EIC Climate Change Technology Conference 2015

Climate Change Risk Perceptions and Implementing Municipal Policy

CCTC 2015 Paper Number 1570047011

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Abstract

The objectives of this thesis were to understand how local planning officials view climate change, assess whether climate change is recognized as an issue requiring policy attention, and perform a policy review to assess the current state of local action in the Regional Municipality of Waterloo. In total, 21 professionals working in the Region took part in the study, and came from a diverse range of industry backgrounds. The results identified four key areas that may help improve implementation of municipal climate change policies: 1) collaboration; 2) leadership; 3) integration within the planning context; and 4) presenting climate change as a local issue.

Keywords: risk perceptions, municipal planning framework, local planning, official plans, leadership

Résumé

Si l'article est en français, le résumé français sera le premier.

Mots clés : conférence, article, modèle, dix mots maximum

1. Introduction

Recognizing that climate change is a global problem but that the impacts will be felt acutely at local levels, there is an imperative need to understand what actions are being taken at the local level and how climate change risk perceptions may be related to these activities. Particularly with the issue of climate change, individuals are presented with several challenges. For example, strong impacts may not be felt in one's lifetime, or if particular weather events do occur, there might be uncertainty as to whether that event was related to climate change. Similarly, if individuals decide to take actions to mitigate or adapt to climate change, there may be a lack of feedback as to whether those actions were effective. This relationship is largely based on the perception of what risks are involved, what barriers or constraints prevent one from taking action, and what specific activities are required to address the issue at hand.

When examining the way people think about and engage with climate change more closely, the environment-behaviour literature demonstrates that most people consider climate change to be a temporally and geographically distant issue. There is a lack of personal engagement as people fail to see themselves as being personally at risk; instead, perceiving it to be a problem for different geographical locations, different generations, and for more vulnerable societies.

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There are also several challenges related to the municipal response for climate change. For example, organizations like the Federation of Canadian Municipalities have developed programs to engage members in climate change mitigation, and encourage decision makers to create action plans to reduce greenhouse gas emissions. However, as of August 2013, only 240 municipalities, from Canada's 4000+ municipalities, have committed to the program [1][2]. There are also multiple barriers for climate action in municipalities, such as having the financial resources, knowledge, capacity, and human resources to effectively take action [2].

Despite these challenges, there is a critical need for municipalities to consider climate change in decision making and integrate the issue into daily activities and planning documents. Many parts of Canada are already experiencing severe weather events such as extreme levels of rainfall, severe flooding, and increased frequency of storms. Local planning officials have the capacity to respond to these changes through mitigation or adaptation strategies, while at the same time, they can play a key role in implementing public policy. However, before asking the question of whether action is being taken on a local level, there needs to be an understanding of how local planning officials view climate change and whether the issue even receives policy attention. In other words, there needs to be an understanding of whether local planning officials, like the general public, also view climate change to be a temporally and geographically distant issue.

The scope of inquiry for this thesis is hence to understand how local planning officials view climate change and whether this relates to the types of policies that are being implemented at the regional and municipal level. Specifically, examining risk perceptions provides one method of approaching this inquiry, as it takes into account how personally relevant the issue may be (i.e. perceived susceptibility), and temporal factors surrounding climate change impacts (i.e. perceived severity). Second, this thesis aims to gain a sense of whether climate change is recognized as an issue requiring policy attention. This requires an understanding of what other issues are given policy attention, whether mitigation and adaptation are considered in decision making, and what possible barriers influence the policy implementation process. Finally, in light of the minimal response from municipalities on climate change, this thesis includes a policy review of various planning documents to understand the current state of climate action at a regional and municipal level.

Given notable gaps in the literature in terms of how perception relates to both intention to act and behaviour, as well as gaps in the literature on how local planning officials (in contrast to the general public) perceive climate change risk, the specific research question this study will address is: What is the relationship between climate change risk perceptions amongst local planning officials and the implementation of climate-related policies? The Regional Municipality of Waterloo in Ontario, Canada, was selected as the study site for convenience purposes, with 'local planning officials' referring to professionals working for the Region of Waterloo, and cities, Waterloo, Kitchener and Cambridge. Climate-related policies refer to any type of policy directed toward mitigating or adapting to climate change impacts.

Knowledge of this relationship can offer insight into what factors shape perceptions, what barriers prevent climate change mitigation and adaptation from becoming a top priority in policy-making, and where missed opportunities exist in various planning documents. This study ultimately aims to gain a better sense of how local planning officials view and respond to climate change, in order to assess how the process of implementing mitigation and adaptation strategies can be further facilitated.

2.   Research Methods

A purposive/targeted method was used in order to exclusively recruit participants that play a direct role in the policy process. Specifically, individuals in senior or managerial type positions were invited to participate given the potential influence they might have in policy implementation.

For convenience, the Regional Municipality of Waterloo was selected as the site for this study, including both the regional and municipal level. This study also recruited individuals from a diverse range of departments. For example, agricultural departments may have a more direct impact from changes in the environment in comparison to economic development departments. In light of this difference, it was anticipated that there might be similar differences in risk perception characteristics.

Modelled after Brody, Grover, Lindquist and Vedlitz (2010), participants were recruited from planning, environmental, agricultural, emergency management, public health and economic development departments. Of interest, Brody et al. (2010) examined whether or not climate change was identified by state and local decision-makers as being a relevant problem, and whether the issue was placed on the agenda for policy-making solutions. The authors not only found differences between departments, but also differences in whether the type of solution was adaptation or mitigation [3]. With regard to the anticipated sample size, interviews were conducted until theoretical saturation had occurred (i.e. the point at which no new interview reveals any new information).

A qualitative research method was adopted for this study given its particular strength in exploring perception of risk and intention to act. The literature provides evidence to suggest that risk perceptions are influenced by qualitative attributes, such as immediacy of adverse effects, decision making and appraisal of choices, and familiarity and appraisal of control [4]. Given this cognitive component in risk perceptions, a qualitative method can provide a good measure in understanding the complexities of human behaviour. This type of method is also particularly valuable when the research is emergent, that is, the researcher begins with an initial plan but may not tightly prescribe to all phases as it is not clear what the ultimate end point will be [5].

2.1   Study Design

The main study consisted of two major phases. The first phase entailed structured interviews with participants, and the second phase involved a review of public policy.

2.1.1   Phase I – Structured Interviews

The first step of this phase was to develop a questionnaire to measure perception of risk about climate change and intention to act. A set of questionnaire items were created after conducting a thorough review of the literature, and pre-tested to assess the effectiveness of the questionnaire instrument. Questionnaire items were designed to inform the main research question: 'What is the relationship between climate change risk perceptions and the implementation of climate-related policies' and 11 sub-questions in areas of: knowledge/sources of information, organizational culture, risk perceptions, level of efficacy, critical actions, role of local government, agenda setting, barriers, inter-departmental differences, work experience, and recognition in public policy. These areas were identified through the literature review as being key constructs in measuring risk perception and intention to act.

Using directory searches and recommendations from the faculty supervisor and key informant, potential participants were identified and contacted for the study. Participants were given the option to either complete an in-person interview where the researcher would administer the questionnaire, or complete an online version (using SurveyMonkey software).

All efforts were taken to ensure the confidentiality of participants. Several efforts were also taken to strengthen the validity and reliability of the study. For example the researcher only used pre-existing rating scales and questionnaire items that have been validated in other studies, and only made modifications based on a thorough review of the literature or if the pre-test deemed it was necessary. Generalizability is used in a limited way in qualitative studies given that these type of research is often very context specific and as such, generalizing the findings to other locations and individuals are not the main objective in this form of inquiry [5]. However, where there were degrees of generalizability, these were identified in the research along with potential limitations.

2.1.2   Phase II – Policy Review

The second phase of this study entailed a policy review. To the knowledge of this author, no other study to date had reviewed regional and municipal official plans, and key provincial legislation for the explicit coverage of climate change, other than a recent publication by Baynham and Stevens in 2013. The authors reviewed municipal community official plans for mitigation and adaptation content. This was in light of provincial mandates in British Columbia, which required that municipal OPs must set targets and policies to reduce greenhouse gas emissions. The authors found that in 39 of the plans reviewed, 25 explicitly addressed climate change and that there was a stronger focus on providing goals and policies, as opposed to facts and implementation provisions [6]. One other study had a similar focus, but evaluated climate change actions plans as opposed to Official Plans. Tang, Brody, Quinn, Chang and Wei (2010) reviewed local climate change actions plans in order to assess how well the issue of climate change was recognized, and the level of preparation for mitigation and adaptation [7]. It was expected that local climate change action plans (in contrast to OPs) would likely have a more explicit approach to addressing climate change impacts. That said, both plans discuss common issues such as transportation policies, land use policies and implementation priorities. As such, the criteria used by Tang et al. (2010) to evaluate local climate change action plans can be relevant in evaluating official plans and key provincial legislation. Moreover, Tang et al.'s (2010) indicators for "action approaches", provides a more comprehensive list of actions than those offered by Brody et al. (2010). Thus, for the purpose of this study, Tang et al.'s (2010) indicators were used to help guide the policy review (see Table 1).

Table 1. Climate change action approaches (Tang et al., 2010)

Sub-category	Indicator
Communication and collaboration policies	Public awareness, education, and participation Inter-organisational coordination procedures (business, government, IPCC, CCP, etc.)
Financial tools	GHG reduction fee Establish a carbon tax

Land use policies	Mixed use and compact development Disaster-resistant land use and building code Green building and green infrastructure (i.e. urban forests, parks and open spaces, natural drainage systems) standards Low-impact design for impervious surface Control of urban service/growth boundaries
Transportation policies	Alternative transportation strategies Transit-oriented development and corridor improvements Parking standards adjustment Pedestrian/resident-friendly, bicycle-friendly, transit-oriented community design
Energy strategies	Renewable energy and solar energy Energy efficiency and energy stars
Waste strategies	Landfill methane capture strategy Zero waste reduction and high recycling strategy Waste and storm water management
Resources management strategies	Creation of conservation zones or protect areas Watershed-based and ecosystem-based land management Vegetation (forest/woodlands) protection
Implementation and monitoring strategies	Establish implementation priorities for actions Financial/budget commitment Identify roles and responsibilities among sectors and stakeholders Continuously monitor, evaluate and update

In the initial stages of the policy review, it came to light that some of the plans discussed climate change in the context of air quality as well as in terms of the 'green economy', which was not readily addressed in Tang et al.'s (2010) categories. These included actions like reducing smog days, reducing greenhouse gas emissions, and promoting green jobs, or a vision of corporate environmental sustainability. There was also mention of financial incentives which was not specified in Tang et al.'s (2010) financial tools sub-category. Furthermore, the Region of Waterloo has a rather strong farming industry; hence the topic of local food was discussed several times. Taken together, the sub-categories of Air Quality, Green Economy, Local Food, and Financial Incentives were identified as relevant policy analysis variables.

There were also some differences between documents in terms of how many times climate change was referenced (if at all), whether the focus was on mitigation or adaptation, and the timeframe surrounding plan objectives and implementation. These variables were also included to the list.

A three-point Likert Scale was adopted to assess references that were Implicit (I) – 'issue was addressed without specific reference to climate change'; Explicit (E) – 'issue addressed with overt reference to climate change'; or Not Evident (NE) – 'issue remains unaddressed'.

3.   Results

Between November 2012 and April 2013, 52 individuals were contacted to take part in the study. Of these individuals, 34 responded, and 22 agreed to participate. Eight individuals declined participation for reasons being that they were not involved with policy, they did not

work closely with climate change issues, climate change was not their area of specialty, or they were too busy at the time. In total, 21 questionnaires were completed in full leaving a final sample size of N=21 (response rate 40.3%).

Participants were all professionals working in the Region of Waterloo. Although one of the research aims was to contact individuals from a variety of departments in order to compare potential differences between departments, the final sample did not lend to enough representation from each department to evaluate the results. For example, there was only one participant from an economic development department, whereas there were was no representation from an agricultural department. In contrast, there was a large proportion of the sample that came from planning departments. In light of this, differences between the departments could not be assessed. Instead, the sample was analyzed uniformly to represent local planning officials more generally. A summary of the department representation can be found below.

Table 2. Distribution of participants' industry

Industry/Profession		Number of participants	Proportion
Planning		5	33%
Environmental		4	26.7%
Agricultural		0	0%
Emergency Management		2	13.3%
Public Health		3	20.0%
Economic Development		1	6.7%
Other		9	
	Fleet services	1	
	Water, Wastewater, Stormwater	2	
	Landscape Architecture/Project Management/Construction	3	
	Emergency Response	1	
	Social Services	2	

Note: total number of participants does not match total sample because some participants self-identified in multiple categories.

3.1   Phase I – Structured Interview Results

The final questionnaire contained 70 items relating to a broad range of issues such as climate change risk perceptions, recent weather events, levels of concern, media coverage, departmental culture, personal actions, challenges with the policy implementation process, and successful initiatives. The findings from the interview responses are summarized below:

1. Participants had a strong understanding of climate change causes and fairly strong self-perception of their knowledge. Internet was the most consulted source of information. However, almost all participants also had exposure to weather changes that were indicative of climate change (most in the last 6 days), heard or saw media coverage on

climate change (most within the last 10 days), or knew of a climate-related initiative taking place in another municipality. These latter sources serve to also inform knowledge on climate change.

2. There appeared to be a quite favourable organizational culture for climate action. Participants perceived there to be a very high capacity to take action, almost all participants considered mitigation (90%) and over half considered adaptation (65%) in decision making; and the role of local government in helping to address climate change was realized by participants.

3. Participants perceived climate change to be a temporally and geographically distant issue. There was a higher risk perceived for the environment, in comparison to personal health or financial situations. Interestingly, participants viewed that public health, in contrast to economic development in the Region, will be more significantly impacted by climate change in the next 30 years. Over half of the participants also viewed there being opportunities or benefits related to climate change, with most participants specifically noting increased agricultural productivity and longer growing seasons.

4. There was not a strong sense of self-efficacy for climate change but additional comments reflected a need for collective efficacy.

5. Participants viewed transportation-related strategies as being the most critical action for climate change mitigation and adaptation.

6. Participants noted that local government should play a leadership role and 'lead by example'. There was not a strong consensus on what local councils needed to do differently in order to effectively adapt to climate change.

7. Climate change is considered in decision making but economic development priorities render that the issue is pushed aside in policy agenda setting. Responses on the role of local councils also suggest that there is not a lot of backing for climate change initiatives.

8. Participants noted there being economic barriers such as budget thresholds and competing priorities, diverse social barriers, and political barriers such as a limited capacity to attend to all issues, and backlash for proposing change, that prevent policy implementation for climate change.

9. The research sub-question relating to departmental differences was not addressed, given limited representation in certain departments.

10. There were notable differences in responses from participants with over 10 years of work experience, compared to participants with less work experience, across several categories.

3.2   Phase II – Policy Review Findings

For the second phase of the study, planning documents were reviewed for 'Explicit' coverage of climate change (i.e. 'issue addressed with overt reference to climate change'). Specific documents reviewed at the provincial level included the Planning Act and Provincial Policy Statement. Specific documents reviewed at the regional level included the draft Regional Official Plan, Strategic Plan, Environmental Sustainable Strategy, Corporate Greenhouse Gas Inventory and Action Plan, and Transportation Master Plan. At the municipal level, key pieces included

Official Plans, Strategic Plans, green procurement policies, environmental or sustainability strategies, relevant master plans, and other documents as recommended by participants. The findings of the policy review are summarized below.

1. Official Plans appeared to be the most comprehensive document to address climate change, with the City of Waterloo OP having the most use of the term (17), and explicitly addressed climate change across the highest number of indicators (17). Sustainable Waterloo's Regional Carbon Initiative had the second highest use of the term (15), across 11 indicators, and was one of the most frequently referenced documents by participants regarding their climate change initiatives.

2. Air quality was consistently the most readily connected issue to climate change, demonstrating a strong access point to integrate relevant discussions in plans that may lack any recognition. At the same time, the often narrow focus on this issue demonstrates a need to present climate change as more multi-faceted problem - not just relating to air quality, and not just mandating emission reduction strategies.

3. Stormwater management credit programs, by-laws and plans demonstrated that stormwater management is an important action for addressing climate change impacts. Particularly the City of Cambridge master plan presented a noteworthy example of how other municipalities can effectively integrate climate change planning into stormwater management activities. There were minor issues with regards to the type of initiatives recommended (e.g. developing air quality and climate change management plans versus addressing the general land use process). This was an important consideration for the types of outcomes that can be anticipated or achieved. There were also minor issues with the level of detail and structure in certain plans which negates opportunities to provide understanding and reasoning for why certain strategies should be adopted.

4. Troublingly, plans that were thought to have a strong focus on climate change across several categories (e.g. environmental strategies), turned out to not always be the case. However these plans had a particularly stronger focus on certain strategies (communication and collaboration policies, monitoring practices, and more creative initiatives), than what was observed in other plans. These plans also suggested that some jurisdictions may think of climate change as a more long-term problem, rather than a short-term concern. Certain documents that were anticipated to have a strong focus also raised the question of whether date of publication was an important determining factor for integrating climate change information. This turned out to not be the case.

5. Finally, some of the more surprising findings were where information in the plans contradicted or acknowledged barriers reported by participants and where plans reflected on climate change in a passive context (mandating the need for a more active voice).

4. Analysis and Recommendations

The questionnaire responses suggested that there is a perception that climate change is a temporally and geographically distant issue. There is a limited sense of self-efficacy, but a higher need for collective action. Participants recognized a high adaptive capacity in the region and autonomy to take action on climate change. However, there is a need for leadership, a business case approach to action, and a dire need to integrate climate change in the context of other planning issues. The policy review findings on the other hand, highlighted that climate change is recognized in some planning documents, with the highest and most comprehensive

recognition found in some Official Plans. The findings also shed light on the important role of collaborative initiatives for advancing environmental goals. Municipalities appeared to most readily adopt energy efficiency and green purchasing practices, along with air quality improvement practices. The relationship between climate change and air quality is also understood and well-established by municipalities. In terms of the main research question, "what is the relationship between climate change risk perceptions and the implementation of climate related policies", the findings can be summarized into the four guiding frameworks:

1. Need for collaboration: perceptions indicate a need, policy demonstrates feasibility

2. Need for leadership: perceptions suggest it is critical but somewhat limited in practice, policy suggests it already exists

3. Need for integration of climate change in the planning context and other planning issues: perceptions suggest disconnect, policy suggests disconnect

4. Need for presenting climate change as a local issue: perceptions demonstrate a need, policy provides a supporting document

Need for collaboration: perceptions indicated a need, policy demonstrated feasibility

The research identified several ways that collaboration can assist in policy implementation. For example, several jurisdictions were involved in a Regional Carbon Initiative and the relevant planning document reviewed had high recognition of climate change. This demonstrated how partnerships can be formed and supported, how the business case for climate action can be developed and adopted, and how these initiatives can help to maintain a focus on climate change within group activities. The research also identified how collaboration can help to increase knowledge by providing a more informed understanding, as resources and relevant data sets can be shared between communities.

The research also discussed how collaboration can refer to inter- and intra- departmental practices. The current study found that work experience was an important consideration, as participants with over 10 years of experience responded differently across several categories compared to those with less experience. Collaboration between individuals from diverse backgrounds can assist in creating a dialogue on how the planning process can be improved, and how the process of implementing climate-related policies can be further facilitated. Where one group may be hesitant to take action, another group can communicate the urgency to address climate change, while another can present alternatives for action.

Need for leadership: perceptions suggested it is critical but somewhat limited in practice, policy suggested it already existed

The need for leadership was a slightly more difficult issue to address. The questionnaire findings demonstrated that participants viewed this as being necessary for climate change, but it appeared to be somewhat limited in practice. The policy review findings on the other hand, suggested that there already existed a strong leadership quality in the Region. See table below:

Table 3. Sample of planning documents emphasizing leadership

City of Waterloo	
Official Plan	- "The City will play a **leadership** role in energy conservation" (sec. 8.5.2) - "Promotes and exemplifies **leadership** in environmental initiatives" (p. 100)

	- "…City's commitment to act as an effective environmental **leader**" (p. 103) - "Demonstrate environmental **leadership** through sustainable design" (p. 108)
Strategic Plan	- "As a council, we are committed to demonstrating **leadership**"… (p. 3)
Green Procurement Policy	- "The City of Waterloo is committed to becoming a **leader** in Green Procurement" (p. 1) - "As identified in this report, the City has already demonstrated **leadership** in Green Purchasing" (p. 5)
Anti-idling bylaw	- "Idling is a community issue and requires broad participation. As **leaders** in the community, it is important that frontline staff **lead by example** to the public to set a higher standard of behaviour" (Agenda page 392 of 426)

Given that the current study did not explicitly seek to measure leadership, and that this quality came to light only after data was collected, it would not be appropriate to make a conclusion on the relationship. More rigorous research methods and instruments that have a higher reliability and validity in exclusively measuring leadership, would provide a better understanding. That said, the obvious importance this issue had in regards to climate change and policy implementation, certainly warrants a closer examination. Further research is hence, recommended to understand the relationship between leadership in theory and practice.

Need for integration of climate change in the planning context and other planning issues: perceptions suggested disconnect, policy suggested disconnect

With regards to the questionnaire responses, the economic, social and political barriers described by participants, largely painted a picture of how climate change is seen as a separate issue from other planning matters. Items concerning other priorities in policy-making, also suggested this disconnect. At the same time, the policy review revealed an absence of the issue when describing the planning context, and in some cases, referenced climate change passively. This demonstrates that perceptions indicated disconnect, while policy also indicated disconnect. With this in mind, there is a critical need to connect climate change to other priorities and demonstrate how the matter is in-line with other 'pressing issues'. Indeed municipalities may face challenges like infrastructure deficits, and providing daily urban services will certainly require a great deal of financial resources. However, frequent storms and flooding will make it more difficult to provide these services, in turn, requiring even more resources if action is not taken. Likewise, population growth presents a quite demanding challenge for municipalities and will require careful planning and allocation of resources. But at the same time, having a larger population that can be impacted by climate change impacts (e.g. poor air quality, power-outages from severe weather events, water shortages, outbreak of vector-borne diseases, etc.) presents a much greater challenge.

Recognizing that there was an over-emphasis on air quality issues in policy, further illustrates why climate change needs to be connected to diverse issues. This would allow for more creative mitigation and adaptation strategies, such as adopting more sustainable design standards, promoting alternative forms of transportation, creating walkable- or bicycle-friendly communities, increasing public participation and engagement, promoting renewable energy sources, and conserving natural heritage resources.

Need for presenting climate change as a local issue: perceptions demonstrated a need, policy can provide the supporting document

This recommendation is similar to the one before however it looks more closely at the temporal and geographical challenges with climate change. Given the finding that most participants perceived climate change to be a temporally and geographically distant issue, it is important to provide local information on climate change impacts and initiatives, and communicate the issue as being a more local concern. Communicating recent events can help to add a personal element to the issue and help future policy directions (as done in the City of Cambridge Stormwater Management Master Plan). In terms of providing local data, the Cambridge Master Plan also pointed out inconsistency between Environment Canada station rainfall data, and those recorded at the City level. As such, it recommended using local data from the City of Cambridge for more accurate information. This demonstrates how policy can support efforts to present climate change as a local issue.

5. Conclusion

Regarding the second research objective, "is climate change recognized as an issue that requires policy attention", there certainly appeared to be some recognition and awareness of the issue, and participants perceived that their departments can take responsive action. The majority of participants also agreed that local government had a role to play in climate change planning. The larger challenge appears to be in demonstrating political leadership and having key individuals in a communities step forward to 'make the case' for why climate change requires greater attention. Wheeler (2008) suggests that plans are neither sufficient nor necessary for climate action, but they demonstrate that systematic consideration has been dedicated to an issue – enough so that the issue reaches the policy development stage [8]. With this in mind, where there is limited recognition in policy documents, leadership can be demonstrated by having key individuals make the effort to sustain the issue in daily discussions. This research does not aim to assert that one form of leadership will be more effective than another, but rather to realize that there appears to be a gap in what the policy documents are communicating, and what participants identified as being necessary for climate action.

Regarding the third research objective, "what is the current state of climate action on the regional and municipal level", the current study found that there is much room for improvement and identified some of the ways in which various plans can be improved. Municipalities should take note of these missed opportunities and consider them in future revisions. While the current study found that the Official Plan appeared to be the most comprehensive document for addressing climate change (i.e. OPs addressed the most issues with explicit and implicit references), it should be kept in mind that Official Plans generally do not have strong legal power in municipal settings and implementation may not always take place. Rather they present an opportunity to outline long-term goals, and create a dialogue on which issues require greater consideration. An alternative to improving Official Plans would be to strengthen master plans or secondary plans, as they identify areas of an Official Plan that require more specific provisions, and as an amendment to the Official Plan, can be more legally binding.

In closing, the relationship between climate change risk perceptions and implementation of climate-related policies is certainly a complex and somewhat uncertain issue, however asking these questions as the current study has done, can help to address some of this complexity. Municipalities should continue to explore the ways in which climate action can be facilitated and to be cognizant of how various factors might influence risk perceptions and policy implementation.

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7.   Biography

Shireen Aslam is a planner by training and holds a Master of Environmental Studies degree in Planning from the University of Waterloo, and a Bachelor of Arts degree in Honours Psychology and Geography from the University of Guelph. She is currently working with the Natural Heritage, Lands and Protected Spaces Branch at the Ontario Ministry of Natural Resources and Forestry, Policy Division.