7-2019

Enhancing Ontario's Rural Infrastructure Preparedness: Inter-Community Service Sharing in a Changing Climate — Interim Report 2: Provincial Survey Results

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Recommended Citation

Gunson, B. & Murphy, B. (2017). Enhancing Ontario's Rural Infrastructure Preparedness: Inter-Community Service Sharing in a Changing Climate. (pp. 1-22, Interim Report 2: Provincial Survey Results). Brantford: Wilfrid Laurier University and Resilient Communities Research Collaborative.

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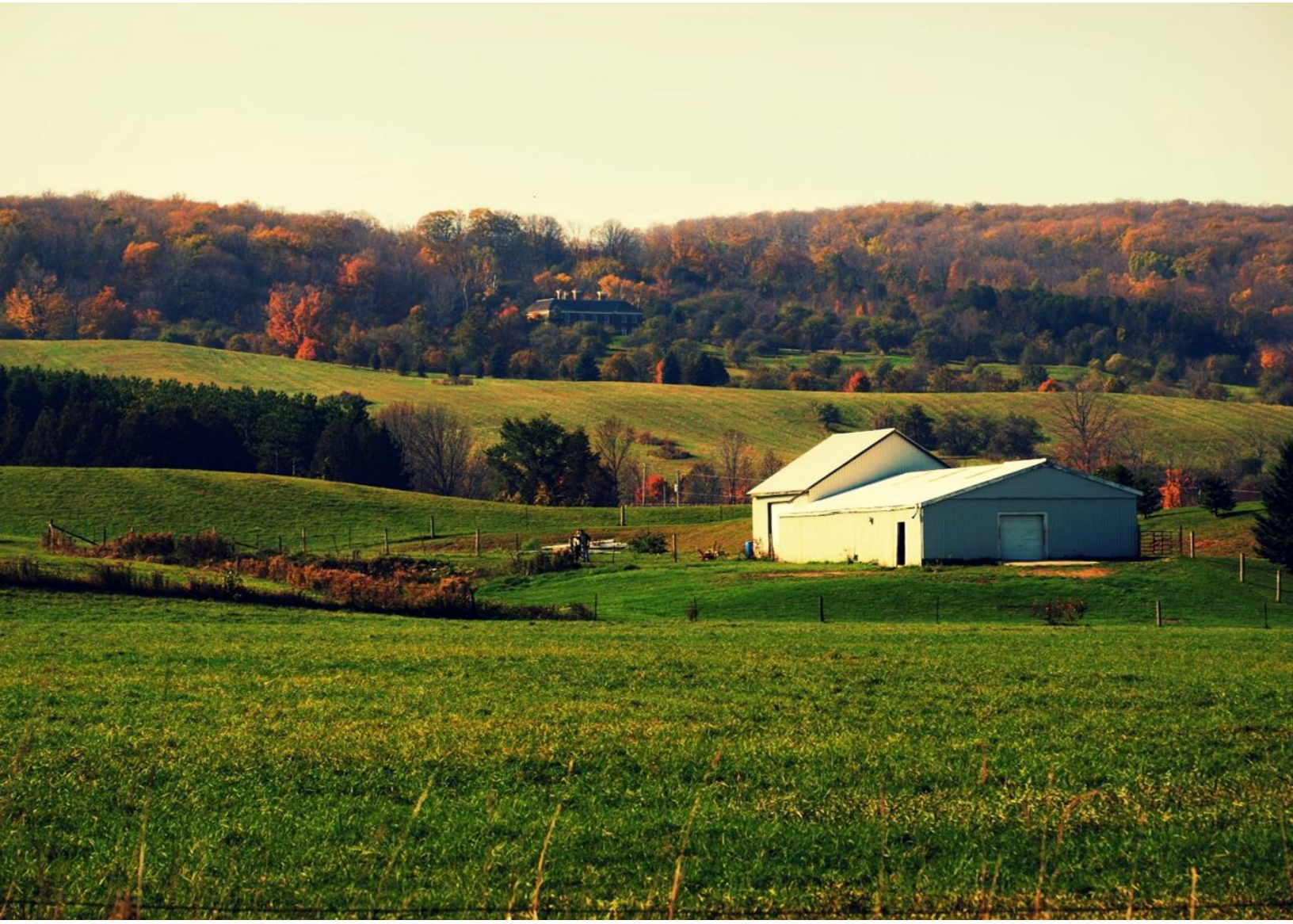
Enhancing Ontario's Rural Infrastructure Preparedness: Inter-Community Service Sharing in a Changing Climate

Interim Report 2: Provincial Survey Results



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Funders - Ontario Ministry of Agriculture, Food, and Rural Affairs (OMAFRA)
Wilfrid Laurier University

Resilient Communities Research Collaborative
www.resilientresearch.ca

July 2019

Contents

This report is part of a larger suite of documents on rural Ontario inter-community service sharing and cooperation which are available from http://www.resilientresearch.ca/research-publications/ including interim report 1 that contains detailed survey development information.

1.0 Introduction

Rural communities draw from their history of doing more with less, strong social networks and an intimate relationship with the natural environment to achieve economic innovation, positive social capacity development and environmental sustainability (Pearson and Burton, 2009). These spaces also experience challenges including preparing for the impacts of climate change (CC). Ontario has already felt some of these effects leading to millions of dollars of damage to the province's infrastructure (Ontario ministry of the environment and climate change, 2015). Exacerbated by an aging infrastructure built by now outdated assumptions, the vulnerability to CC will likely increase and the built-in coping range may not be adequate to handle future climate extremes. The types of municipal-controlled infrastructure most likely impacted, the hazard vulnerabilities and the services interrupted are outlined in Table 1.0 (Pearson and Burton, 2009; Canadian council of professional engineers, 2018).

Table 1.0: Municipal-controlled infrastructure and services impacted by climate change (Adapted from: Canadian council of professional engineers, 2018)

Municipal-Controlled Infrastructure Impacted	CC Hazard Vulnerability	Service Interrupted
Public Works		
Dams	Flood, ice jam, drought	Water management, potable water
Reservoirs, potable water intake and delivery structures	Drought (low water levels), heat waves, flood, ice jam, intense cold, algae blooms	Drinking water quantity/quality, industrial water supply
Sanitary and storm water systems	Intense rain events, wind	Sewage management, water drainage
Bridges, roads and sidewalks	Freeze-thaw cycle, ice accretion, wind, heat wave, flood, winter storm	Transportation
Emergency Management		
Fire, emergency medical services, police, search and rescue, emergency social services	All extreme weather events Where less mitigation and preparedness, cost of response and recovery increased	Could impact multiple services Could be cascading impacts across services

The purpose of the broader research project is to 1) assess the potential of inter-community service cooperation (ICSC) as a possible tool to address the impacts of CC in small (500-7500 pop.) Ontario rural communities south of the Sudbury region and 2) understand the extent to which such collaboration and the impacts of CC are, or could be, embedded within the community's infrastructure (asset) management processes (AMP). For the purposes of this project, rural communities include all Ontario communities who self-identify as rural, or partially rural, and have membership in the Rural Ontario Municipal Association (ROMA). This project is guided by a Project Advisory Board (PAB) consisting of experts representing key rural sectors. The research is focused on the infrastructure sectors most likely affected by CC, that are under the control of Ontario rural communities, and where ICSC shows promise.

1.1 Inter-Community Service Cooperation

ICSC is defined as the provision, sharing, or procurement of infrastructure and services between two or more communities. Across Canada and internationally, ICSC is increasing with research suggesting that the careful use of shared services can contribute to cost savings and improved local service provision (Dollery & Akimov, 2007; LeRoux & Carr, 2007; Province of Nova Scotia, 2014). The Ontario Ministry of Infrastructure asserts that "Opportunities should be pursued to provide infrastructure more efficiently by forging partnerships with other communities…" (Government of Ontario, 2017, p. 3). Common services shared are potable water, wastewater, storm water, road maintenance, infrastructure management, emergency services, procurement, project tendering, permits and inspections (Government of Ontario, 2017). The advantages of using ICSC include sharing knowledge and expertise; spreading the costs and risk among participants; reducing wasteful service reproduction; increasing the ability to meet service level targets and/or offering new/upgraded services; better leverage of grant approvals; and taking advantage of economies of scale (MFOA, 2016). Joint initiatives can contribute to building stronger regions and the development of integrated solutions to increase quality of life beyond the reach of individual communities.

Most Ontario municipalities share some type of service. In Ontario, the top 3 services shared are emergency services, road maintenance and libraries (ROMA/OGRA, 2014). Yet, only 63% of communities with a population under 10,000 share services and smaller communities are less likely to undertake cost sharing and more likely to purchase services from other municipalities as opposed to providing them (KPMG, 2013). Southern Ontario municipalities are more likely to share services that are dependent on infrastructure as compared to northern regions where the greater distances may serve to limit sharing opportunities. Informal arrangements are more common in smaller municipalities as compared to cities (LeRoux & Carr, 2007). For small communities, a good way to initiate ICSC might be to develop relationships through a non-binding joint services committee or begin with a simple opportunity, such as equipment sharing (KPMG, 2014). Applying for joint funding for a major infrastructure project can spread the risks and costs (KPMG, 2013). In relation to municipal bridge rehabilitation work, the Ontario Good Roads Association asserts that when contracts are bundled geographically across communities, increasing the size of the contracts, cost savings, innovation, and operational standardization can be achieved (OGRA/RCCAO, 2013).

When focusing on the most visible impacts from CC, extreme weather events, an ICSC municipal response could include the joint upgrading of water management systems, rerouting transportation, harmonizing building codes and coordinating emergency services and response (Black, Bruce, & Egener, 2010). In terms of increasing climate change preparedness, ICSC presents a host of strengths and challenges that each community must evaluate prior to engaging in ICSC activities (Table 1.2). This research seeks to further understand these factors and develop some insights and best practices to help rural communities maximize their CC preparedness, efficiency and fiscal responsibility.

Table 1.2 - Strengths and challenges of municipal inter-community service cooperation for climate change preparedness.

Strengths	Challenges
- Economic saving (e.g. bridge construction or road maintenance contracts) heightens economies of scale - Bolsters pre-existing relations with neighbouring communities, and has potential to create new relationships - Potential to reduce regional vulnerability to CC (e.g. coordinating emergency services and response) - Increased funding to build climate resiliency into infrastructure projects	- Capacity (financial and personnel) - Political support to form and maintain partnerships - Set-up time requirements - Fear loss of control, authority or identity - Concerns of amalgamation - Limited knowledge of CC impacts and/or viable solutions - Labour relations issues - Service quality loss (e.g. winter road maintenance) - Distance between rural communities inhibits sharing of fixed infrastructures (e.g. water systems)

1.2 Asset Management in Ontario

The asset management process (AMP) is defined by the Ontario government as "…. the process of making the best possible decisions regarding the building, operating, maintaining, renewing, replacing and disposing of infrastructure assets. It helps prioritize infrastructure needs and ensures that investments are made in the right place and at the right time to minimize future repair and rehabilitation costs" (Government of Ontario, 2017, p.15). The objective of AMPs is to maximize benefits, manage risk, and provide satisfactory levels of service to the public in a sustainable manner. Asset management requires a thorough understanding of the characteristics and condition of infrastructure assets, as well as the service levels expected from them. It also involves setting strategic priorities to optimize decision making about when and how to proceed with investments. Finally, it requires the development of a financial plan, which is the most critical step in putting the plan into action (Government of Ontario, 2017).

Ontario communities have been encouraged to undertake a standardized AMP process. AMPs outline the state of local infrastructure (types, age, condition, valuation/replacement cost); expected levels of service (performance measures, external trends/issues); coordinated strategies for maintenance, growth, disposal and renewal including non-infrastructural solutions (integrated planning and land use planning); procurement options, benefits and costs including revenue streams, historic and forecasted costs for the life cycle of the assets, assessment of risk (probability, consequence, vulnerability); and financing options. AMP challenges include lack of familiarity, personnel training, time and finances and data gaps (Ministry of Infrastructure, 2012). This project explores the extent to which AMPs address CC and if ICSC could be used to address some of these shortfalls.

The Ontario government is now making AMP's mandatory. As of January 1st, 2018, Ontario municipalities are subject to O. Reg. 588/17: Asset Management Planning for Municipal Infrastructure, under the Infrastructure for Jobs and Prosperity Act, 2015, S.O. 2015, c.15. Under

the law, every municipality will be required to prepare a comprehensive strategic asset management policy, a plan to maintain core municipal infrastructure, a levels of service proposal, and a publicly accessible asset management plan. Key dates include[1]:

- July 1, 2019: Date for municipalities to have a finalized strategic asset management policy.
- July 1, 2021: Date for municipalities to have an approved asset management plan for core assets (roads, bridges and culverts, water, wastewater and stormwater management) that discusses current levels of service and the cost of maintaining those services.
- July 1, 2023: Date for municipalities to have an approved asset management plan for all municipal infrastructure assets that discusses current levels of service and the cost of maintaining those services.
- July 1, 2024: Date for municipalities to have an approved asset management plan for all municipal infrastructure assets that builds upon the requirements set out in 2023. This includes a discussion of proposed levels of service, what activities will be required to meet proposed levels of service, and a strategy to fund the activities.

1.3 Climate Change in Ontario

In Ontario, CC is already underway (Ministry of the Environment and Climate Change, 2015) and by 2050 an increase in annual average temperature between 2.5-3.7° C is projected. The total amount of precipitation is not expected to change substantially in more southern regions; however, more precipitation is expected in the winter and spring. With increasing southern temperatures, more intense dry periods are expected in the summer months. Projections suggest that more frequent and more intense extreme events are likely and that the risk of disruptions to infrastructure is likely to increase. Flooding from sudden spring melts and intense rain events, high wind events, summer drought, winter ice jams, hail, and extreme cold or hot temperatures are examples of climate-related threats on infrastructure identified by the Canadian Council of Professional Engineers (2018). The impacts of CC are already requiring the adaptation of infrastructure designs and plans, such as the need to retrofit or update storm water infrastructure and wastewater treatment plants (Infrastructure Canada, 2012; Black, Bruce, & Egener, 2010).

Ontario legislation requires local governments to mitigate, prepare and respond to threats within their jurisdictions and to sustain adequate infrastructure to provide a suite of local services (ICLEI, 2012). Infrastructure vulnerability is influenced by the character, magnitude and rate of CC, the sensitivities of the infrastructure to the changes and the capacity to absorb the changes. Undertaking AMP provides the baseline for understanding CC impacts, including risk assessments of potential infrastructure vulnerabilities as well as cost effective response strategies. Municipal preparedness for CC is a function of the range of available options and resources, the organization, nature and characteristics of local infrastructure and access to risk-spreading mechanisms (such as ICSC) (Infrastructure Canada, 2012). Because the impacts will be felt across infrastructure sectors, research suggests that CC preparedness should be integrated, or ‘mainstreamed’, into all day-to day infrastructure planning and management and that and all

[1] Government of Ontario AMP planning regulation available online: https://www.ontario.ca/laws/regulation/r17588

key departments and stakeholders should be consulted in discussing potential preparedness strategies (Boyle, Cunningham & Dekens, 2013).

2.0 Provincial Survey Results

2.1 Background Information

An online survey directed to Ontario public works and community emergency management coordinator staff in 163 communities in small (500-7500 pop.) Ontario rural communities south of the Sudbury region was distributed in June 2018. 34 completed surveys were returned (21% response rate). The survey provided a well-distributed cross-section of community sizes with most communities between 2500-5000 people. The communities larger than 7500 were 7,800, 8,000, 12,000, and 13,000 (Table 2.1). 16 respondents indicated they were elected officials (47%), 18 respondents were public works or other non-elected staff (53%).

Table 2.1 - Online survey population distribution.

Population	< 500	500-999	1000-2499	2500-4999	5000-7500	> 7500
Communities	0	4	4	12	7	4

2.2 Impact of Severe Weather or Climate Change

The responses outline that 28 of the 34 communities (82%) have experienced CC impacts on their infrastructure in the past 10 years (Figure 2.1). Grouping together the responses representing *some impact* and *extensive impact*, the infrastructure most affected were roads and bridges (27), stormwater and wastewater management (15), fire or emergency services (13), community and social infrastructure (9) and drinking water (5) (Table 2.2).

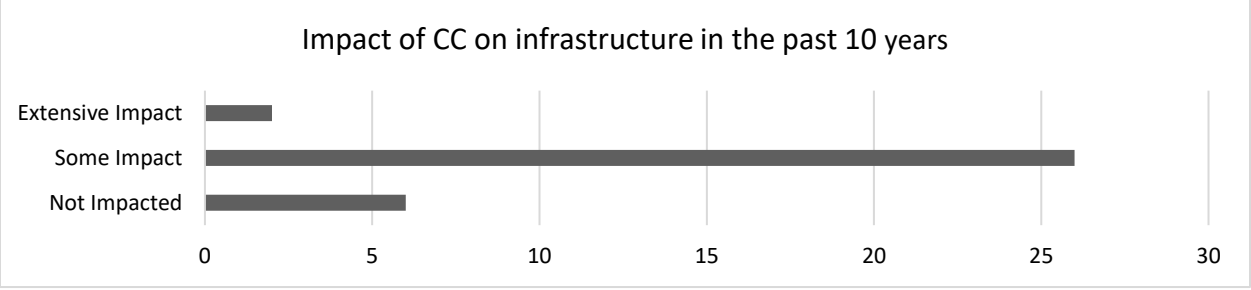

Figure 2.1 - Impact of CC on infrastructure in the past 10 years.

Table 2.2 - Infrastructure most impacted in the past 10 years.

	Not Impacted	Some Impact	Extensive Impact
Municipal roads and bridges	1	24	3
Storm water and wastewater management	13	13	2
Fire or emergency services	15	12	1
Community and social infrastructure	19	9	0
Drinking water	23	5	0

Looking into the future 94% (32) of responding communities indicated that extreme weather or climate change will have an impact on their community's infrastructure in the next 10 years (Figure 2.2). In combining *some impact* and *extensive impact*, the expected impacts were anticipated to be greatest on municipal roads and bridges (27), storm water and wastewater management (22), followed by fire or emergency services (13) (Table 2.3). It's important to note that only 2 respondents felt that their communities had not or would not be impacted by extreme weather or CC. These respondents stated that they had not experienced any events in many years, that they were well prepared and that they didn't have enough information to decide if there will be future impacts.

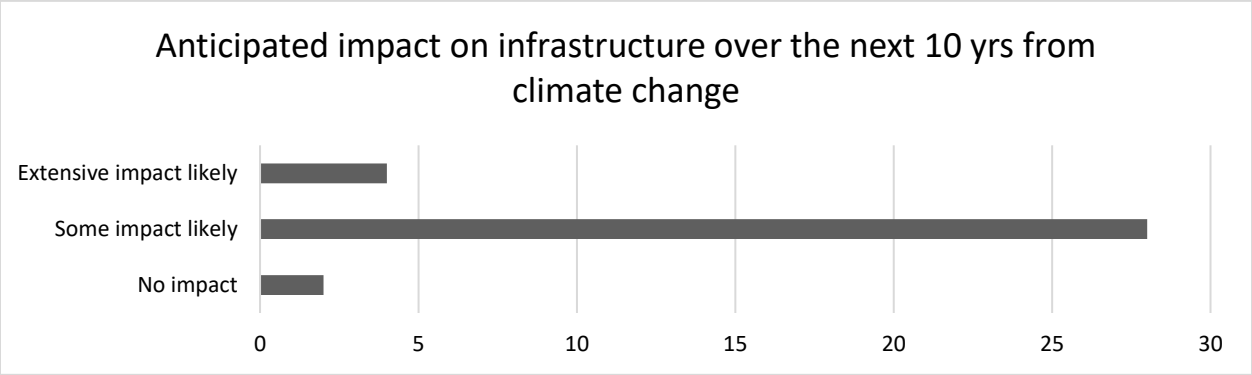

Figure 2.2 - Infrastructure most impacted in the next 10 years.

Table 2.3 - Infrastructure most likely impacted in the next 10 years.

	Not Impacted	Some Impact	Extensive Impact
Municipal roads and bridges	2	25	5
Storm water and wastewater management	10	17	5
Fire or emergency services	8	20	4
Community and social infrastructure	13	16	3
Drinking water	16	16	0

2.3 Climate Change Preparedness

When asked about the measures to prepare for CC or extreme weather, between 16 (47%) and 18 (53%) indicated that they had undertaken 7 of the 11 listed activities (Table 2.4). The top 3 responses were: i) preparedness activities had been integrated into community planning, 18 (53%), ii) municipalities worked with neighbouring communities or regional/county governments to improve preparedness, 17 (50%), and iii) municipalities prepared communication materials for the public, 17 (50%). Then, inquiring about future measures, respondents were asked to identify the activities with the most potential to minimize the impacts of CC or extreme weather. Only two activities garnered significant responses. These were i) incorporate climate resiliency into infrastructure projects, 10 (34%), and ii) work with neighbouring communities or regional/county governments to improve preparedness, 8 (28%) (Table 2.5).

Table 2.4 - Measures undertaken to prepare for climate change or extreme weather.

	Respondents	Percentage
Integrated into community planning (e.g. Official Plan, Asset Management Planning)	18	53%
Worked with neighboring community/communities or regional/county government to improve preparedness of infrastructure and services	17	50%
Prepared communication materials for the public	17	50%
Worked with Conservation Authority	16	47%
Prepared briefing materials for council	16	47%
Used mapping software (e.g. Geographic Information System (GIS)) to identify potential flooding and drought areas	16	47%
Incorporated climate resiliency into infrastructure projects, including new infrastructure, upgrading or preventive maintenance	16	47%
Operations personnel improvements including hiring staff and/or training	11	32%
Obtaining funding to support preparedness efforts	9	26%
Planned/implemented green infrastructure (e.g. Low impact development)	6	18%
Our community has not undertaken any infrastructure preparedness activities	3	8%

Table 2.5 - Measures that have the most potential to minimize the future impacts of climate change or extreme weather*

*This question was provided to 29 communities who indicated more than 1 preparation measure in the previous question.

	Respondents	Percentage
Incorporate climate resiliency into infrastructure projects, including new infrastructure, upgrading or preventive maintenance	10	34%
Work with neighboring community/communities or regional/county government to improve preparedness of infrastructure and services	8	28%
Use mapping software (e.g. Geographic Information System (GIS)) to identify potential flooding and drought areas	2	7%
Integrate into community planning (e.g. Official Plan, Asset Management Planning)	2	7%
Prepare briefing materials for council	2	7%
Obtain funding to support preparedness efforts	1	3%
Work with Conservation Authority	1	3%
Operations personnel improvements including hiring staff and/or training	1	3%
Plan/implement green infrastructure (e.g. Low impact development)	0	0%
Prepared communication materials for the public	0	0%

2.4 Inter-Community Service Cooperation

70% (24) of respondents selected that their community had some type of ICSC set up, 15% (5) chose that they thought their community has established ICSC, while 15% (5) noted that no ICSC had been established (Figure 2.3). The following questions were only distributed to those first 2 categories (e.g. 75% (29) respondents).

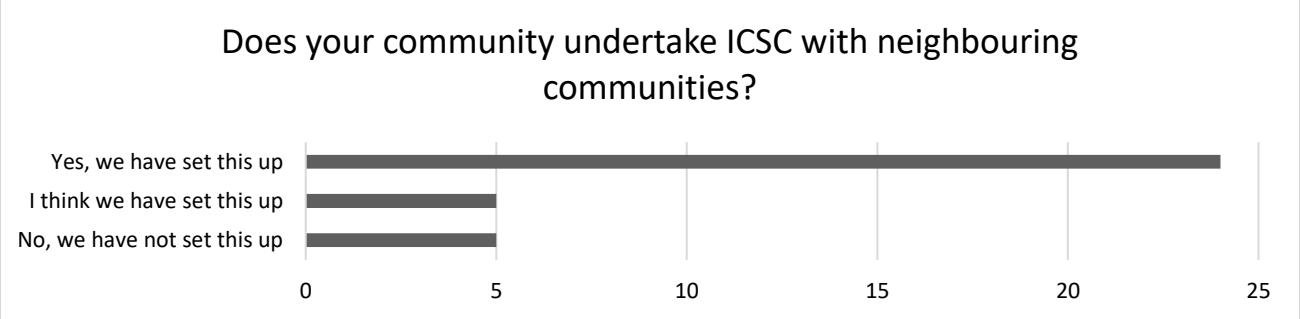

Figure 2.3 – Number of communities undertaking ICSC.

In relation to the services most likely to be impacted by CC or extreme weather, the services most often involved in some type of ICSC arrangement were fire or emergency services, 79% (23), followed by municipal roads and bridges, 58% (17), community and social infrastructure, 48% (14), drinking water, 17% (5), other, 14% (4), and stormwater and wastewater management, 10% (3). *Other* services mentioned by respondents include**:** planning; IT support/building official services; chief building official and other officials; expansion of programs to minimize impact of invasive species (Figure 2.4).

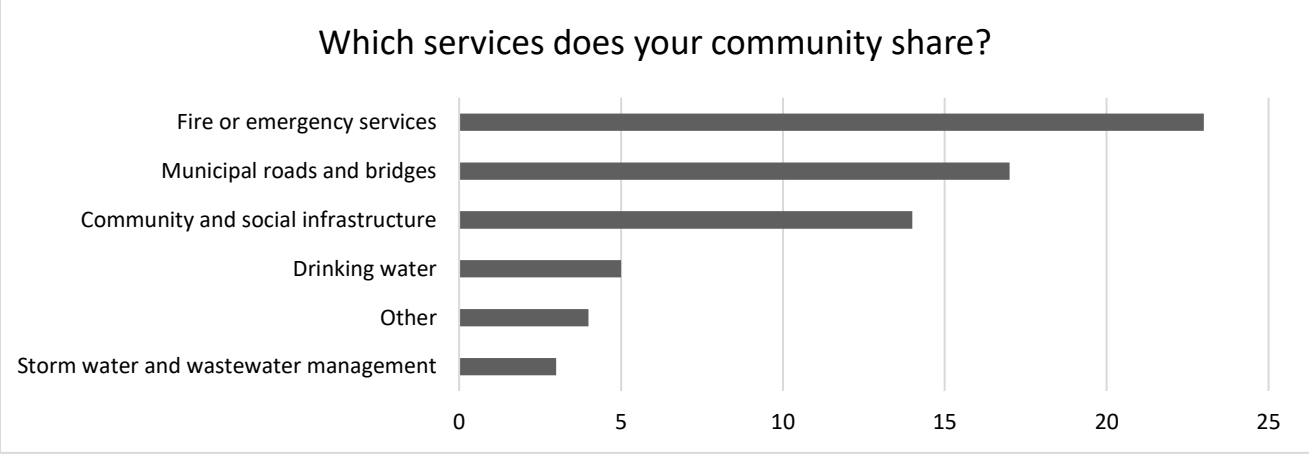

Figure 2.4 - Services shared, provided or purchased.

The top three areas of focus within these cooperative agreements were training, 72% (21), personnel, 62% (18), and service provision, 52% (15) (Figure 2.5).

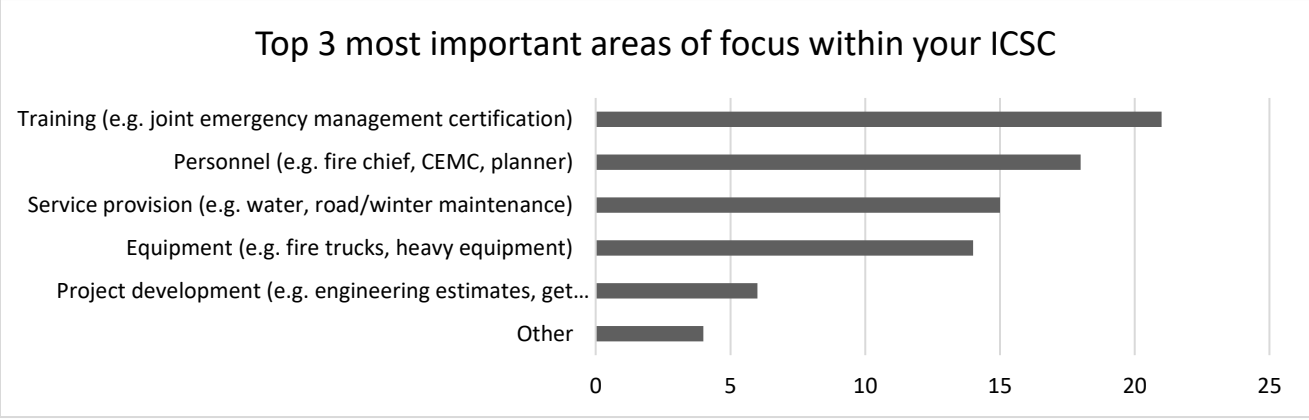

Figure 2.5 - Three most important areas of focus within cooperative agreements.

Respondents were asked a series of questions regarding the factors that influence ICSC (Figure 2.6). These factors were rated on the following Likert scale: *not important*, *somewhat important*, *very important*. The most important factor was strong working relationships with neighbours, followed by the need for agreements to be formalized legal agreements (verses 'handshake' agreements), and that sharing would lead to efficiency benefits (e.g. cost reduction).

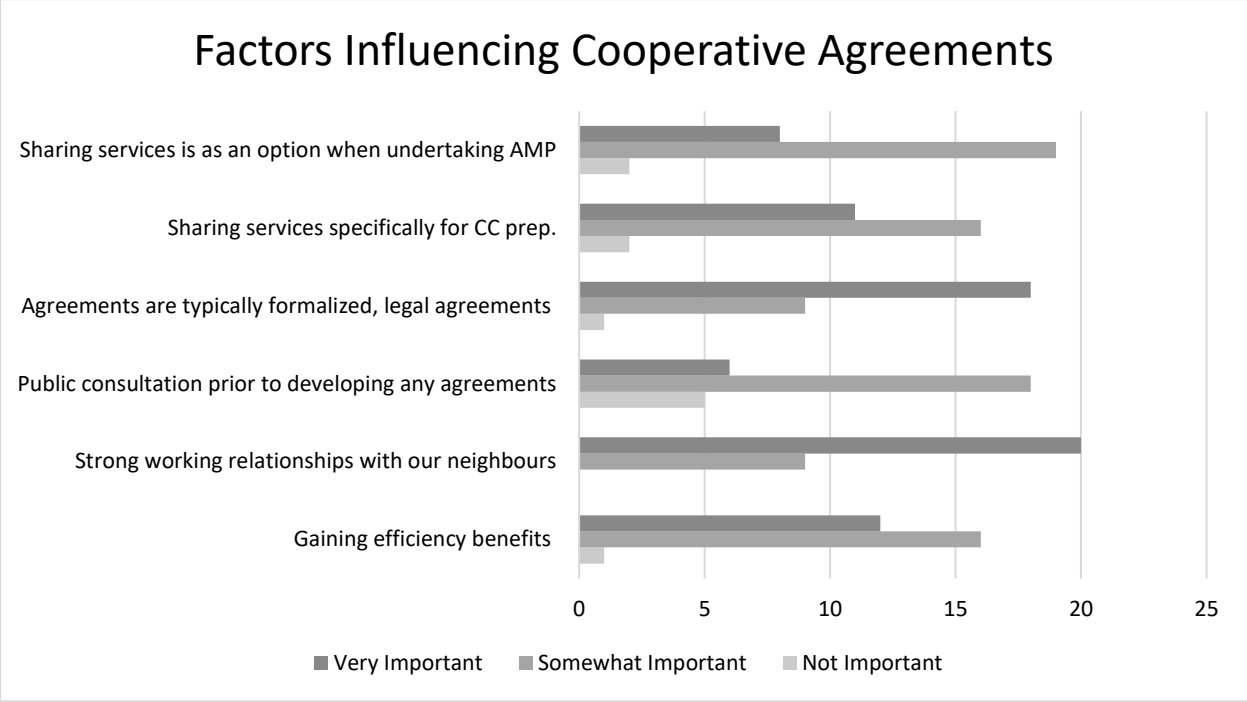

Figure 2.6 - Factors influencing cooperative agreements.

In the future, respondents specified that the cooperative agreements they are most likely to engage in over the next 10 years were fire or emergency services, 41% (12), roads and bridges, 38% (11), community and social infrastructure, 34% (10), stormwater and wastewater management, 24% (7), other, 1% (3), and drinking water, 0.03% (1) (Figure 2.7). Responses to *Other* include**:** likely to build on the emergency management mutual assistance programs already in place; planning and other expertise not available locally; and ferry operations in our island community. 28% (8) respondents indicated that they did not plan to undertake any new cooperative agreements over the next ten years (see Figure 2.8 for reasons why).

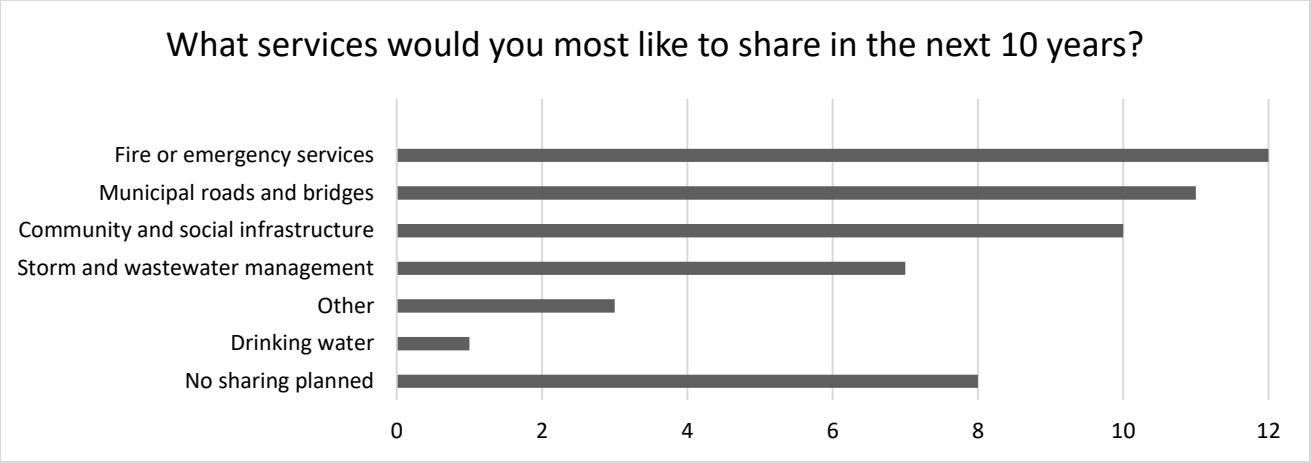

Figure 2.7 - Most likely cooperative agreements over the next 10 years.

Among those 8 communities with no sharing planned (Figure 2.7), the questionnaire inquired about the barriers that impeded ICSC activities (Figure 2.8). Respondents were allowed to pick all that applied. The top 5 barriers were: i) lack of personnel capacity, 100% (8), ii) lack of political support, 88% (7), iii) other, 63% (5), iv) lack of financial capacity, 63% (5), distance between communities is too far, 63% (5), Responses to *Other* include: lack of time/personnel/resources to identify causes of concern and develop shared agreements as remedy; it's not a priority; we share where appropriate, but much of the existing infrastructure will still be in use 10 years from now; we do not provide some services listed; we do it, it is just limited.

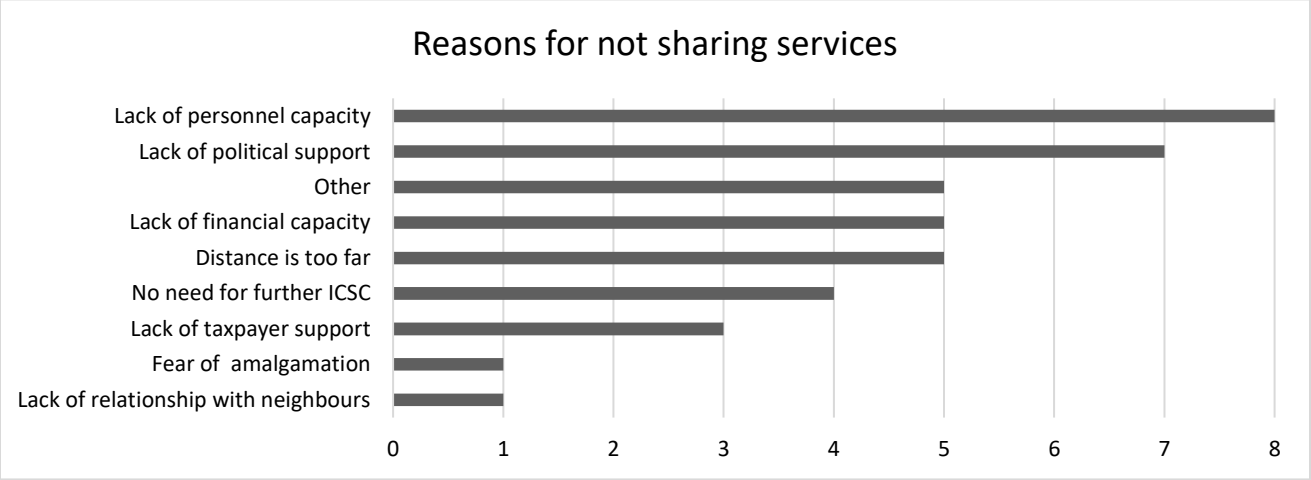

Figure 2.8 – Reasons for not sharing services as cited by 8 respondents whom selected 'no sharing planned' in Figure 2.7 but whom already engage in some form of ICSC.

For the 5 communities who do not currently engage in any ICSC (from Figure 2.3) the two main reasons cited were i) lack of financial capacity, 80% (4), and ii) lack of personnel, 40% (2) (Figure 2.9). One *Other* comment was left: we have tried to work on some joint tendering but have not been successful with others to get involved. When asked if these communities intend to undertake ICSC in the future, 2 indicated that they did not have any future plans, and 2 selected that they may develop an agreement around fire or emergency services (Figure 2.10). The *Other* comments included: mutual aid agreements for fire services have existed for many years; mutual aid only provides assistance with services that are provided by both partners in the agreement; and more recently the municipality is developing an automatic aid agreement to provide first response fire services to a neighboring municipality to cover parts of that municipality that are separate and land-locked.

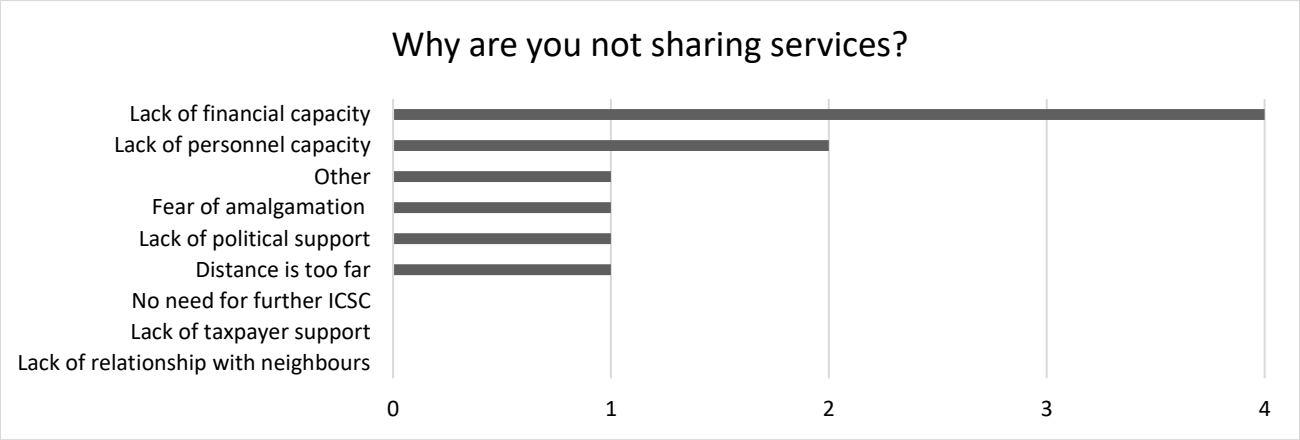

Figure 2.9 - Reasons for not sharing services as cited by 5 respondents whom selected 'we have not set up ICSC' in Figure 2.3.

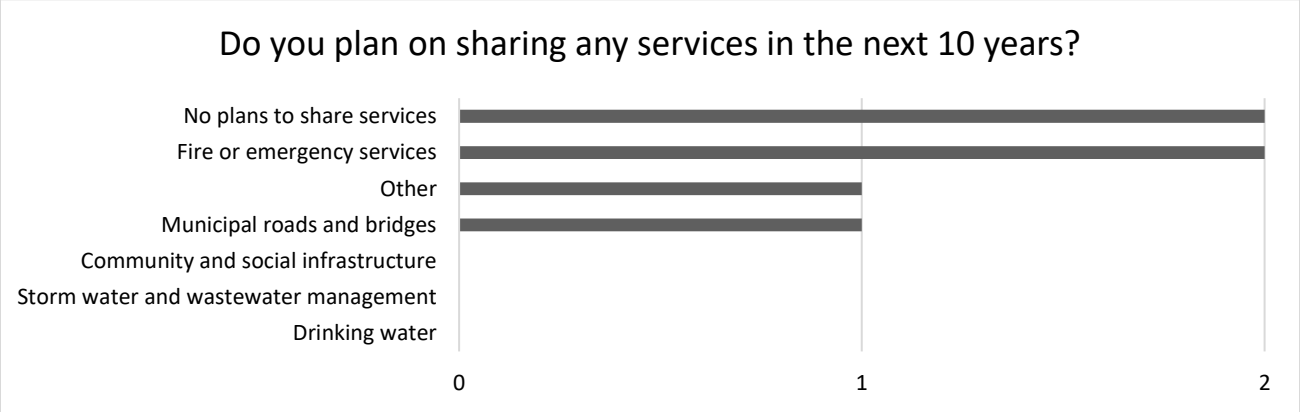

Figure 2.10 - Potential services sharing plans indicated by 5 respondents whom selected 'we have not set up ICSC' in Figure 2.3.

2.5 Asset Management Planning

The following section of the survey asked respondents about their community's asset management plans (AMP). 94% (32) communities said 'yes' to having an AMP in place, with two unsure responses [(1) 'think we have' and (1) 'do not think we have'] (Figure 2.11).

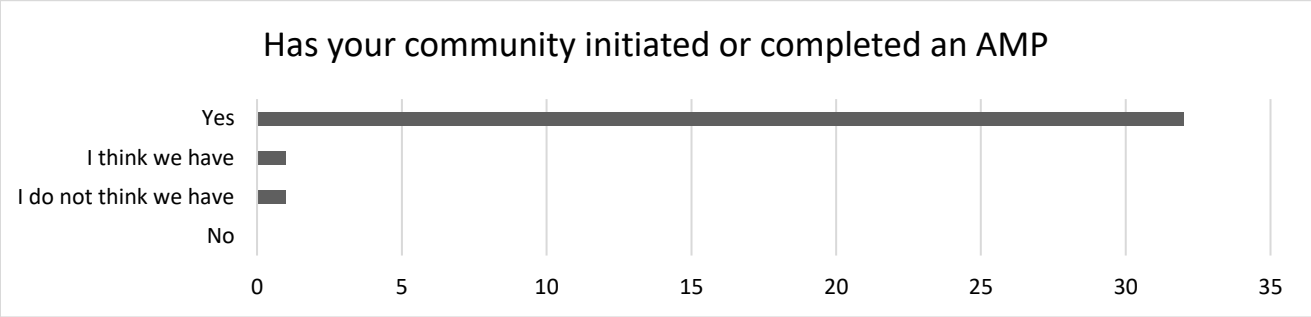

Figure 2.11 – Has your community initiated or completed an AMP?

Figure 2.12 shows that of the 32 'yes' responses from Figure 2.11, that 73% (25) of AMP's had been in place for more than one year, with 2 being in-place for one year or less and 2 still in the development stage.

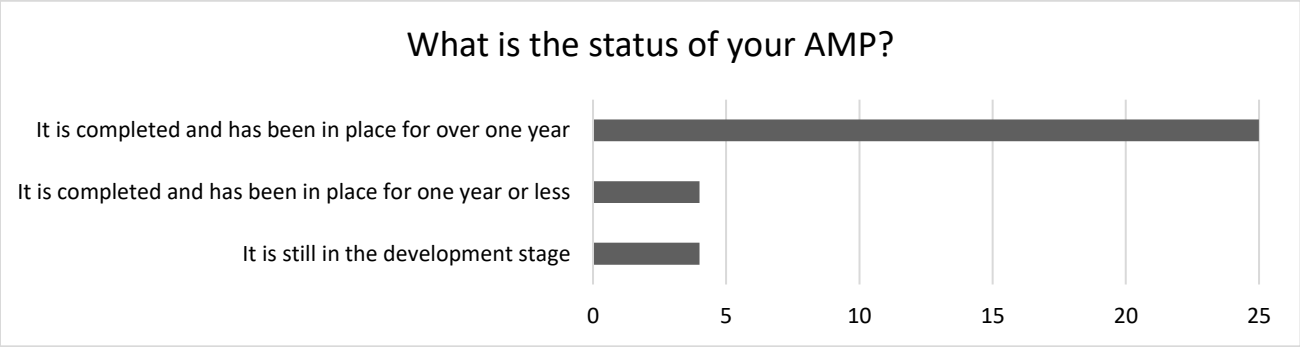

Figure 2.12 – The status of community's AMP (for the 32 communities who are sure they have an AMP in place).

We asked the 33 communities that have (or believe they have) an AMP (from Figure 2.11) to indicate what extent their asset management planning is integrated into the community's regular planning processes (Figure 2.13). 69% (23) indicated that AMP is integrated into some regular planning processes, 12% (4) is integrated into all regular planning processes, with 18% (6)

stating that their AMP is undertaken to meet provincial guidelines but is not integrated into regular planning processes.

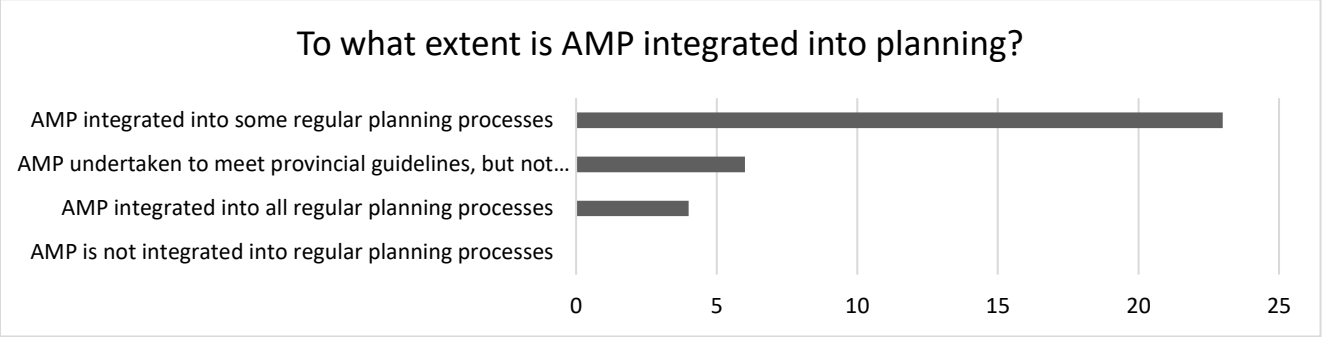

Figure 2.13 - To what extent is asset management planning integrated into your community's regular planning processes (provided to 33 communities that indicated 'yes' or 'I think so' to having an AMP in Figure 2.11).

We asked the 33 communities who have an AMP in place a series of Likert-scale questions to tease-out their thoughts on the link between AMP and extreme weather or CC. Results show that 55% (18) agree that ICSC is a potential solution to address impacts of CC on infrastructure (Figure 2.14). 58% (19) agree that their community considers CC impacts on infrastructure in their AMP (Figure 2.15), yet 45% (15) concede that their community lacks sufficient knowledge about CC impacts to infrastructure to incorporate it properly into their AMP (Figure 2.16).

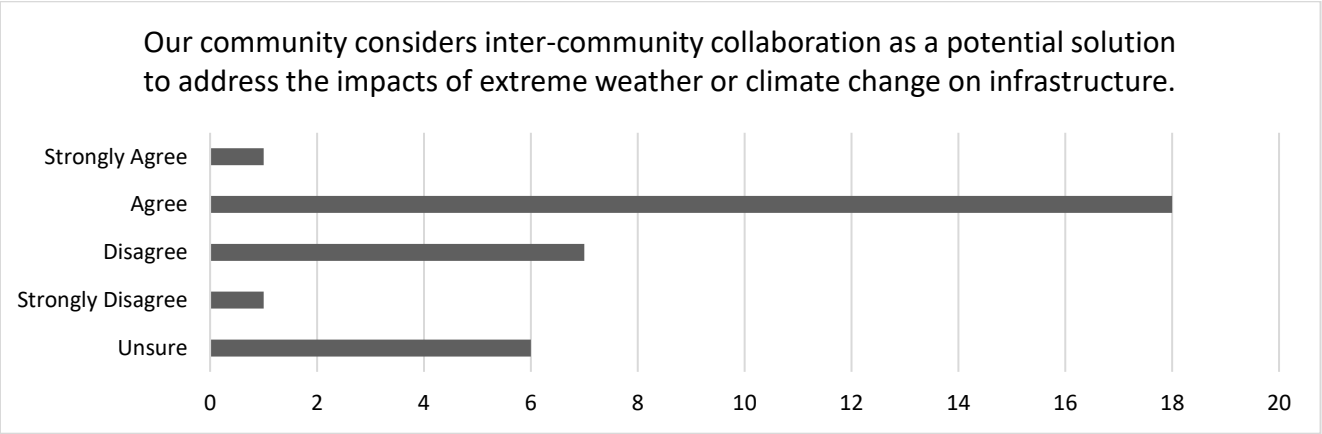

Figure 2.14 - Responses to whether ICSC is seen as a potential solution to address impacts of CC on infrastructure.

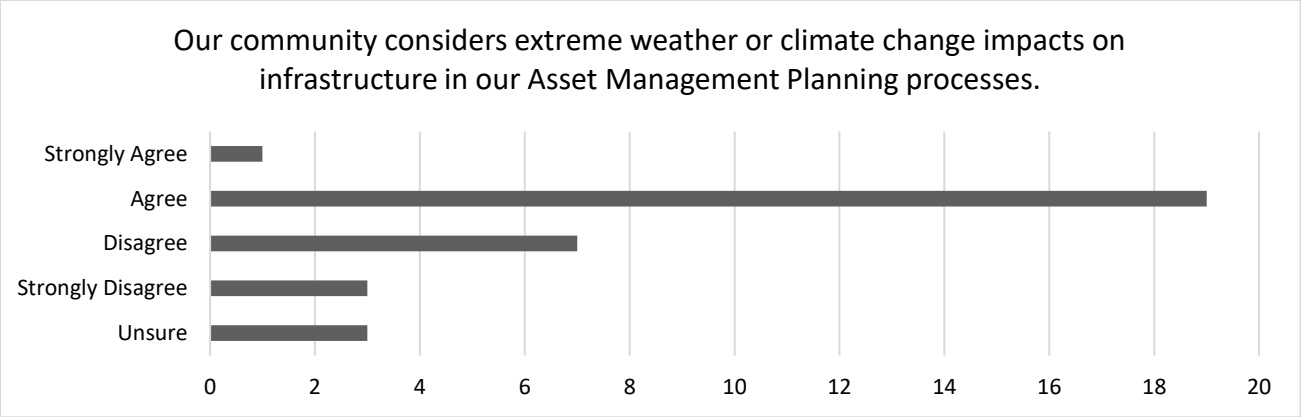

Figure 2.15 - Responses to whether community's consider CC impacts on infrastructure in their AMP.

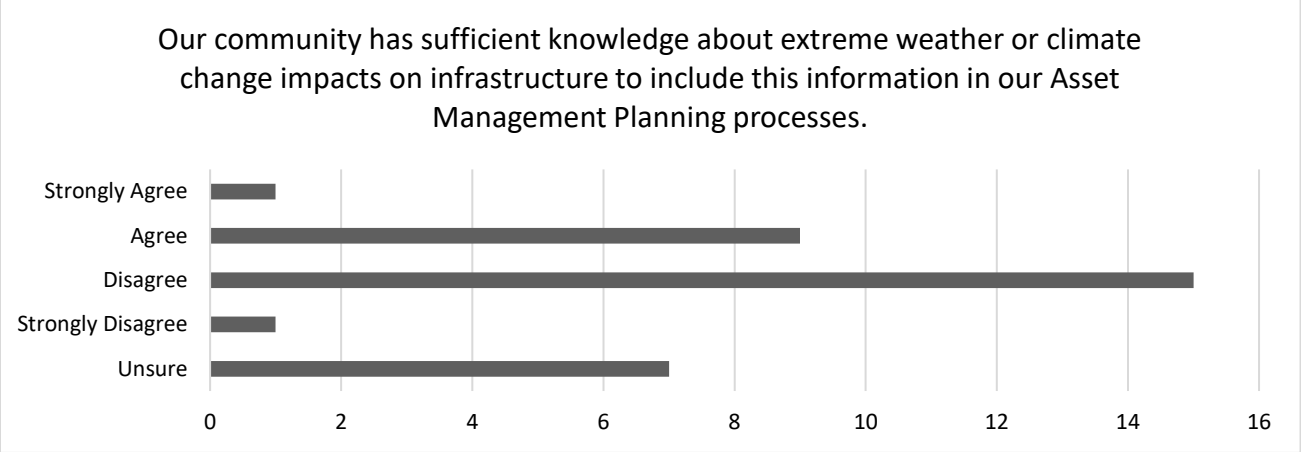

Figure 2.16 - Responses indicating if community's feel they have enough knowledge about CC to include this information in their AMP.

One (1) community indicated they had not undertaken an AMP. The respondent indicated that they do not have the expertise to undertake asset management planning (Table 2.6). When asked if their community was likely to adopt AMP in the next year, the respondent was unsure (Table 2.7). When probed on why s/he indicated 'unsure' about future AMP plans, the respondent indicated that AMP has been proposed in their community, but the needed resources may not be available (Table 2.8).

Table 2.6 - Why hasn't your community undertaken AMP?

Our community is too small to benefit from the Asset Management Planning	0
Our community doesn't have the expertise to undertake Asset Management Planning	**1**
Our community lacks access to, and analysis of, accurate, current or relevant data	0
Lack of council support	0
Our community already has a good infrastructure management process in place so Asset Management Planning is unnecessary	0

Table 2.7 - Is your community likely to adopt the Asset Management Planning process in the next year?

Yes	0
No	0
Unsure	**1**

Table 2.8 - Why are you unsure about your community's future plans regarding the adoption of Asset Management Planning in the next year?

I have no information regarding if our community will implement Asset Management Planning in the next year	0
Asset Management Planning has been proposed, but the timelines are uncertain	0
Asset Management Planning has been proposed, but the needed resources may not be available	**1**

3.0 Discussion

The survey reveals that the impact of severe weather or climate change on infrastructure has been felt by 28 of the 34 communities (82%) in the past 10 years. Respondents commented that their most common extreme weather events were flooding, wind events, freeze-thaw cycles, and ice damage to dams. These results are consistent with previous research in this area[2]. Comments provided by respondents noted broader impacts such as reduced tourism from erratic freeze/thaw cycles during winter months, and a general strain on all levels of municipal government (staff, public works employees, fire/emergency services and general administration) in dealing with CC related problems.

Respondents noted that the increasing costs of weather events are impacting all levels of services and are making it harder to respond effectively. Comments indicate that rural communities experience extreme weather regularly and the impacts appear to be growing from dealing with

[2] Results from a 2017 OMAFRA project on rural municipal emergency management and critical infrastructure are available online (see 'xTREME toolkit'): http://www.resilientresearch.ca/research-publications/

singular events (e.g. a culvert washout) to more regional impacts (such as reduced tourism due to flooding).

ICSC results show that many rural communities are already undertaking some form of service sharing (70% in this study). It is interesting to note that 56% of communities consider ICSC as a potential solution to address the impacts of extreme weather or CC on infrastructure. Of the 8 communities in our study who do not share resources, the three main reasons cited were lack of personnel capacity, 100% (8), lack of political support, 88% (7), and distance between communities, 63% (5). Lack of financial capacity was the most cited reason most communities do not currently plan on engaging in further ICSC. When respondents were asked about activities with the most potential to minimize the impacts of CC or extreme weather, 10 (34%) deemed it important to incorporate climate resiliency into infrastructure projects, and 8 (28%) felt that working with neighbouring communities or regional/county governments to improve preparedness would be important (see Table 2.5).

Virtually all communities in this study (94%) had asset management plans. Several respondents noted that although their municipality has a plan, they don't have the capability to fund this plan. Comments from respondents noted that the needs identified in the AMP are considered loosely as a guideline to what needs to be done and unfortunately get pushed-back after each extreme weather event. The Northern-most small community in our study commented that planning and other expertise are not available where they are located, making it is very hard to incorporate CC impacts into their AMP. The community noted that it is very difficult to plan for future extreme weather events expenses without expertise locally available.

Climate change uncertainty was another common theme that emerged. Respondents commented that no one knows for certain if we should be planning for 100, 500 or 1000 year events over the next 50 years. This is a common concern in the climate change literature, underlying the importance of continued study on how these changes will impact rural spaces and what can be done to prepare for and mitigate the impacts.

4.0 Conclusion

The research suggests that rural communities in Ontario are dealing with increasing impacts from CC and that they often don’t have the resources to cope effectively. While current ICSC and AMP strategies have been somewhat effective, there is a need to identify and showcase innovative strategies that align with community goals/activities, address challenges and capitalize on existing strengths. In phase 3 of this project we are highlighting 10 case studies that outline potential best practices.

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