interesting perspective on the situation were not willing to speak with me. They may have had a good reason to be unwilling to grant an interview but it

is unlikely that simply having enough time is one, considering that I pursued potential interviewees over a period of five months and I visited them in their choice of location. It is to be expected that some people will not participate in a study and the research that I conducted was no different. Some individuals simply do not see the value of participating in an academic study and giving their time to a pursuit that they may not directly benefit from. These people fail to see that by giving their perspective and input to an academic study they are contributing to what they were trying to accomplish in the planning effort (i.e. safer communities) by another means. The study may not directly benefit them, or even the outcome of the planning process in Peterborough, but it may help other communities and their residents experiencing a similar situation.

3.4 Description of Case Study and Study Area

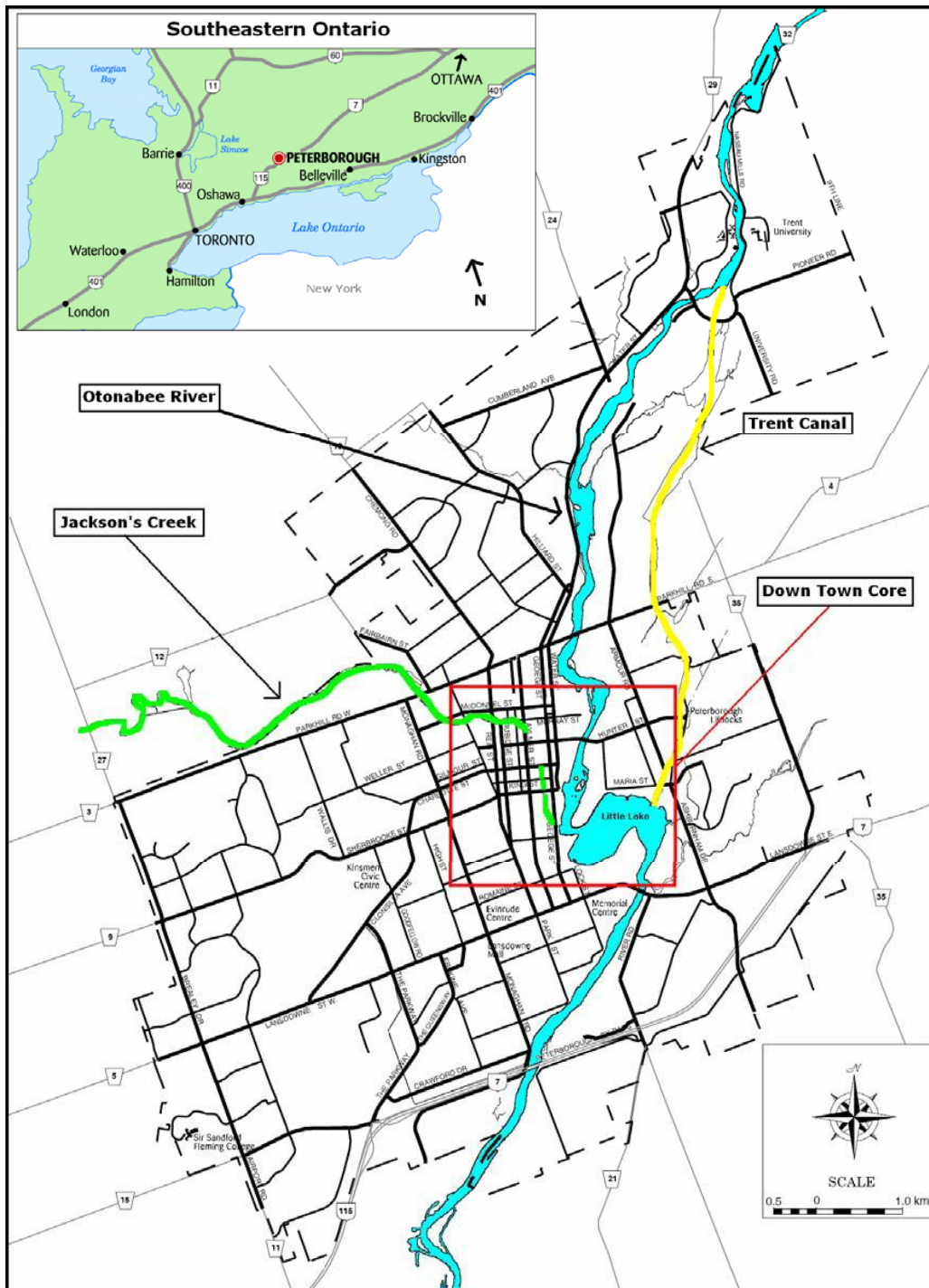
The City of Peterborough, Ontario was selected for this study due to an interest in the post-disaster flood reduction planning efforts made by the City after the July 2004 flood event⁷.

3.4.1 Study Area

The City of Peterborough is located 127 km North East of Toronto, Ontario in an area of the province known as The Kawarthas. The 2006 census population of Peterborough was 74 898 (Statistics Canada, 2007). The following figure (Figure 3) depicts the location of Peterborough within Southeastern Ontario and provides a map of the City.

⁷ The City of Peterborough makes a generally interesting study area for flood-related issues, partly due to suffering two large-scale flood events in June 2002 and July 2004.

Figure 3. Map of Peterborough, Ontario



Source: Sandink, 2006

3.4.2 Severe rainfall events in Peterborough

As mentioned in chapter one, on June 11, 2002, the City of Peterborough experienced an estimated 1:100 year heavy rainfall event that generated approximately 73 mm of rainfall within a 24 hour period (Sandink, 2006; UMA, 2005; Lacey, 2005). Extensive flood damage was sustained to many properties in low lying areas of the City due to both overland flow and sewer backup. Little more than two years later, on July 15, 2004, the City was struck again by a heavy rainfall event. This storm event was significantly more severe, and resulted in 229 mm of rain in a 24 hour period (Lacey, 2005). An astounding 87 mm of rain fell during the peak hour of the storm. This is the volume of rain that is expected during a 24-hour, 100 year design storm (UMA, 2005). The July 2004 heavy rainfall event was estimated to be a 1:290 year event (Hammond, 2004).

Both rainfall events caused significant damage to private and public property in the City. Flood damage caused by the 2004 rainfall event was reportedly in excess of \$100 million in direct physical damages to private and public property (UMA, 2005). Indirect damages were also suffered as a result of both events, including disruption in residential living conditions, loss of business, and loss of income (UMA, 2005). The damage caused by the July 2004 heavy rainfall event forced the City of Peterborough to declare a state of emergency⁸. It is estimated that approximately 6000 to 8000 properties were affected by the July 2004 event, while the June 2002 heavy rainfall event affected considerably fewer properties (Sandink, 2006).

⁸ A declared state of emergency qualifies a municipality for provincial financial assistance (Sandink, 2006).

Rainfall from the July 2004 event was most heavily concentrated on Peterborough's downtown core (UMA, 2005). Several key informants interviewed marveled at the City's unfortunate luck and shared a similar sentiment that "the storm seemed to sit on top of the City" (Interviewee #1, 2007; Interviewee #3, 2007; Interviewee #4, 2007). Damages were suffered throughout the entire City but were most heavily concentrated downtown. Due to the nature of Peterborough's topography, the condition of the infrastructure, and the concentration of impervious surfaces in the older parts of the city, flooding and sewer backup was most severe in the downtown core (UMA, 2005; Sandink, 2006).

3.4.3 Water, topography and infrastructure in Peterborough

There are a number of rivers, canals and smaller waterways that traverse or otherwise constitute the drainage network of the Peterborough land area. The Otonabee River flows through the centre of Peterborough, and the Trent canal was built alongside a section of this river to facilitate shipping needs. Many dams and locks have been constructed along the river and canal but they exist primarily to maintain navigability and not for flood control. A number of significant creeks in Peterborough are tributaries to the Otonabee River, including Jackson, Byersville, Curtis, Thompson, and Bears Creeks. A flood control weir has been built on Jackson's Creek in an attempt to regulate water flow and reduce flooding along the creek (Sandink, 2006). The City's storm sewer system controls storm water run-off by removing surface water from impervious surfaces. A high water table exists beneath the city (Interviewee #2, 2007). Much of the development in the City has occurred within the 100-year regulatory floodplain due to the age of the City (Interviewee #2, 2007). Proposed new

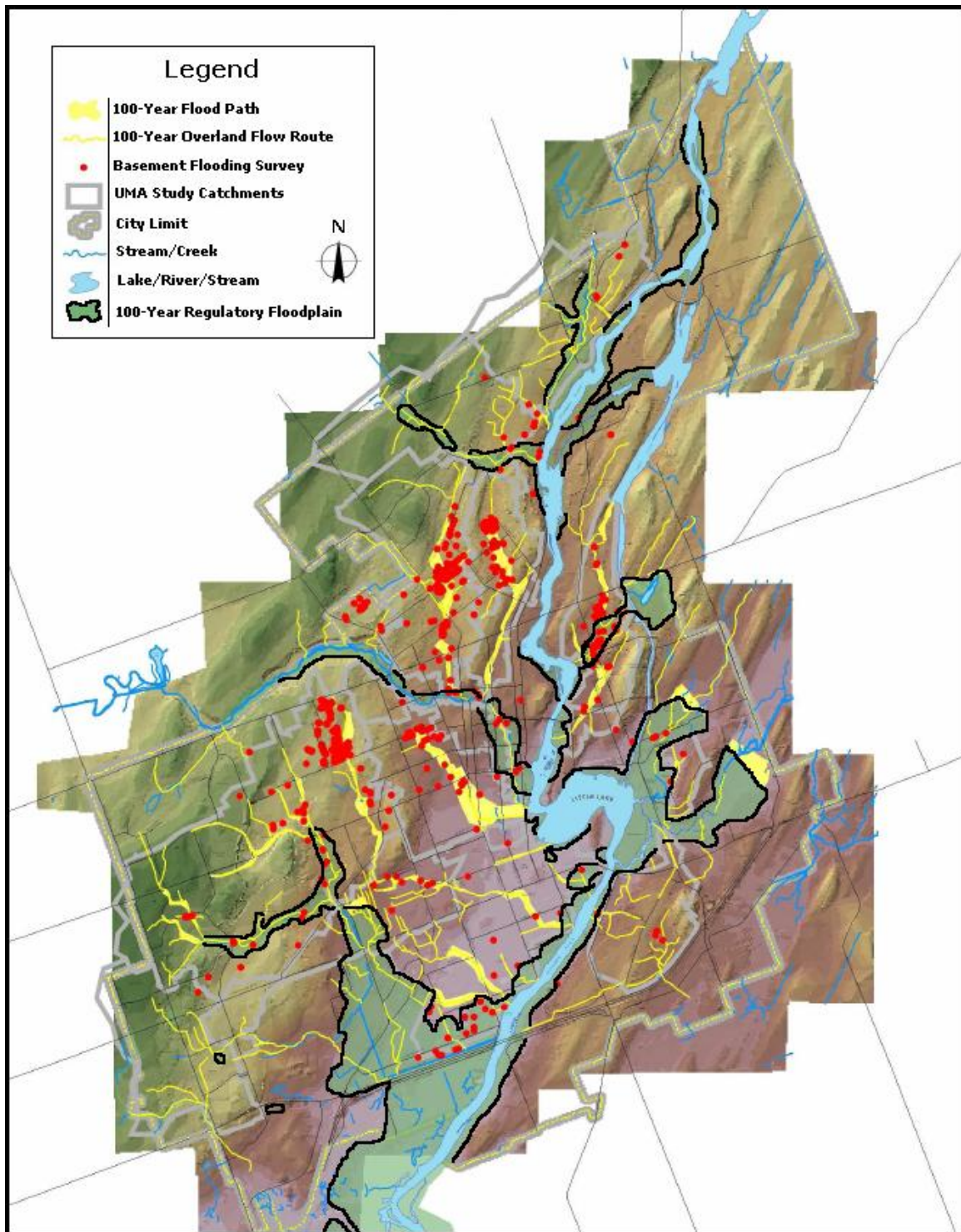
development in the city is regulated by the Otonabee Region Conservation Authority (ORCA) in addition to the City of Peterborough. The City's aging storm and sanitary sewer system infrastructure have been identified as another cause of flood damage (UMA, 2005). The figure (Figure 4) on the following page is a map of Peterborough showing hydrological details, such as waterways, 100-year flood path, 100-year overland flow route, and the 100-year regulatory floodplain. The map also shows the UMA study areas and the locations of completed basement flooding surveys.

3.5 July 2004 flood causes: FRMP study

The Flood Reduction Master Plan was created by UMA Engineering Ltd. and completed in April 2005. It reports the findings of the FRMP study and offers recommendations on how the City of Peterborough should proceed to reduce the potential for flood damages in the future. The City has used the FRMP as the foundation of the ongoing Flood Reduction Program and as a tool to guide and justify future actions. The FRMP identifies the following major causes of flood damage (from UMA, 2005):

- **Unprecedented heavy rainfall** – The intensity of the July 2004 rainfall event was more than twice the current design standard used by most municipalities in Ontario. The study found that, in one particularly intense hour, the City was inundated with approximately the volume of water expected in a 24-hour period during a 1 in 100-year storm event. This heavy rainfall event was centred on the City's largely impervious downtown core, resulting in high runoff and overland flows.

Figure 4. Map of Peterborough showing floodplains and flood paths



Source: UMA, 2005

- **Insufficient storm sewer capacity** – Many City roads have an insufficient number of, or poorly located catchbasins, resulting in ineffective water collection. The study found that approximately 80% of the City’s storm trunk sewers that were analysed were undersized and did not meet current 5-year design standards, causing “bottlenecks” in the conveyance of the system.
- **Poorly defined overland flow routes** – This is a result of filling in or relocating natural watercourses over time without accommodating the water elsewhere. Also, development has occurred in floodplains and on low points in the landscape that were formerly natural watercourses. Many City roads do not allow for an efficient overland conveyance of water due to a lack of curbs, gutters and deep ditches. UMA found that over 225 properties in the City were vulnerable to overland flow damage from a 100-year storm event.
- **Unwanted water getting into the sanitary sewer system** – During the July 2004 event this led to a sanitary sewer system back up, resulting in basement flooding and wastewater treatment plant bypass. It is the conclusion of UMA that this is primarily a result of foundation drain and illegal roof downspout connections, as well as inflow through aging pipes and man holes. Foundation drains were legally connected to the City’s sanitary sewer system until 1991. The study reports that in “dry” weather, the wastewater treatment plant receives up to twice as much water as the public utility commission (PUC) water treatment plant delivers to residents in the City. During “wet” weather, this difference reaches six or more times the PUC water delivered.

3.6 Summary

This chapter provided a description of the case study, including: case study research methods, limitations of the research program, background information of the case study area, a description of the June 2002 and July 2004 flood events and subsequent planning efforts, and the causes of the July 2004 flood as identified by the Flood Reduction Master Plan.

Chapter 4

Findings and Analysis

4.1 Introduction

After the July 2004 flood event, feelings of loss, pain and sadness quickly turned to anger and frustration for many members of the Peterborough community (Interviewee #2, 2007; Interviewee #3, 2007; Interviewee #5, 2007; Interviewee #6, 2007; Interviewee #10, 2007; Interviewee #11, 2007; Interviewee #12; 2007). Residents and business owners were upset about the damage they had suffered and held the City at fault for not being adequately prepared to handle such a rainfall event. Many citizens felt that the City had not done enough to prepare for flood hazards, despite the reality of being susceptible to flooding made apparent just two years prior. Members of the community demanded that the City take action to protect its citizens from future flood losses.

City and UMA staff made several decisions, some perhaps more intentionally than others, about how participation would be incorporated in the planning process. This case study is an excellent example of citizen participation in hazards mitigation through land use planning. It may be useful to analyse the case in terms of the six critical choices identified by Brody *et al.* (2003). Examining the decisions made by City and UMA staff will serve to apply theory in the current literature to a recent and local situation in order to more fully understand sustainable hazards mitigation in practice.

4.2 Analysis of decisions

The following sections will report the findings of the case study by analyzing the decisions made by the project team in terms of each of the six strategic planning choices identified by Brody *et al.* (2003).

4.2.1 Choice 1: Program administration

The City of Peterborough responded quickly to the public outcry by initiating a unique Flood Reduction planning program. Early in the planning process, the City established that part of the mandate of the program was to involve citizen participation in decision making. One of the first steps of the Flood Reduction program was for the City to hire an outside, independent consulting firm to study the cause and impacts of the July 2004 flood and to create a Flood Reduction Master Plan, and this firm was at least partially responsible for the citizen participation approach used.

The consulting firm that was awarded the contract was UMA Engineering Ltd. (UMA) of Mississauga, Ontario. The City worked with UMA at the beginning of the process to establish how the study and planning process would be conducted, in other words, the Terms of Reference. It was agreed that citizen participation would play a large and influential role in the creation of the Flood Reduction Master Plan, with the intention of satisfying an unhappy population while using local knowledge to benefit decision making. When the City of Peterborough handed control of the project over to UMA it was with the assurance that UMA had the capabilities to gather and utilize public input (Interviewee #1, 2007; Interviewee #3, 2007; Interviewee #4, 2007).

The City decided to hire a consulting firm to perform the study and create the plan for two main reasons. First, the City simply did not possess the resources and staff required for such an undertaking (Interviewee #3, 2007). City planning and engineering staff were busy with their normal workload and could not devote the necessary time to the flood reduction program. They also lacked the specialized training, skills and experience required to study urban flooding and prepare a detailed report with appropriate recommendations. The second reason that the City decided to hire a consulting firm was to depoliticize the planning process by making it independent from City council and staff (Interviewee #3, 2007). Since this post-disaster flood hazard mitigation effort was such a contentious issue, the City thought it would be best to keep the process at ‘arm’s length’ from City councillors and staff. This way, the process would not be affected by political pressure, as would be the result of constituents of different wards in the city influencing their councillors. In this same vein, the Flood Reduction Program was created under the Office of the Chief Administrator, rather than within the Engineering or Planning department, so that the program would not be the responsibility of any single department of the City. The intention of this decision was to help foster the attitude that all City staff should contribute to the planning program without assuming an unfair responsibility for it (Interviewee #3, 2007).

4.2.1.1 Project Team

UMA assigned ten staff persons to work on their project team (UMA, 2005). UMA charged several of these staff with administering a property and basement flood survey to residents who attended the public meetings. UMA also deployed staff to go door-to-door in

severely affected areas of the city to collect detailed information from home and business owners about location, volume and time of overland flooding and sewer backup. Knowledge gathered from the survey and personal interviews with citizens was then compiled and used to inform the study and subsequent decisions (Interviewee #4). To ensure effective citizen participation at the public meetings, UMA hired another consultant to facilitate the meetings. This facilitation consultant possessed specialized skills in running effective public meetings. The skill set of this consultant proved to be invaluable in producing a smoothly run meeting with fair and equal citizen input (Interviewee #1, 2007; Interviewee #3, 2007; Interviewee #4, 2007; Interviewee #5, 2007). UMA also hired a media relations and public information advisor to help ensure that information was properly and accurately communicated to the public in order to raise awareness of the process and gain maximum involvement. This consultant enjoyed established contacts within the local media that benefitted the flow of this information (Interviewee #3, 2007; Interviewee #4, 2007).

4.2.1.2 Environmental Assessment Process

The Flood Reduction Master Plan Study was undertaken under the Ontario Environmental Assessment Act as a Municipal Class Environmental Assessment (UMA, 2005). There existed some confusion between City staff, UMA staff, the other consultants and the public as to whether or not the Study actually went through the EA process and what exactly a Municipal Class EA entails. Some key informants interviewed correctly believed that the plan went through the EA process, some were under the impression that it did not go through the EA process, and others were unsure.

4.2.2 Choice 2: Objectives to guide citizen involvement

The objectives of the flood reduction master plan study and planning process included educating citizens, seeking their preferences on alternatives, and granting them influence in decision making (UMA, 2005; Interviewee #3, 2007; Interviewee #4, 2007). An important aim of the process was to empower citizens to influence the outcome of the final plan. In order for citizens to make competent contributions to the planning process, the project team had to first provide some technical education to participants about how municipal infrastructure handles heavy rainfall. Education was not a one-way communication though – participants also educated the project team about what happens on their properties and in their neighbourhoods when there is a heavy rainfall. Beyond simply educating citizens, UMA sought the preferences of citizens as to what is most important to them to come out of the study. UMA asked participants early in the planning process whether structural or other mitigation measures should be used and what areas of the city should be addressed first.

It is important to recognize that there was some difference in opinion between different individuals interviewed about the level of citizen participation that existed in the planning program (see column two, Table 1). In other words, in terms of Arnstein's Ladder of Citizen Participation (1969), there was discrepancy of opinion regarding which "rung" of the ladder most appropriately represented the level of participation throughout the process. When asked to choose a rung of the ladder that most accurately describes the level of participation in the flood reduction program in Peterborough, it was apparent that answering this question created difficulty for the key informants. Many of the key informants were

hesitant to provide an answer to this question, and most provided one of two common explanations. Some informants were hesitant to attach their opinion to a question that so clearly represented what they thought of the process. They were afraid that, despite assurance that their answers would be kept confidential, somehow other people would discover that perhaps their personal opinion did not line up with the official stance of their organization, or what they should have thought. Other informants were uncomfortable with some of the language used to describe the rungs of Arnstein's Ladder (1969). They felt that the words that represented some of the rungs of the ladder inaccurately described the corresponding level of participation, or that the words were 'loaded' and had other underlying meanings (Interviewee #1, 2007; Interviewee #2, 2007; Interviewee #5, 2007; Interviewee #8, 2007; Interviewee #12, 2007). This question proved to provide the most difficulty for most key informants to answer.

Only nine out of fifteen informants provided an answer to this question, with the remainder being unable to answer or declining to answer the question. Four of the informants simply did not have enough direct experience with the citizen participation element of the flood reduction planning program to give a valid and meaningful response to the question. These four informants were not asked to answer this question. Two other informants were asked this question but declined to provide an answer to it. This personal decision is unfortunate for research purposes but acceptable, as each informant was told at the outset of the interview that they were free to choose to not respond to any question asked of them.

There was significant variation in the responses of the nine key informants that did provide an answer to this question. No more than two of nine informants agreed on the level of participation used in the planning program. Two informants answered that they felt the level of participation could be mostly accurately described by the seventh (Delegated Power) or eighth (Citizen Control) rung of the ladder. Two informants thought that the sixth (Partnership) rung of the ladder was most appropriate. One informant was of the opinion that the level of participation should be classified as the fifth (Placation) rung; another answered the fourth (Consultation) rung; and another thought that the third (Informing) rung most accurately reflected the level of participation that existed in the planning program. One informant believed that the fourth (Consultation) or fifth (Placation) rung of the ladder represented the participation level. The other informant felt that the range of rungs from 3 (Informing) to 5 (Placation) was the most appropriate way to answer the question. This difference in opinion between parties involved in the planning process shows that despite an effort to include citizen input in decision making, it is a difficult challenge to satisfy all participating stakeholders.

4.2.3 Choice 3: Stage of the planning process when citizens first become involved

Due to the nature of the flood reduction program, citizens were involved from an earlier stage in the process than is often the case in other planning programs. The creation of the Flood Reduction Master Plan was somewhat unique because the situation being planned for (i.e. damage due to flooding) had already occurred, as opposed to a more traditional planning program (e.g. for a proposed development). For this reason, citizens were involved

early in the process because they were aware of the ‘planning problem’, and were seen by planners to be a key part in the gathering of information and knowledge required to understand the flood hazard and to propose possible solutions.

UMA was retained by the City of Peterborough in August 2004, within one month of the July rainfall event (UMA, 2005). UMA initiated the Flood Reduction Master Plan Study immediately in August and the study was carried out over the following eight-month period to May 2005. UMA began the citizen participation element of the planning process just two months after the flood disaster, and began by inviting members of the public to a round of Public Information Meetings. This first round of meetings included five separate meetings on different dates – one meeting in each of the City’s five wards. UMA notified the public of these meetings by putting information notices in both Peterborough newspapers. Notices were published in *Peterborough This Week* on September 16 and 23 and in the *Peterborough Examiner* on September 17 and 24 (UMA, 2005). Each meeting was held at the same time in the evening, from 5:00 pm to 9:00 pm. The following was the schedule and locations of each of the five meetings in the first round of public information meetings (UMA, 2005).

- Tuesday, September 28, 2004 at Kenner Collegiate Institute, Ward 1 – Otonabee
- Wednesday, September 29, 2004 at Cavalry Church, Ward 2 – Monaghan
- Tuesday, October 5, 2004 at Northminster United Church, Ward 5 – Northcrest
- Wednesday, October 6, 2004 at Auburn Bible Chapel, Ward 4 – Ashburnham
- Thursday, October 7, 2004 at Murray Street Baptist Church, Ward 3 – Town

During the first round of public information meetings, citizens were consulted to help UMA discover the specific details of what happened during the course of the July 2004 heavy rainfall event. UMA used the information and data gathered during these meetings to inform the study and in the creation of the Flood Reduction Master Plan. The first round of public information meetings was well-attended, with an estimated combined total of approximately 600 citizens present at the meetings (Hammond, 2004; UMA, 2005). Participation at the meetings was spirited and lively, reflecting the passion for this issue that existed in the community (Interviewee #3, 2007; Interviewee #5, 2007; Interviewee #11, 2007).

UMA informed the public of the second round of meetings by again putting information notices in both Peterborough newspapers. Notices were published in *Peterborough This Week* on February 11, 18 and 25 and in the *Peterborough Examiner* on February 12, 19 and 26 (UMA, 2005). In addition to newspaper notices, notification letters were mailed to citizens who signed a mailing list during the first round of meetings. The schedule of the second round of public information meetings was as follows (UMA, 2005).

- Wednesday, February 23, 2005 at Grace United Church, Ward 1 – Otonabee
- Thursday, February 24, 2005 at the Evinrude Centre, Ward 2 – Monaghan
- Tuesday, March 1, 2005 at Northminster United Church, Ward 3 – Northcrest
- Wednesday, March 2, 2005 at Auburn Bible Chapel, Ward 4 – Ashburnham
- Thursday, March 3, 2005 at St. James United Church, Ward 5 – Town

During the second round of public information meetings, UMA presented the findings of the study and the Flood Reduction Master Plan to citizens for their comment.

4.2.4 Choice 4: How many and which types of groups to target

Geographic targeting was the only method of targeting used by UMA to generate citizen participation in the Flood Reduction Master Plan process. There was no evidence that other forms, such as targeting specific sectors of the population or groups within the community for participation, was used in the FRMP process. UMA chose to target five different sub-populations within Peterborough that were determined by geographic area. These five geographic areas already existed as municipal political wards, and served as established arbitrary boundaries within the community. UMA targeted the populations of each ward during both rounds of public information meetings. A separate meeting was held in each of the five wards during both rounds of meetings.

The decision to target citizens for participation in this manner was made for two main reasons. First, the population of the City of Peterborough was thought to be simply too large to hold general public information meetings that invited citizens from across the City (Interviewee #3, 2007; Interviewee #4, 2007). Attendance at one of these meetings, even if several of them were held, would have been too high to allow for an effective and productive meeting. Several hundred people would have been in attendance, rendering effective participation impossible. There would have been simply too many people to allow everyone who wanted to participate the chance to do so. Not having the opportunity to participate would have increased frustration at the process and discouraged further participation.

The second reason for targeting the populations of each geographic area separately was to gather location-specific information and input at the meetings (Interviewee #3, 2007;

Interviewee #4, 2007). It was thought that concentrating on the specific concerns and needs of different areas of the City would allow a better understanding of each area to result. Targeting participation from the populations of these areas, the people who have the most knowledge and best understanding of the areas, would provide the most accurate and informed contributions to the planning process. It may have also encouraged additional participation as citizens felt that they could contribute to a specific local issue, of which few people would have similar knowledge. This geographic area targeting strategy may have been successful in garnering some additional citizen participation at the public information meetings.

Groups of citizens within the community with special interests or specific needs, however, were not intentionally targeted to participate and offer their perspective to the planning process.

4.2.4.1 Flood Relief Committee

It should be noted that many citizens were provided assistance in recovering from property damage caused by flooding and sewer backup by the City of Peterborough's "Flood Relief Committee". This committee distributed financial assistance provided by the provincial and federal governments to citizens in need who did not have home insurance coverage (Interviewee #1, 2007; Interviewee #3, 2007; Interviewee #7, 2007; Interviewee #10, 2007). Citizens receiving this assistance were not asked for input regarding the Flood Reduction Master Plan study (Interviewee #10). This may be considered a missed opportunity. However, it cannot be expected of people in such a difficult situation to be

concerned about planning issues when more pressing challenges exist. In addition, it is worth noting that the Flood Relief Committee consisted of 18 members of the community, 17 of whom were male and 1 female.

4.2.5 Choice 5: Techniques for obtaining citizen input

UMA used several techniques to obtain citizen input throughout the flood reduction study and planning process. The primary means of garnering citizen participation was through two rounds of public information meetings, totaling ten meetings. During these meetings the project team used several different techniques (described in this section) to obtain input from participants. In addition to the public information meetings, UMA gathered information from citizens by conducting door-to-door interviews with residents and business owners in the areas of the City that suffered the most damage. UMA was interested in gathering detailed information regarding location, volume and time of overland flow and sewer backup and used this data collected from the interviews to inform the study (Interviewee #4, 2007).

The purpose of the first round of meetings was to ask citizens to share knowledge and information about how their property was affected by flooding or sewer backup (Interviewee #4, 2007; Interviewee #11, 2007). Each of the meetings in the first round was held at the same time in the evening, from 5:00 pm to 9:00 pm, and structured in the same manner. The meetings began with an informal drop-in/roundtable working session from 5:00 pm to 7:30 pm. During this time, citizens could meet personally or in small groups with UMA and City staff to share their experience and knowledge of the July 2004 and June 2002 flood events.

Citizens were encouraged to bring anecdotal evidence, such as photographs and other documentation, to this portion of the meeting to contribute to the raw data being collected by UMA staff and help them better understand the extent and distribution of flood damage. UMA recorded all information provided by participants in a Geographic Information System (GIS) database. This database stored information and photographs linked to properties on a map of the City to create a valuable aid in the study. Also during the informal drop-in/roundtable portion of the meeting, citizens were asked to complete a Basement Flooding Survey for the July 2004 and June 2002 storms events. This survey provided another opportunity for the public to document the damage sustained to their property and to contribute to the recording of damages throughout the City. The survey helped UMA understand how the City's storm, sanitary, and overland flow systems performed during the heavy rainfall events. UMA used the data collected by the survey to contribute to the study. Surveys were available to the public from October 2004 to the end of January 2005. A total of 429 completed surveys were received (UMA, 2005).

After the drop-in/roundtable portion of the meeting, a formal question and answer session was led by UMA from 7:30 to 8:30 pm. UMA staff began this session by outlining to participants the study and planning process. UMA also provided key information about the urban drainage network in the City, to help participants better understand how and why flooding may have occurred. The question and answer session that followed gave participants the opportunity to give comments, identify their concerns and ask questions to UMA staff about the process that would be undertaken during the subsequent months. It also gave citizens a chance to hear the concerns raised by other members of the public.

At most meetings in the first round, the issues that were raised during the formal question and answer session digressed from the intended focus of the meeting (Interviewee #3, 2007; Interviewee #4, 2007; Interviewee #5, 2007; Interviewee #11, 2007). Participants were quite rightly still very emotionally charged from the damage caused by the flooding and the ordeal they had been through just a few months prior to the meeting. For many citizens, this round of meetings was the first opportunity they had to share their grief, frustration and experience with someone of some authority. Inevitably, and understandably, many participants were tempted to use the question and answer session as an opportunity to complain about any number of issues that concerned them. These issues ranged from problems with insurance coverage, to the City being liable for the damage, to questions like “why were we struck by such a storm again?” (Interviewee #4, 2007; Interviewee #11, 2007).

Although it may have satisfied some individuals’ interests to be heard, this type of input was not particularly helpful in contributing useful information to the planning process. This problem is exactly the reason that UMA hired an independent public consultation facilitator (Interviewee #3, 2007; Interviewee #4, 2007; Interviewee #11). The function of the facilitator was to control the exchange of dialogue during the question and answer session so that the amount of input given by participants was fair and equal, and that the input remained relatively on focus. The facilitator ensured that different participants were allowed the opportunity to speak and that they did not take up more than a reasonable amount of time with their question or comment. The facilitator also ensured that each participant was granted the right to speak their own opinion, and protected participants from being criticized by other participants who may have disagreed. Key informants involved in the planning

process were unanimous in their agreement that the public meetings greatly benefitted from having this consultant facilitate the question and answer sessions (Interviewees #1-13, 2007). It was estimated that approximately 600 citizens attended the first round of public information meetings (Hammond, 2004; UMA, 2005).

The second round of public information meetings had a different purpose than the first, but a similar format. Held in late February/early March, 2005, the general purpose of the second round of meetings was for UMA to present the findings of the study, propose the Flood Reduction Master Plan, and ask for comments from the public. More specifically, UMA stated that the purpose of the second round of meetings was to: introduce participants to the Municipal Class Environmental Assessment process to be followed for Master Plan projects; present the causes of flooding; present the UMA analysis of the storm, sanitary and overland flow routes; and present the proposed alternative solutions (UMA, 2005).

The meetings began with an informal drop-in session from 5:00 to 7:00 pm, during which citizens could familiarize themselves with the findings of the study and the master plan. Participants could again meet personally with UMA staff, and also City staff during this round, during this drop-in session. At 7:00 pm, UMA staff began a formal presentation of the study findings and master plan. The presentation was followed by a formal question and answer session until 9:00 pm. This session was again facilitated by the same consultant as in the first round of meetings. During this round, UMA and City staff were present at the front of the room to answer questions and receive comments from participants. The City was present in an official capacity during this round of meetings because the freedom of plan-

writing stage was coming to a close and the City was transitioning back to taking ownership of the final plan product (Interviewee #3, 2007).

During these meetings participants were given a comment form to complete at their leisure. The purpose of this form was to assist UMA in confirming the causes of the flooding, prioritize new works projects, and identify additional alternative solutions that UMA did not propose in the master plan. The technique of using comment forms is especially helpful in soliciting feedback from those citizens who prefer to participate by contributing their input in a more private manner. UMA received a total of 120 of these comment forms before the March 18, 2005 closing date (UMA, 2005). However, given that the master plan was accepted and published on April 5, 2005, a relatively short amount of time was granted for the input provided by the comment forms to influence the outcome of the final plan.

4.2.5.1 Citizen Advisory Panel

A citizens' group called the Citizen's Advisory Panel (CAP) was created by the City to oversee the Flood Reduction Master Plan study and planning process on behalf of the public. The CAP consisted of eleven Peterborough citizens who were recruited to represent the community and chosen for their significant local knowledge and professional expertise (UMA, 2005). The members of the panel did not represent any of the government offices or agencies that were represented on the Technical Committee. The recruitment process for the CAP involved advertisements in both local newspapers, the *Peterborough Examiner* and *Peterborough This Week*, and allowed for a two-week submission window.

The function of the Citizen's Advisory Panel was to provide input and advice on the study and public consultation process from the perspective of the community. The CAP reviewed the work of UMA to ensure that the study was being done effectively and thoroughly in the best interest of the public. The CAP was also a watchdog to make sure that the study and planning process was not being interfered with by the City at a staff or political level (Interviewee #2, 2007; Interviewee #3, 2007; Interviewee #12, 2007). UMA presented its progress to the CAP at four meetings held at key times throughout the study process before UMA presented information to the general public (UMA, 2005).

It was found that all key informants that had experience or familiarity with the CAP during the planning process believed that the CAP performed its responsibility effectively and to the benefit of the public. Many key informants stated that the interests of the public were better realized and the quality of the final plan benefitted from the role of the Citizen's Advisory Panel (Interviewee #2, 2007; Interviewee #3, 2007; Interviewee #4, 2007; Interviewee #5, 2007; Interviewee #12, 2007). Following the approval of the Flood Reduction Master Plan by the City, the CAP was seen to have fulfilled its purpose and was subsequently dissolved (Interviewee #3, 2007; Interviewee #12).

4.2.6 Choice 6: Providing citizens with information

It was necessary for City and UMA staff to provide technical information to citizens in order for them to make informed contributions to the planning process. The City and UMA shared responsibility for providing information and educating citizens as part of the mandate of the flood reduction program and their mutual interest for knowledgeable and

competent participation in decision making. Due to expertise in different aspects of the program, the City and UMA were able to provide assistance to citizens that covered their various gaps in knowledge. City staff took primary responsibility for educating citizens about how the municipal storm and sanitary sewer systems respond to heavy rainfall, overland flow routes, and waterway maintenance in the City (Interviewee #2, 2007; Interviewee #3, 2007). Staff were able to inform participants about the City's role preparing for, and responding to, a heavy rainfall event that causes flooding. UMA staff educated citizens about more specialized flood and engineering information, such as storm interval calculation, computer-generated flood models, and engineering flood mitigation measures (Interviewee #4, 2007).

Several issues created confusion and misunderstanding among the citizens of Peterborough and participants in the planning process. One issue that proved to be a major point of confusion was the calculation of storm intervals. UMA estimated that the June 2002 storm was a 1 in 100 year rainfall event and that the July 2004 storm was an approximately 1 in 290 year event (Hammond, 2004; Interviewee #4, 2007; UMA, 2005). Peterborough residents generally accepted the June 2002 storm as a rare event, or a fluke, and after it occurred figured that they would never experience anything like it again. Many residents believed that there would be at least 100 years before another rainfall event like that would occur again (Leblanc, 2004). Therefore, many citizens could not understand how two heavy rainfall events of such magnitude, which were supposed to happen only once in a lifetime or more, could possibly occur within just over two years. Residents who participated in the program expressed anger, frustration and helplessness upon learning these figures. These

feelings led to a mistrust of statistics among some participants, which threatened to undermine the working relationship between UMA and City staff and citizen participants (Interviewee #3; 2007; Interviewee #4, 2007; Leblanc, 2004).

4.3 Flood Reduction Master Plan identification of public priorities

Citizen participation in the FRMP study and planning process had a large influence in determining the recommended priorities of the master plan. As a direct result of citizen input at the Public Information Meetings and through submitted comment forms, the FRMP (UMA, 2005) identifies the following list of priorities for mitigation efforts, in order of importance to Peterborough citizens:

- 1) Basement flooding from sanitary sewage (29% of respondents)
- 2) Basement flooding from stormwater (24%)
- 3) Erosion and property damage from overland flows (18%)
- 4) Ponding on public roadways (15%)
- 5) Ponding on private properties (14%)

As a result of citizen participation and UMA's analysis, the FRMP (UMA, 2005) identifies that three subwatersheds within the City are in need of urgent attention to storm sewer capacity, in the following order of priority:

- 1) Jackson
- 2) Riverview
- 3) Curtis

Again as a result of citizen participation and the project team's analysis, the FRMP (UMA, 2005) identifies that priority should be placed on the following three subwatersheds to

control overland flow, based on the number of properties vulnerable to overland flow flood damage from a 100 year storm event:

- 1) Jackson (100 properties)
- 2) Curtis (55 properties)
- 3) Beyersville/Harper (30 properties)

Therefore, based largely on citizen participation in the study and planning process, the recommendations of the FRMP (UMA, 2005) are to prioritize mitigation efforts in the City of Peterborough as follows:

- Preventing basement flooding with sanitary sewage
- Four subwatersheds are the highest priorities for urgent drainage system attention, in the following order of importance:
 - 1) Jackson
 - 2) Curtis
 - 3) Beyersville/Harper
 - 4) Riverview

4.4 Summary of case study findings

The table on the following page (Table 1) is a summary of the case study findings presented in this chapter. The most important findings are summarized in a column for each of the six ‘strategic choices’ identified by Brody *et al.* (2003). Since key informants had differing opinions of the ‘Objectives’ choice, rows in that column assign the perspective to the appropriate source and highlight this difference of opinion. The numbers in the ‘Objectives’ column correspond to the rung(s) on Arnstein’s *Ladder of Citizen Participation* (1969) that each key informant identified, as reported in section 4.2.2. The lower section of the table gives a brief description of each ‘strategic choice’.

Table 1. Summary of findings

Interviewee	Choices					
	Administration	Objectives	Stage	Targeting	Techniques	Information
1	City contracted UMA to create FRMP. Citizen participation considered important. Two other specialized consultants also hired. Some confusion about plan going through EA process.	7-8	Citizens involved at early stage in planning process.	Geographic areas (political wards) were targeted for participation rather than sectors of the general population.	Many participation techniques used within two rounds of five Public Information Meetings.	Technical information was shared carefully to maintain honesty and trust in working relationship. Some confusion but mistrust of statistics was largely avoided.
2		4-5				
3		n.c.				
4		7-8				
5		5				
6		3				
7		3-5				
8		4				
9		n.c.				
10		6				
11		n.c.				
12		6				
13		n.c.				
14		n.c.				
15		n.c.				
Secondary sources						
FRMP		6-8				
Appendix A		6-8				

*n.c. = No comment/response or perspective on the situation

Choice	Description
Administration	Whether or not to include participation in the planning process and how to staff citizen involvement efforts.
Objectives	Whether the planning program simply educates citizens, seeks their preferences of alternatives/solutions, or grants them influence in decision making. Which “rung” on Arnstein’s Ladder (1969) most accurately describes the level of participation?
Stage	When to start encouraging and allowing citizen participation in the planning process.
Targeting	Which types of stakeholder groups and segments of the population are invited to participate in the planning process?
Techniques	What types of approaches are employed to generate citizen participation?
Information	What types of information and dissemination processes are used to inform participants?

Chapter 5

Discussion and Implications

5.1 Introduction

The six strategic planning choices that have been identified by Brody et al. (2003) are a useful lens through which to analyse the flood reduction program in Peterborough as a hazard mitigation planning program that involves citizen participation. Such an analysis is necessary to better understand citizen participation as a critical element of hazards mitigation planning, and thus benefits the study of sustainable hazards mitigation. The effective application of this new approach to government decision making and planning practice may help to reduce the human and economic costs of natural hazards.

This chapter will discuss the findings of the research presented in the previous chapter, and comment on the relevance and implications of these findings. The chapter will be structured in three main subsections. The first will discuss five aspects of citizen participation in the study and planning process that improved the quality of the final plan. The second subsection will discuss one aspect of the process that did not make a difference or matter much to the final quality of the plan. The third subsection will discuss three flawed aspects of citizen participation in the planning process that should be recognized as having hurt the quality of the final plan.

5.2 Aspects of the process that improved the plan

There were several aspects of citizen participation in the study and planning process that improved the quality of the process and the final plan, and thus should be considered strengths. The strengths of the citizen participation element of the planning program included: involving citizen participation early in the planning process; contracting a private consulting firm and granting them freedom in creating the plan, which depoliticized the study and planning process; hiring additional specialized facilitation and media relations consultants; employing several different participation techniques within the Public Information Meetings; and focusing a concentrated effort on honesty to build trust in the working relationship, which avoided a mistrust in statistics that threatened citizen participation.

5.2.1 Participation early in planning process

The decision to include citizen participation at such an early stage in the study and planning process was influential to the success of the program and the outcome of the final plan. The nature of the Flood Reduction Master Plan study may have lent itself to making this decision an easier one than it may have otherwise been if this was a more traditional planning program. Since the objective of the program was to create a plan to reduce the negative impacts of a heavy rainfall event like the ones that occurred in June 2002 and July 2004, an important part of the beginning of the study was gathering information from citizens that were affected by the events. The project team consulted citizens to learn what happened during these events on their properties and in their neighbourhoods in order to make well

informed decisions and be better able to propose appropriate solutions. This necessitated the involvement of these citizens in the process from an early stage.

The opportunity to be involved at an early and important stage of the program did much to satisfy the need of many citizens to contribute their input and feel that someone of some authority was listening to them. The public demanded that the planning process be initiated quickly after the July 2004 event, and citizens were eager to offer their input to the process. The City met this demand by commissioning UMA to conduct the study in August 2004, approximately one month after the event and during the height of community backlash to the issue. UMA also responded to community demands by offering the first round of public information meetings by the end of September.

This decision is in keeping with the relevant academic literature, which advocates that in order to be meaningful, participation must be included in the planning process “early, often, and ongoing” (Wondolleck & Yaffee, 2000, p. 103). Brody *et al.* (2003) state that “early participation injects community knowledge and expertise into the planning process when it is most needed” (p. 250), which was exactly the case for the flood reduction master plan study. The authors also note that at the early stages of a planning program, the issues considered are often too general or abstract to generate accurate or useful contributions from potentially affected stakeholders (Brody *et al.*, 2003). This was clearly not the case for this program, as participants had very specific ideas about the problems with the City’s infrastructure, how they were affected by overland flow flooding or sewer backup, and actions that should be taken to reduce damages in the future. Since citizens had so much information and such strong opinions that they wanted to offer them all to planners

immediately when they had the chance, it was a challenge for planners to organize this information and encourage participants to contribute different information at the appropriate time. Rather than the issues being too broad or general, they were instead very specific and focused for participants who knew what they wanted to get out of the planning program.

The literature goes on to state that participation that is introduced during the later stages of a planning program may be able to generate focused and well-informed input from participants, but may be too late to have an actual effect on the final plan (Alterman *et al.*, 2004; Brody *et al.*, 2003). The experience of the Flood Reduction planning program in Peterborough would extend this theory, adding that participation that does not occur at the early stages of the program actually makes the quality of the final plan worse, because the information that is required to make competent decisions throughout the process is incomplete and possibly inaccurate. This would result in misinformed decisions that may lead to a plan that does not serve the best interests of the community or affected stakeholders. The inclusion of citizen participation early in the planning process is the only way to ensure that the foundation of information from which decisions are made is complete and accurate and can at the very least provide the opportunity for competent decisions to be made later in the process. If participation does not happen until too late, this opportunity may never exist.

Furthermore, Brody *et al.* (2003) state that citizen participation that does not begin until the later stages of the planning process may result in “an adversarial, reactionary atmosphere” (p. 250). The experience in Peterborough demonstrates that an adversarial, or even hostile, atmosphere may also be present when citizens are involved during the early stages of the planning process. This observation would suggest that the avoidance of

adversarial reactions from citizen participants, at any time during the planning process, may not always be possible. This type of atmosphere though, when kept in control, may actually benefit the planning process. Heated, adversarial dialogue amongst citizens, and between participants and planners, strengthens the quality of the information that comes out of the process by ensuring that many perspectives are represented, and challenged by other perspectives. Having this adversarial discussion early in the planning process may be ideal, because the positive use of this impassioned participation may be maximized at this stage. This atmosphere produces many different viewpoints and opinions, and may actually generate more interest and participation in the process from other citizens. The community may be stimulated by this type of participation early in a planning program. Carefully fostering this participation will create an opportunity to thoroughly gather the information that forms the foundation for decision making throughout the planning process.

5.2.2 Freedom in creating plan

The City of Peterborough made the decision to commission the Flood Reduction Master Plan study to a private consulting firm for two main reasons that were presented in chapter four. First, the City simply did not have the resources and staff required to conduct the complex study at an appropriate calibre. Second, the City wanted to depoliticize the planning process by making it independent from City council and staff. The intent of depoliticizing the process was to allow for freedom in the creation of the Master Plan instead of subjecting the process to political pressure that could influence the outcome. The decision

to hire a private consulting firm to depoliticize such a contentious issue allowed for a freedom in creating the plan that would not be possible if the City conducted the study.

It was speculated that if elected officials were involved in the study and planning process they would complicate decision making by injecting political motivations. The intention of the city-wide study was to benefit the population of the entire city, and if councillors were involved they may be foremost concerned with meeting the interests of the constituents in their wards. It was feared that councillors would put pressure on staff to place additional importance on meeting the needs of their wards. Another concern was that staff in different departments of the municipality would have different priorities that would introduce a competitive atmosphere. By removing the study from the mandate of City staff and councillors, this decision depoliticized the planning process and allowed UMA the freedom to create the plan while being open and honest with the City and citizens.

This decision, though it may not have been made by a careful check of the relevant literature, heeds the call of the literature precisely. This literature cites many practical examples to indicate that hazard mitigation efforts are often subject to political pressure, and may benefit some people at the expense of others (Maskrey, 1989). Political pressure may exist to the point of making mitigation measures irrelevant or even counterproductive in local situations (Maskrey, 1989). The result of a politicized planning process is that some people benefit over others, which directly undermines the objective of hazards mitigation to create safe and resilient communities. The decision to eliminate political pressure from the flood reduction study and planning process benefitted the entire Peterborough community.

Additionally, in the case of Peterborough, the decision to not include City staff or councillors in any element of conducting the study or planning process fuelled some speculation that senior City officials did not trust staff to carry out the process satisfactorily. There were feelings that senior officials did not believe that staff were capable of creating a satisfactory plan (Interviewee #3, 2007; Interviewee #5, 2007). These feelings resulted in some unrest within the bureaucracy and led to further speculation among members of the community that City staff were incompetent or lazy. There existed reports that some City staff members were upset by this questioning of their value but these feelings did not dissuade the City from hiring a private consultant and there is no reason to believe that these feelings negatively affected the planning process or the final outcome of the plan.

5.2.3 Public Facilitation and Media Relations consultants

The City of Peterborough contracted UMA to create the Flood Reduction Master Plan by conducting the Study with the resources necessary to do so appropriately. In addition to its in-house staff, UMA decided that it must hire two additional private consultants to fill specialized job functions for which UMA did not have the capacity. UMA contracted a public facilitation consultant and a media relations consultant to add to the project team. Key informants questioned about the additional consultants were unanimous in their agreement that these consultants were a great benefit to the planning process, and their specialized skills and experience strengthened the quality of the final plan. To have such broad and strong support among people involved in the process is a testament to the value of the decision to hire these consultants and the contribution that they each made to the planning program.

Moreover, this decision is consistent with recommendations made in the current hazards literature. Brody *et al.* (2003) state that using an outside consultant, with specialized training or experience in citizen involvement techniques, to manage (or facilitate) the participation element of a planning program can help to ensure that citizen participation has a positive impact on the decision making process, and the outcome of the final plan.

The facilitation consultant that was hired is an independent, private consultant that specializes in facilitating public meetings. This consultant had never worked in collaboration with UMA before, had never worked in Peterborough, and was based outside of Peterborough and unfamiliar with members of the public. UMA had learned of this consultant's work through other professional contacts, and invited the consultant to a meeting to share ideas about the situation in Peterborough. The consultant provided some advice on the process drawn from her own professional experience, and UMA decided to take this advice and hired her. The facilitation consultant provided expertise and experience in running effective public meetings so that participants had a fair and equal chance to contribute, participants were allowed to share their opinions without being attacked by others, and a smooth and efficient meeting was conducted. Having a professional facilitator in charge of running the meeting also allowed UMA staff to concentrate their efforts and attention on planning and engineering issues.

The facilitation consultant collaborated with UMA staff to create the citizen participation element of the study and planning program. Together, they decided on employing a citizen participation technique they called "Constructive Public Engagement" to obtain community input to the planning process (Interviewee #11, 2007). This technique

used a variety of citizen participation methods within public meetings, as described in section 4.2.5. A variety of participation methods were used to try to maximize public involvement in the meetings and minimize frustration for the participants. This strategy proved to be very effective in doing so, and this experience was a professional success ‘benchmark’ for the facilitation consultant (Interviewee #11, 2007).

An example of the input that the facilitation consultant contributed to the design of the planning program is in regards to the role of municipal councillors at the public meetings. At the beginning of the process there was a lot of concern and discourse over what the function of the elected official should be. There was mounting pressure from some members of the public that wanted to hear from their councillor or the Mayor at the public meetings; they wanted to know what the City is doing to make things better. The facilitation consultant had a strong opinion that nothing positive would be gained by having elected officials speak at the meetings, and advised UMA that councillors should be there to listen and not one of them should speak. The facilitator drew upon professional experience that elected officials would only be able to speak to political interests and would be unable to offer anything of value in decision making in this situation. The facilitator argued that although elected officials will want to say to their community that they will do everything possible to not have this happen again, a lot of the information is outside their knowledge and decisions are outside their powers, so would result in creating more mistrust in the process. The facilitator said that councillors could show compassion to the public and great interest in finding solutions by simply attending the meetings and listening to citizens, and be acknowledged for doing so.

UMA took the advice of the facilitation consultant and did not allow elected officials to speak or be asked questions by participants at the meetings. This decision was challenged often by participants during the first round of meetings but the project team was convinced it was the correct decision and abided by it. It was the responsibility of the facilitation consultant to defend this decision to the public and explain the reason it was made.

At the public information meetings, the facilitation consultant recorded the questions, concerns and comments from participants on a large-size flip chart at the front of the room. The consultant would write down the main idea of what the participant was saying and then asked the participant to confirm if this accurately captures what they meant. The consultant decided against recording public input verbatim in order to maintain an informal feel to the meetings and encourage participants to be candid in their input. The consultant found from past experience that by putting a tape recorder in front of participants and then transcribing what they said, they were likely to be conscious of being on the record and chose their words much more carefully. Instead, the consultant recorded the main ideas of participant input and later compiled these from all of the meetings and released them to the public as Appendix A of the Flood Reduction Master Plan. Appendix A serves to document much of the citizen input and provides a helpful resource for understanding many of the myriad questions and concerns of the public at the time of the information meetings. Many key informants expressed their satisfaction that Appendix A was included in the FRMP, as it offers a direct link between citizen input and the plan, and communicates a good sense of the feeling in the community during the months after the flood event.

Although a less public figure than the facilitation consultant, the media relations and public information advisor also had an important role in the success of including citizen participation in the creation of the FRMP. UMA hired this consultant to help ensure that information was communicated to the public in order to raise awareness of the process and maximize participation. The advisor acted as a strategist and liaison to local media so that information about the planning process would be transmitted most effectively and accurately through the media to the public. The advising consultant was a local citizen and business owner, which provided several advantages to hiring an out of town consultant. The advisor was familiar with Peterborough and the population of the City, and enjoyed established contacts within the business community and among local media outlets, including local newspapers and radio stations. The advisor arranged meetings with the media so that City and UMA staff could provide information about the planning program on their terms and ensure its accuracy and the message that they want to be portrayed. All members of the project team that were interviewed agreed that the media relations and public information advisor was a great benefit in communicating to the public.

5.2.4 Participation techniques

A variety of techniques were used to generate and foster citizen participation in the Flood Reduction Master Plan study and planning process. These techniques consisted of Public Information Meetings, the Citizen's Advisory Panel (CAP), and home and business visits by UMA staff to conduct personal interviews. The primary technique that was used to gather citizen input was the Public Information Meetings. The Citizen's Advisory Panel had

a specialized role in the planning process. Rather than simply offering input and information to the study, CAP members used their combined professional experience to oversee the work of UMA on behalf of the community. The personal interviews conducted by UMA staff of home and business owners in the areas of the City that suffered the most damage were undertaken for highly focused data collection and fact-checking purposes rather than to gather opinions. The interviews also assured citizens that they were an important part of the early stages of the study and that their participation was valuable to the planning process.

By using these diverse participation techniques, including the variety of techniques used within the Public Information Meetings, the project team attempted to generate as much, and as broad a spectrum of citizen participation as possible. As noted by Brody *et al.* (2003), a variety of citizen participation techniques can be used to accomplish different objectives. While the Citizen's Advisory Panel and personal interviews had specific participation objectives, the Public Information Meetings were used by the project team to accomplish multiple objectives. These meetings attempted to educate participants as well as provide the opportunity for participants to educate the project team, seek citizen preferences on planning methods and solution alternatives, and grant participants influence on decision making.

An important recommendation made by Brody *et al.* (2003) is that planning programs should use a wide range of citizen participation techniques to ensure that there is "adequate information output, stakeholder preference input, and dialogue between planners and stakeholders" (p. 260). The efforts of the project team to use a variety of techniques to generate participation certainly adhere to this recommendation made by experienced hazards

researchers. Brody *et al.* (2003) do not recommend that traditional public hearings be abandoned, but that they be supplemented with other participation techniques, such as workshops, committees, Web sites, focus groups, charettes and surveys. The project team attempted to include many of these techniques within the ten public information meetings, the Citizen's Advisory Panel and personal interviews of home and business owners. A valuable suggestion for planners, and one that clarifies what a participation program should accomplish, is to think in terms of creating techniques for three equally important situations: one-way planner output of information; one-way public input of preferences, and; two-way dialogue (Brody *et al.*, 2003).

Although many different techniques were used to successfully generate citizen participation, some may not have been utilized to their fullest potential and other techniques (e.g. delegated decision making) were not chosen to be used at all in the planning program. Factors that influenced the choice of techniques that were used in the planning process were time and budgetary constraints. Time was a constraining factor because there was great pressure from the community to create a plan that would guide action and works projects for the City to take in the immediate future. The deadline to complete the Master Plan was an arbitrary date chosen by the City and UMA, rather than a date decided by necessity. The date was set according to a timeline that was deemed reasonable by the project team to conduct a thoroughly researched study and create a clear and influential plan, while being sensitive to the demands of the community for a timely finished product. The imposed time constraint limited the participation techniques that could be employed in the planning program.

Financial budgetary constraints also limited possible participation techniques. Both the City and UMA had a budget for this project that they attempted to adhere to as closely as possible. Budgetary constraints restricted the number of staff working on the project and the number of hours they could devote to it. The participation techniques that were employed during the Public Information Meetings were staff and time-intensive, and therefore allocated significant budgetary support. Since financial resources were finite, a limit was placed on the amount of the budget that could be spent for the purpose of citizen participation.

5.2.5 Honesty to build trust in working relationship

A critical objective of both City and UMA staff was to strive for honesty and trust in their working relationship with the citizens of Peterborough and participants in the program. The project team attempted to establish rapport early in the program by leading by example. The City made it clear to the public that UMA was hired to objectively study the situation to learn what caused the damage and suggest actions that can be taken to reduce future flood damage. It was repeatedly stated that UMA would not be making excuses for what happened and that they were given the freedom to be openly and honestly critical. UMA took this responsibility seriously and “took great pains to be as honest and straightforward as possible” (Interviewee #4, 2007). If UMA staff were unsure of the answer to a citizen’s question they would reply truthfully by saying that they did not know, or that they had not looked into that yet, or that they did not know if they would ever be able to answer that question. The project team felt that the openness and honesty shown by staff was greatly appreciated by the public and did much to strengthen the level of trust that existed (Interviewee #3, 2007; Interviewee

#4, 2007). It was necessary for this trust to exist between participants in the program and the project team in order for information to be disseminated appropriately.

The element of trust was also an important factor in permitting the flow of information from citizen participants to UMA staff. Since an important focus of the planning process, especially during the first round of meetings, was placed on participants sharing their knowledge with the project team to inform the study, establishing an appropriate level of trust was essential to participants feeling comfortable enough to do so. Sharing the details of what was for many citizens a traumatic experience required confidence that the information would not be used inappropriately. For example, on the mind of many citizens at the time of the meetings was dealing with their insurance companies to collect coverage on the property damage they sustained. Some citizens were very concerned about the level of coverage they might receive if their insurance company knew the exact details of their property damage. A common issue was that some homeowners were covered for sewer backup damage, which is considered a technological hazard, but not for overland flow damage, which is considered a natural hazard (for a detailed description of natural and technological hazard insurance coverage issues see Sandink, 2006). These citizens may not have wanted their insurance company to learn the details of the property damage they sustained if their insurance claim was not completely accurate.

Some citizens were also concerned that their insurance company would discontinue their flood coverage if they made a claim on flood damage, or even if they did not make a claim but sustained property damage from the flood. These feelings of unease and worry made some citizen participants hesitant to share their knowledge and information with people

who were in a position of authority, such as UMA staff. Some citizens were very concerned that UMA would make this detailed information available to the insurance industry, and Peterborough residents would be penalized on their home insurance coverage as a result. UMA became aware that this dilemma was discouraging citizens from participating in the planning process and thus proposed a solution to the problem. UMA promised participants that they would retain strict access to citizens' personal property damage information and not share it with any other parties, including the City and the insurance industry (Interviewee #4, 2007). Since UMA is a private corporation and not a public body, like the City, they are able to maintain stricter control over information.

UMA assured participants by stipulating as a condition of gathering that information that strict confidentiality would be maintained and that UMA would only present the information in the plan in a consolidated format, such that individuals or properties could not be identified. This assurance by UMA satisfied would-be participants that they would not be adversely affected for being forthright with personal property information that would benefit the study (Interviewee #4, 2007). As previously mentioned, UMA included some of this information shared by participants in Appendix A of the Flood Reduction Master Plan. Being honest in an attempt to build a trusting working relationship brought about a solution that allowed more information to be shared by participants and thus improved the quality of the planning process and the overall plan itself.

5.2.5.1 Avoiding a mistrust of statistics: calculation of storm intervals

An issue that created a great amount of confusion and misunderstanding among participants was the calculation of storm intervals. UMA estimated that the June 2002 rainfall event was an approximately 1 in 100 year event and that the July 2004 storm was an approximately 1 in 290 year event (UMA, 2005). Two heavy rainfall events of such magnitude occurring within approximately two years confused, angered and frustrated citizens (Leblanc, 2004). The confusion that was initially created by these statistics, and the lack of effective initial education by UMA about such measures of flood recurrence, threatened the trust that was attempting to be established in the working relationship between the project team and participants.

This issue had the potential to ruin the key elements of trust and honesty between the project team and participants, and thus the overall success of the program. UMA therefore attempted to handle this difficult issue with great care and sensitivity. UMA devoted additional time and attention to detail to ensure that most participants understood and were comfortable with these statistics, and understood how they could be possible. By doing this, the project team turned a potentially harmful situation into one that instead improved the existing level of trust, by showing participants that the project team was open and honest, and cared that participants understood the information. Although it proved to be a difficult issue to work through, it provided an opportunity to strengthen the working relationship and further establish the trust necessary for participants to share their local knowledge and information with the project team. In the end, the issue benefitted the process rather than hurt it. UMA did not attempt to make excuses for the statistics, or justify why two heavy

rainfall events of such magnitude could strike Peterborough in just over two years. Instead, the project team shared in the amazement and disbelief with participants that this could happen, and the feeling of how unfortunate it was. The project team conveyed the feeling that “we are all in this together, that nobody was trying to put anything past anyone, and that we can all help each other through a difficult time” (Interviewee #3, 2007). This approach proved to be very successful in generating trust and benefitted the process, participants’ satisfaction with the process, and thus the quality of the final plan. The additional time and careful attention to detail that were required to disseminate technical information to citizens should be considered worthwhile and productive, as an understanding of this information is required if competent decisions are to be made.

5.3 An aspect of the process that did not affect the quality of the FRMP

There existed, and remains, some confusion among interviewees and the wider public as to whether or not the Flood Reduction Study and Master Plan was required to go through or went through the Environmental Assessment (EA) process. Furthermore, there was a significant lack of understanding of what the EA process is and what the process involves. It was found that individuals that were involved in different aspects of the study and planning process had conflicting opinions as to the place of EA in the Master Planning process. City staff, UMA project team staff, other private consultants, and representatives of citizens groups had different understandings of whether or not the Master Plan was required to go through the EA process, and if it actually did go through the process. Some key informants were of the understanding that the Master Plan went through the EA Process, some believed

that it did not go through the process for various reasons such as time constraints, and some informants did not know if it had gone through the process or even what the EA process is.

The confusion that existed was inconsequential to the final quality of the Master Plan (Interviewee #2, 2007; Interviewee #3, 2007; Interviewee #4, 2007). As long as the UMA and project team staff who were charged with creating the plan understood the EA process and legislation that was required to be followed, participants could be assured that the FRMP met the necessary standards. As described in section 4.2.1.2 the FRMP was undertaken under the Ontario Environmental Assessment Act as a Municipal Class Environmental Assessment, and the plan met or exceeded the requirements of this EA process (UMA, 2005). Since this was the case, key informants that were involved in guiding the plan through the EA process acknowledged that it made little difference whether or not people were familiar with, or can remember, the details of that process (Interviewee #3, 2007; Interviewee #4, 2007; Interviewee #5, 2007).

5.4 Aspects of citizen participation that hurt the quality of the FRMP

There were three main aspects of the citizen participation element of the study and planning process that negatively affected the final quality of the Flood Reduction Master Plan and should be considered flaws in the planning program. The first is that there was some discrepancy in opinion regarding the level of participation that actually existed in the planning and decision making process. The second flawed aspect is that there existed some dissatisfaction with the role of the technical review committee, especially the lack of involvement of this committee in creating the Terms of Reference for the study. The third is

that the project team targeted the populations of different geographic areas within the City as a strategy to generate participation, and failed to target groups of citizens in the community with special interests or specific needs. Each of these aspects is discussed separately in the following sections.

5.4.1 Perceived level of participation that existed

As described in section 4.2.2, there was a discrepancy of opinion between different key informants interviewed about the level of citizen participation that truly existed in the flood reduction planning program (see also column two, Table 1). This discrepancy of opinion is indicative of the difficulty that arises in attempting to satisfy the desires of all stakeholders. The quality of the Flood Reduction Master Plan may have benefitted from addressing this difficulty at the beginning of the planning process. By stating an explicit and defined level of participation that was to be the objective of the planning process, the City and UMA might have averted the confusion and disappointment felt by many stakeholders that were left to guess what the intentions of the project team were in terms of participation. Clearly defining the intended level of participation may have given citizen participants a more accurate expectation of the planning process.

A key recommendation of Brody *et al.* (2003) reflects this observation in the literature. The authors advocate that planning program administrators be required to clearly state the citizen participation objectives of the program. They argue that if an official statement of objectives for participation is published and disseminated, community debate over the role of citizens in the planning process will result (Brody *et al.*, 2003). This healthy

debate will allow members of the community to voice their opinion specifically regarding citizen participation in the planning program, before the planning issues are even addressed. Consulting citizens on the role they will have in the planning process, and even granting them influence in deciding what that role should be, will serve to give the community a more accurate expectation of the planning process. Defining the intended level of participation could be accomplished by referring citizens to a visual tool such as Arnstein's Ladder (1969), or other equivalent, and identifying the level of participation in terms of corresponding to one of the rungs.

A potential problem with attempting to define the intended level of participation at the beginning of the planning process is that doing so may create acrimonious conflict before the actual process even begins. The subject of this conflict would be the structure of the planning process rather than the issues generated by the plan itself. Focusing on this subject may not seem to be the ideal way of commencing a planning project, as it would delay conversation about other pressing issues, but would result in a clearer idea of the role of citizen participation for all parties involved. Careful attention devoted specifically to the role of citizen participation at the beginning of the planning process may serve to strengthen the quality of participation throughout the entire process, and thus improve the quality of the final plan.

5.4.1.1 Language of participation

Key informants were asked to choose the rung of Arnstein's Ladder of Citizen Participation (1969) that mostly appropriately represented the level of participation that existed in the flood reduction planning program. It was noted in section 4.2.2 that this question provided difficulty for many key informants. One of the reasons for this difficulty was that some key informants were uncomfortable with some of the language used to describe the rungs of the ladder. These key informants felt that some of the words misrepresented the corresponding level of participation, or that the words were "loaded" and had other underlying meanings (Interviewee #1, 2007; Interviewee #2, 2007; Interviewee #5, 2007; Interviewee #8, 2007; Interviewee #12, 2007). The words that caused the most difficulty for key informants were 'Placation', used to describe the fifth rung of the ladder, and 'Tokenism', used to describe the middle group of the third, fourth and fifth rungs.

Future researchers may avoid this problem by taking a different approach to using Arnstein's Ladder (1969) as a reference tool. Two alternate methods are immediately apparent. The first is to change the words used to describe the rungs to more neutral, unbiased word choices. This method may make it easier to select the most appropriate level of participation, but does not accomplish the purpose of Arnstein's Ladder (1969), which is to provoke citizen power in government decision making. Existing in the literature are alternatives to Arnstein's Ladder (1969) that use language that may be more neutral and less abrasive. Doberstein (2001) identifies levels of citizen participation similar to Arnstein (1969) using alternative language (from lowest level of participation to highest): *persuasion, education, information feedback, consultation, joint planning/shared decision making,*

delegated authority, and *self-determination* (after Rahnema, 1992 and Roberts, 1995). The second alternate method is for the researcher to ask informants to describe how they see citizen participation and then the researcher determines which rung most closely represents this description. This method may, however, introduce researcher bias or lead to inaccurate representation of informant opinions.

5.4.2 Role of the Technical Review Committee

Two concerns of a technical nature were mentioned by one member of the Technical Review Committee regarding the creation of the Master Plan. These concerns reportedly stemmed from a general dissatisfaction among some members with the role of the committee in the planning process. The feeling was that the committee existed only to provide information and support UMA in achieving their mission, and members were not given the mandate to provide direction and advice to UMA drawn from their own professional expertise and experience.

The first specific concern was that the Terms of Reference for the study were set by UMA and some senior City staff and were approved before the committee existed (Interviewee #5, 2007). Not having the opportunity to develop the Terms of Reference resulted in limiting the ability of the Technical Review Committee to direct the study and offer input. This was discouraging for members of the committee because they then had to work with and oversee a study that they had no hand in creating. Committee members may not have even liked or agreed with the Terms of Reference, or believed them to be appropriate for the study.

The second concern was that no chance existed for a technical peer review of the process used to obtain the findings of the study and Master Plan (Interviewee #5, 2007). The technical committee was able to review the final figures and conclusions of the study but was not provided the opportunity to analyze the choices that UMA made in terms of the computer modeling and base figures used to come to those findings. There existed some concern within the committee that they did not have the mandate to look further into the modeling processes used by UMA than the results. The committee was worried that some of the assumptions made by UMA and used in the modeling could aggregate and result in error during later stages of the project. The committee was not overly concerned that the results looked inaccurate or did not ‘make sense’, they just wanted the chance to ensure that the base numbers were appropriate (Interviewee #5, 2007). Committee members pointed out that the construction phase would be too late to learn that some of the base design parameters were wrong or not appropriate and that the opportunity should exist for the committee to review the figures before that occurred. These concerns resulted in some increasingly divisive debates as UMA neared the conclusion of the study and planning process.

5.4.3 Targeting as a strategy to generate citizen participation

UMA did not use targeting to its maximum potential as a strategy to generate citizen participation. While there was an effort made to target citizens for participation in the Flood Reduction Master Plan process, it may not have been the most appropriate method of achieving participation from all potentially affected stakeholders. UMA targeted the populations of five different geographic areas (the existing municipal political wards) within

the City for participation in the planning process. Two Public Information Meetings were held in each geographic area. This geographic targeting⁹ strategy, however, may not have allowed for the most accurate reflection of needs within the community.

By employing this single targeting strategy, UMA missed the opportunity to gather invaluable input from groups of citizens with special interests or specific needs (which could have been attempted by a strategy known as social targeting¹⁰). These groups of citizens may represent a relatively large portion of the population. Portions of the population with interests and needs that differ from the rest of the population were not targeted for their perspectives. These groups are an important and significant part of the community, and to not give them due consideration and seek their contribution to decision making is a failure in the thoroughness of the planning process. Representatives of some of these groups were interviewed to discover their thoughts on the planning process. Although they gave a mixed reaction, each said that they were not consulted to their satisfaction (Interviewee #6, 2007; Interviewee #7, 2007; Interviewee #10, 2007; Interviewee #13, 2007).

The failure of UMA to target specific stakeholder groups within the community for participation in the FRMP process should be considered a flaw in the planning program, and may result in negative repercussions for some segments of the Peterborough population in the future. This lack of social targeting should be considered a flaw in the program because,

⁹ Geographic targeting is the subject of an emerging body of literature. Also known as spatial or place-based targeting, geographic targeting allocates resources to specifically defined geographic areas (Thomson, 2008). In the case of citizen participation in the FRMP process, area-specific geographic targeting was used, which “deliberately channels resources to a specifically defined geographic location than is larger than an individual project but smaller than the geographic area over which the entity providing the resource has jurisdiction” (Thomson, 2008, p. 632).

¹⁰ Social, or people-based, targeting allocates resources to individuals or groups who have specific characteristics (Thomson, 2008).

as described in section 2.5, many authors, including Arnstein (1969), Brody (2003), Burke (1979), Day (1997), Fagence (1977), and Fainstein and Fainstein (1985), advocate for better representation of the interests of all members of a community, regardless of their social or economic stature.

The needs of different socio-economic sectors of the Peterborough population were not addressed by asking for input to the FRMP process from representatives of these groups. Of particular concern are the needs of low-income members of the community. Many key informants noted that these citizens were especially adversely affected by the flood and sewer backup for several reasons (Interviewee #6, 2007; Interviewee #7, 2007; Interviewee #10, 2007; Interviewee #12, 2007). Although it was beyond the scope of the research to prove these reasons, several key informants offered much speculation on this topic. They speculated that low-income members of the community are often the people that rent basement apartments because they are generally the least expensive places to live. Basement flooding was a major cause of property damage sustained in the July 2004 event (UMA, 2005). Some basement apartments may not be legally rentable because they do not meet building standards. Tenants may be paying rent 'under the table' for these apartments, which makes them affordable places to live. Also, low-income citizens may not have any or adequate insurance coverage because they cannot afford to pay the insurance premiums. This lack of insurance left many citizens particularly hard hit by the event (Interviewee #10, 2007). Additionally, it is well noted in the literature that low-income citizens often may be subsisting day-to-day and are severely vulnerable to disruptions such as a flood event (Blaikie *et al.*, 1994; Maskrey, 1989; Mileti, 1999).

UMA did not directly target any of the poverty reduction or social assistance organizations in the community for their input. This oversight denied giving special consideration to these typically underrepresented sectors of the population. Members of these sectors did have the opportunity to participate in public meetings in their ward of the City but they did not have a formal voice in decision making that identified and distinguished their needs from those of the rest of the community.

It should be recognized that low-income citizens make up an important and significant segment of the population. Not considering them in a major planning project such as this is an oversight that hurts the overall community. Acknowledging and attending to the needs of these citizens betters the rest of the City and makes the entire community more resilient to hazards (Mileti, 1999).

When asked pointedly if these groups were targeted for participation or given special consideration in the planning process, City and UMA key informants responded that they were unaware whether organizations representing low-income members of the community existed or were present at the public information meetings. These informants were more concerned about whether these organizations were causing a problem or distraction during the public meetings, and were satisfied if they did not hear anything from these groups. This is an inappropriate attitude to have when conducting a planning program that is designed to include citizen input. Contribution to decision making from a broad cross-section of citizens should be sought, not avoided (Arnstein, 1969; Brody, 2003; Burke, 1979; Day, 1997; Fagence, 1977; Fainstein & Fainstein, 1985). This contribution would benefit not only the planning process, but the final plan would be better suited to the community as a whole.

Intentionally targeting typically underrepresented sectors of the population (e.g. low-income, elderly, infirm populations) for participation in the planning process would create additional work for the project team, and may slow down the process and release of the final plan. Deliberately including these citizens in decision making would mean altering citizen participation efforts to accommodate the needs of these populations (i.e. alternate meeting times, locations, participation techniques). These citizens may add another viewpoint that is not in keeping with those of other citizens, and this may present additional challenges to the project team. But accommodating these citizens in order to include their input in the planning process is absolutely critical in creating an effective plan that meets the needs of the entire population.

5.5 Summary

This chapter discussed the findings of the research presented in chapter four, and commented on the relevance and implications of these findings to the existing literature and research in the field. The chapter was organized in three main sections. The first section discussed five strengths of the citizen participation element of the planning process that improved the quality of the FRMP: involving citizen participation early in the planning process; contracting a private consulting firm and granting them freedom in creating the plan, which depoliticized the planning process; hiring additional specialized facilitation and media relations consultants; employing several different participation techniques within the Public Information Meetings, and; focusing a concentrated effort on honesty to build trust in the working relationship, which avoided a mistrust in statistics that threatened citizen

participation. The second section discussed one aspect of the planning process that created some confusion but was found to be inconsequential to affecting the quality of the FRMP, that is, the confusion regarding the Environmental Assessment process to which the plan was subject. The third section offered three weaknesses of the planning program that should be recognized as affecting the quality of the FRMP: discrepancy in opinion regarding the level of participation that actually existed in the planning and decision making process; dissatisfaction with the role of the technical review committee, especially the lack of involvement of this committee in creating the Terms of Reference for the study, and; the decision to employ geographic targeting rather than social targeting as a strategy to generate citizen participation.

Chapter 6

Recommendations and Conclusion

6.1 Recommendations

This case study research exposes some practical implications of a hazard mitigation planning exercise involving citizen participation that may be generalized to other similar planning efforts of this nature. The research identifies many strengths and several weaknesses of the citizen participation aspect of the Flood Reduction Master Plan. An undertaking like the creation of the FRMP is a highly worthwhile and recommended investment of time and resources, but is not a perfect, solve-all method of hazard mitigation. There exist some limitations which are the products of trying to involve citizens in planning in order to reduce the impacts of future events similar to that which occurred in 2004. These limitations are described in this section. Recommendations for citizen participation in future hazard mitigation planning efforts, based on the research findings and the author's analysis and discussion, are then offered.

One limiting factor mentioned by key informants was that there is very little interest among citizens to be involved in planning policy development and decision making before a disaster that negatively affects people, like flooding, occurs (Interviewee #4, 2007; Interviewee #5, 2007). Citizens often have little concern for such things as development planning and policy, floodplain mapping and infrastructure upgrades when they have not been directly affected by their inadequacies. After a disaster occurs, the expectation by both citizens and planners is that the public will be involved in planning efforts to mitigate the

severity of a future event similar to the one that just devastated the community. One key informant summarized this thought nicely by observing that “acceptance of the risk decreases as soon as the incident occurs” (Interviewee #5, 2007). This implies that most citizens do not care enough to be involved in planning for hazards mitigation until they are negatively affected by a disaster.

In many cases after a disaster, the public is consulted and citizens are provided the opportunity to be involved in the planning process. The expectation that they contribute worthwhile and competent input, however, may be somewhat unrealistic given that most citizens were not involved in the decision making that preceded the event and led to the existing conditions and circumstances that produced vulnerability. This is a source of frustration for both planners and citizen participants, as both parties feel that this type of planning process is flawed. Planners and engineers tend to have a good understanding of the factors that led to damages and are familiar with policy and decision making processes. Citizens often have an accurate understanding of how they were affected by the event, and typically have a sense of urgency that their needs are met, yet may be poorly informed about the multiple causes of a disaster. The result is that time must be spent on educating and informing citizens to a level where they can understand the larger scale and make valuable contributions to the process. One key informant expressed concern about this inherent problem: “The problem is that [citizens] are not really involved in the front end and then all of a sudden you have a flood and then you involve them in the back end” (Interviewee #5, 2007).

Another limitation of a planning effort like the Flood Reduction Master Plan is that the product is a stand-alone plan. While the plan sets out general and specific recommendations for further action to mitigate flood damages in the future, it is not yet a part of comprehensive land use planning policy. The plan will be more effective, and have more permanence, when it is incorporated into the City of Peterborough's Official and secondary plans. Recommendations made in the FRMP will then become an intricate part of the foundation for future land use and development decisions in the City, regardless of the budgetary resources or political will that is devoted to flood reduction at the time. The incorporation of a stand-alone hazard mitigation plan into comprehensive land use planning policy is the ultimate way for a plan to have a lasting impact on the community.

Chapter 5 of the thesis offered a discussion of the aspects of citizen participation in the FRMP process that affected the quality of the final plan. Five aspects of citizen participation were identified as positively affecting the quality of the planning process and final plan. Three aspects were identified as hurting the quality of the planning process and final plan. These analyses of the FRMP process can be generalized to make recommendations that would apply to other hazard mitigation planning programs that include citizen participation. The first five recommendations are based on *positive* aspects of citizen participation in the FRMP process and are in no particular order of importance.

1. Include citizen participation at the earliest stages of the planning process.
2. Depoliticize the planning process by granting the project team freedom from political and administrative pressure in conducting the study and creating the plan.

3. Hire additional consultants with specialized skills and experience if necessary.
4. Use a wide variety of participation techniques to generate and foster citizen participation.
5. Promote honesty to build trust in working relationship between project team and citizen participants.

The following three recommendations are based on *negative* aspects of citizen participation in the FRMP process that can be improved upon.

6. Clearly define the intended level of citizen participation early in the planning process.
7. Establish a Technical Review Committee before the Terms of Reference are set and ensure that the Committee is involved in setting the Terms. Provide the opportunity for the Committee to conduct a technical peer review of the engineering calculations and models used in the planning process.
8. Employ both social targeting and geographic targeting as strategies to generate citizen participation.

The final two recommendations aim to contribute to the theory of citizen participation in hazard mitigation and are made from the experience of applying that theory to the thesis case study.

9. While remaining a seminal work and an invaluable foundation of citizen participation research, the language used in Arnstein's *Ladder* (1969) may be considered outdated, thus rendering the *Ladder* in its original form inappropriate for use in a modern context. Modifying the *Ladder* or replacing the language with other word choices (as discussed in section 5.4.1.1) when conducting research may elicit more willing, and accurate, responses from those involved in contemporary planning programs involving citizen participation.
10. In addition to the six 'strategic choices' identified by Brody *et al.* (2003) and used as a framework in this thesis, a seventh 'choice' may be appropriate to consider in the design of citizen participation in hazard mitigation planning, and beneficial to the analysis of such a planning program. This seventh 'choice' may be whether to evaluate or assess how citizen participation was included in the planning process at the completion of the program, as this thesis has done. Deciding in favour of this 'choice' could then serve to keep those involved accountable throughout the process and provide a basis for comparison to other planning programs upon completion.

6.2 Future research

The research undertaken in Peterborough for this thesis is not an exhaustive study of citizen participation in hazards mitigation planning or of flood reduction planning efforts in Peterborough. Many new questions were raised by this case study and directions for future research are suggested here. Ideally, further research could build upon the work of this thesis and further add to the base of knowledge to which this thesis has attempted to meaningfully

contribute. Future research related to that of this thesis could be conducted in three areas: research on the Peterborough Flood Reduction Master Plan, research on the hazard mitigation steps taken in Peterborough as a result of the FRMP, and research on similar hazard mitigation efforts beyond those taken in Peterborough.

Research additional to the scope of this thesis may include conducting a thorough investigation of how citizen input influenced (or did not influence) the Flood Reduction Master Plan. This investigation could be accomplished by conducting a systematic analysis of citizen input documented by UMA in the GIS database, Appendix A of the FRMP and other records, and comparing this information with the FRMP to discover the extent to which citizen input was used. Another valuable future study would be to investigate the long-term efficacy of the FRMP, and by extension, the efficacy of citizen participation in the Plan. A logical time to conduct this research is after the City of Peterborough next updates its Official and secondary plans. This undertaking would present an ideal opportunity to determine if the findings and recommendations of the FRMP are being incorporated into comprehensive land use planning policy.

One major recommendation made in Peterborough's Flood Reduction Master Plan (UMA, 2005) is that the City should be divided into seven sub-watersheds, so that these smaller areas may be studied in greater detail to determine the specific actions that must be taken to reduce future potential flood damage. The Plan suggested that these actions might include, but are not limited to, physical infrastructure changes, municipal purchase of high-risk properties, increased development standards and planning policy updates. The City of Peterborough accepted this recommendation, and an Environmental Study Report (ESR) of

each sub-watershed will be conducted independently by a private consulting firm (Interviewee #1, 2007; Interviewee #2, 2007; Interviewee #3, 2007). Several of the ESRs were in process and some were nearing completion at the time that this thesis was written. Additional research that would extend the research conducted for this thesis includes studying the role of citizen participation in each of Peterborough's seven ESR planning processes. The decisions made about how citizen participation is included in each of the ESRs could be analyzed in terms of the six strategic choices framework proposed by Brody *et al.* (2003), as this thesis has done.

Multiple case studies of planning programs of a similar nature would be a valuable addition to this thesis research, as comparisons between the studies could be made to discover trends of beneficial and harmful decisions. These case studies could investigate the role of citizen participation in other post-disaster hazard mitigation efforts in similar Canadian urban flood situations. The July 2004 flood event in Edmonton and the August 2005 event in Toronto are two such examples that would provide valuable comparative research. Case study research could also be conducted on citizen participation in similar flood mitigation efforts in other developed countries, to discover other 'best practices' and learn how Canadian planning efforts may be improved. Research could extend beyond flood hazard mitigation to the role of citizen participation in mitigation planning for other hazards. Perhaps most worthwhile, hazard mitigation efforts in developing countries could be studied to discover the role of citizen participation and local knowledge in decision making in different cases. Contributing to the knowledge base of hazards mitigation in these countries may help to reduce the number of lives that are too often needlessly lost.

6.3 Evaluation of success

This thesis has analyzed citizen participation in the FRMP study and planning process in terms of the framework of six strategic planning choices proposed by Brody *et al.* (2003). Table 2 is a summary of the author’s Chapter 4 and 5 analyses of citizen participation in the FRMP, using a common qualitative, four-point scale: Excellent, Good, Fair, and Poor. The Table provides an evaluation of the success of decisions made for citizen participation, and justification for the evaluation based on the analyses.

Table 2. Evaluation of citizen participation success

Choice	Level of success	Justification
1. Administration	Excellent	Contracted a consulting firm with the expertise necessary to conduct study appropriately; depoliticized planning process; two additional specialized consultants also hired.
2. Objectives	Fair	Included citizen participation throughout the study and planning process; much discrepancy of opinion regarding the level of participation that actually existed; did not define intended level of participation.
3. Stage	Excellent	Citizens involved very early in study and throughout planning process; citizens were a vital part of gathering information early in process.
4. Targeting	Fair	The populations of geographic areas within the City were targeted for participation; stakeholders with special interests or specific needs within the community were not targeted for participation (social targeting).
5. Techniques	Excellent	Wide variety of participation techniques used.
6. Information	Good	Much care and attention to detail taken in dissemination of information; honest communication built trust in working relationship; some confusion early in process but mistrust of statistics largely avoided.

6.4 Conclusion

The City of Peterborough FRMP applied current hazards mitigation theory to planning practice in a post-disaster setting. Citizen participation was judged to be an important part of the FRMP process. This study analyzed the decisions that were made about citizen participation in terms of a recently proposed framework found in the hazards and planning literature. Many strengths and several weaknesses of the citizen participation aspect of the planning program were identified and discussed. Many elements of citizen participation in the FRMP process can be considered successful by the standards set in the literature. Ultimately, research for this thesis has revealed that citizen participation in the FRMP has provided a strong foundation upon which current and future flood hazard mitigation efforts in Peterborough can be based, and it is likely that the inclusion of citizen participation has reduced Peterborough's exposure to the flood hazard.

Appendix A
List of key informants

List of key informants

Key Informant	Position	Cited as
1	City of Peterborough senior staff	Interviewee #1, 2007
2	City of Peterborough senior staff	Interviewee #2, 2007
3	City of Peterborough senior staff	Interviewee #3, 2007
4	Consultant	Interviewee #4, 2007
5	ORCA senior staff	Interviewee #5, 2007
6	Community group representative	Interviewee #6, 2007
7	Community group representative	Interviewee #7, 2007
8	ORCA senior staff	Interviewee #8, 2007
9	ORCA senior staff	Interviewee #9, 2007
10	Community group representative	Interviewee #10, 2007
11	Consultant	Interviewee #11, 2007
12	City of Peterborough senior staff	Interviewee #12, 2007
13	Community group representative	Interviewee #13, 2007
14	University researcher	Interviewee #14, 2007
15	University researcher	Interviewee #15, 2007

Appendix B
Interview question themes

Question Themes for Key Informant Interviews

- Experiences of July 2004 flood event
 - Were you directly or indirectly affected, and if so, how?
 - Short-term or long-term impacts, or both?
 - In your opinion, was there adequate or inadequate warning and evacuation notice?

- What factors contributed to the flood being as bad as it was?
 - Land use planning
 - Within and outside city
 - Failure of structural mitigation measures
 - Storm sewer inadequacy
 - Storm severity
 - Resource/environmental management (e.g. habitat conversion, river management)
 - Warning/evacuation
 - Urban runoff (hard surfaces)
 - Other factors?

- Response by the City of Peterborough (what actions taken, are these adequate?)
 - Actions taken during the flood event (emergency assistance, shelter, etc.)
 - Longer-term reactions to the flood (governance, planning and management)

- Flood Reduction Program
 - Were you involved in this program (Why or why not)?
 - Did you want to be involved (Why or why not)?
 - Were residents of the community involved in the program?
 - Provide details
 - Discuss the role of community involvement in the program
 - Degree of community involvement in the planning process
 - How were the ideas and opinions of the community used in the planning and decision making processes?
 - To what extent were contributions by the community used in post-flood planning and decision making processes?
 - Overall successes and shortcomings of the program (effectiveness)
 - Did the program accomplish its objectives?
 - Other non-flood related experiences with community involvement in city planning?
 - Role of Citizens' Advisory Panel (CAP)
 - Role of public facilitation consultant

- The contribution of the flood reduction program to the Flood Reduction Master Plan and comprehensive land use planning in the City of Peterborough
 - Was this a useful exercise?
 - Did the information and knowledge gained through the program influence comprehensive land use planning and decision making?
 - If no, why not?
 - If yes, how?

- To what degree is Peterborough a safer and more resilient community as a result of this process?
 - Why or why not?

- Recommendations for additional contacts or written documents?

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