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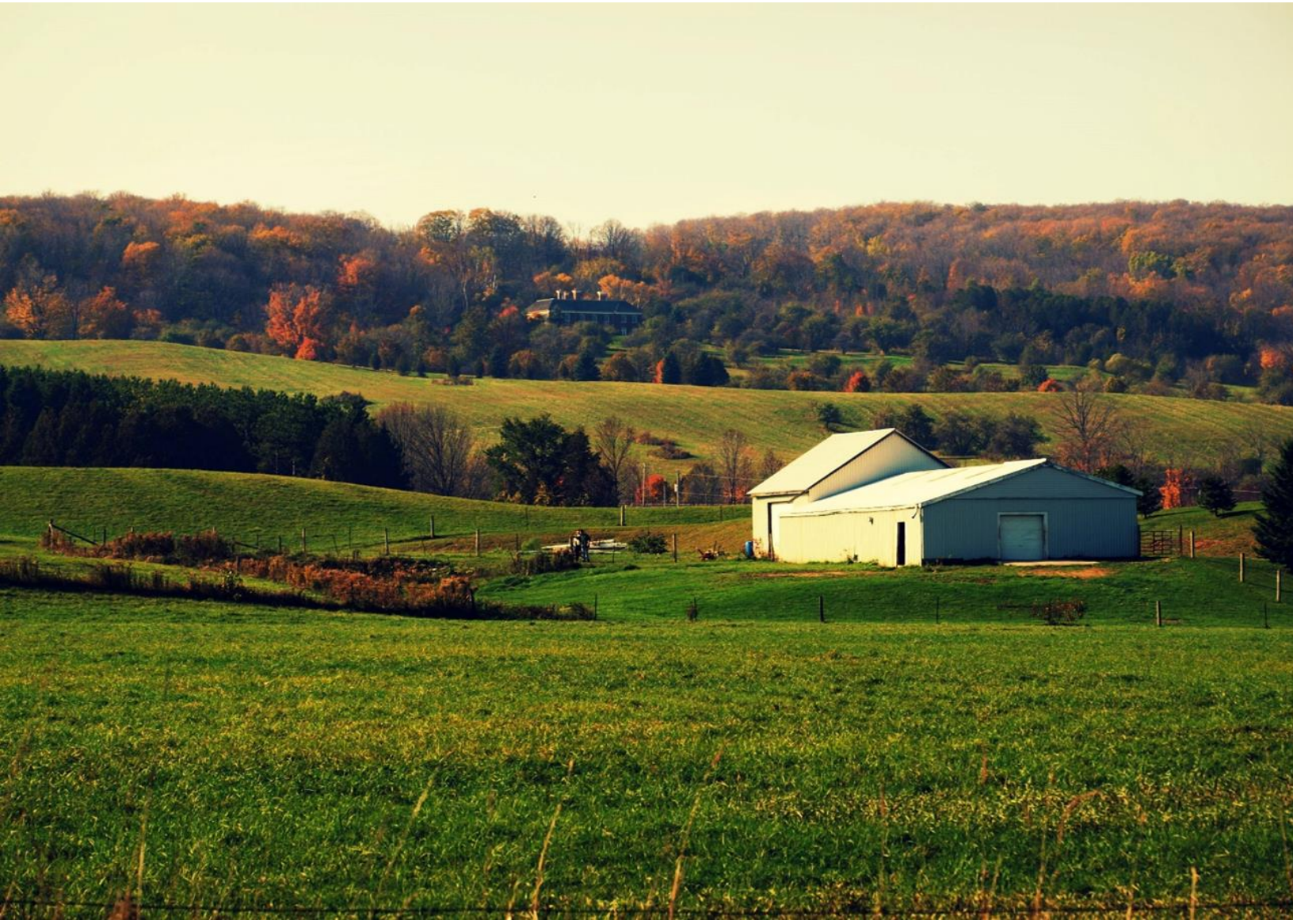
Enhancing Ontario's Rural Infrastructure Preparedness: Inter-Community Service Sharing in a Changing Climate

Final Report: SWOT Analysis and Key Insights



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Long-lasting, efficiently designed and properly maintained infrastructure contributes toward the Frontenac's vision of sustainability. Strong coordination between the County and Townships ensures that infrastructure provides maximum utility at reasonable cost while ensuring minimized environmental impacts (Frontenac County, 2009, p. 31)[1].

1.0 Introduction

This final report draws together the insights from the three-year Ontario Ministry of Agriculture, Food and Rural Affairs (2016-2019) study. The quote above succinctly draws together the vision behind this project: Enhanced, efficient service cooperation that contributes to a sustainable and prepared infrastructure system, while protecting the environmental capital upon which rural economies frequently depend. The purpose of the research project was to 1) assess the potential of inter-community service cooperation (ICSC) as a possible tool to address the impacts of climate change (CC) in small (500-7500 pop.) Ontario rural communities south of the Sudbury region and 2) understand the extent to which such cooperation and the impacts of CC are, or could be, embedded within the community's infrastructure (asset) management processes (AMP). While the conclusions of this report are generalized to represent an overall picture of Ontario rural municipalities, each jurisdiction is distinctive with its own history and geography. Thus, any policy or practitioner recommendations must take into consideration local circumstances, needs and preferences.

This report begins by defining key terms. It then undertakes a brief SWOT (Strengths, Weaknesses, Opportunities and Threats) assessment to draw out key project insights. The SWOT analysis is based primarily on reports written from each of the three stages of the project: key informant interviews, survey and case studies[2]. The questions that guided the SWOT analysis are provided in Table 1. The goal was to identify the range of factors that can either limit or enhance an Ontario rural municipality's ability to undertake service cooperation, with a particular focus on the impacts of CC on its infrastructure and the role of asset management. In this SWOT analysis, the strengths and weaknesses are internal to, and under the control of, the municipality while the opportunities and threats are part of the external environment that can have a direct or indirect impact on the municipality.

[1] See Frontenac case study http://www.resilientresearch.ca/research-publications/
[2] Complete rural ICSC toolkit is available online at http://www.resilientresearch.ca/research-publications/

Table 1 - SWOT analysis: climate change prepared inter-community service cooperation.

Centre of Control	***Enhance***	***Limit***
Internal: Municipal-Controlled Infrastructure	*Strengths* -What do municipalities already have in place and what is going well? -How can AMPs and ICSC enhance CC preparedness?	*Weaknesses* -What are the challenges facing municipal management? -What are the municipal barriers to using AMPs and ICSC effectively?
External: Outside Influences on Municipal-Controlled Infrastructure	*Opportunities* -What outside factors could support and extend what municipalities are already doing? -How can the municipal use of AMPs and ICSC be bolstered to maximize CC preparedness?	*Threats* -What are the broader challenges facing municipalities? -What are the wider risks and roadblocks that could impede the municipal use of AMPs and ICSC in their efforts to improve CC preparedness?

2.0 Key Terms

2.1 Ontario Rural Municipality

Three hundred and thirty-five (75%) of all municipalities in Ontario are either rural or partially rural, as defined through the Rural Ontario Municipal Association. This project undertook key informant interviews, a province-wide survey and targeted case studies to understand rural infrastructure-related service cooperation, asset management planning and the potential to increase CC preparedness.

2.2 Intercommunity Service Cooperation (ICSC)

ICSC is defined as the sharing, procuring or providing of needed infrastructure services with one or more municipalities or other organizations. Research suggests that the careful use of service cooperation can contribute to cost savings and improved local service provision. Types of ICSC agreements include verbal agreements (handshake, informal); memorandums of understanding; bylaw approval; and formal contracts. ICSC can include many different characteristics (e.g. duration, flexibility, costs, breadth) and may be undertaken through a variety of mechanisms (e.g. mutual aid, joint hiring/training, service board/agency).

2.3 Infrastructure

Infrastructure includes the physical structures and human systems, resources and processes that support those structures, including AMP. Municipal controlled infrastructure most likely impacted by CC includes bridges, roads, sanitary and storm water systems, potable water systems (including dams and reservoirs), fire and emergency services (including emergency response, medical services, social services, police and search and rescue). Compared to urban areas, the larger geographic land base and lower average incomes in rural communities leads to additional challenges in delivering services and supporting infrastructure.

2.4 Asset Management Planning (AMP)

AMP is a municipal-level evaluation process undertaken to make evidence-based decisions regarding the building, operating, maintaining, renewing, replacing and disposing of infrastructure assets. Effective AMP can maximize the life cycle of infrastructure assets and provide cost efficient service delivery through the tracking of current costs, service levels and assets, the early identification of risks (including CC), and deterioration and the projection of future infrastructure needs and costs.

2.5 Climate Change (CC)

In Ontario, CC is already underway and by 2050 an increase in annual average temperature between 2.5-3.7° C is projected. Projections suggest that more frequent and more intense extreme events are likely and that the risk of disruptions to infrastructure is likely to increase. The impacts of CC are already requiring the adaptation of infrastructure designs and plans, such as the retrofit of stormwater infrastructure, and wastewater treatment plants are expected to need significant updates.

2.6 Climate Change Preparedness

Preparedness involves undertaking the necessary measures to reduce risk, avoid damage and adjust to CC variability and extremes; developing a state of readiness to minimize loss of life, injury and property damage; the ability to sustain essential functions during a crisis; and the capacity to take advantage of new opportunities. Municipal preparedness for CC is a function of the range of available options and resources including support from higher levels of government, the organization and characteristics of local infrastructure and the nature of local hazards and vulnerability levels.

3.0 SWOT Analysis

3.1 Strengths

Ongoing Service Cooperation Agreements

As expected, service cooperation is quite common across rural municipalities with fire or emergency services and municipal roads and bridges topping the list for services shared. Joint training, personnel sharing, or service provision were the most common areas of focus within these agreements. Deep social capital and strong working relationships with neighbouring or upper tier jurisdictions (e.g. county) are considered to be the most important factor influencing cooperation. The most common form of ICSC is cooperation between two lower tier municipalities. This is followed by lower tier coordination of services with an upper tier government; lower tier municipalities developing a stand-alone entity with other municipalities to provide a needed service; and municipalities sharing space or coordinating service with an outside agency.

Basic Climate Change Preparedness Measures

As time and resources permit, rural municipalities have been undertaking a range of activities that contribute to infrastructure preparedness including integration of CC adaptation into planning, cooperating with neighbouring communities or regional county governments to improve preparedness, preparing educational materials, working with conservation authorities, etc. Looking forward, incorporating climate resiliency into infrastructure projects and working with other jurisdictions are considered to have the most potential to minimize future impacts.

Ongoing Infrastructure Management

On the positive side, most surveyed municipalities and all case study municipalities indicated that service cooperation was often considered or already in place to help address the infrastructure needs of their jurisdictions. Most had completed AMPs and many suggested that their jurisdictions planned on updating their AMPs to include the impacts of CC. Most survey respondents indicated that AMPs are integrated into planning processes.

3.2 Weaknesses

Barriers and Limitations to Service Cooperation

Barriers to service cooperation include lack of personnel capacity (such as employee education and training), political support, limited financial capacity (often related to a smaller tax base and less diversified economic development), lack of knowledge and time to develop service agreements, lower population densities and longer distances between communities. CC preparedness is not usually part of the conversation when service cooperation agreements are considered. Rather, it is an added, but often unconsidered benefit. Further, AMPs and other locally relevant planning and decision-making documents are often silent about service cooperation.

Infrastructure Deficits and the Impact of Climate Change

There is much research across Canada and internationally documenting that municipalities are currently facing enormous infrastructure deficits, mostly due to aging infrastructure. In the current study, infrastructure gaps and budget shortfalls were noted by interview respondents in all of the case study communities. The extreme weather expected under a changing climate is expected to exacerbate this problem. Rural municipalities are often reactive, dealing with extreme weather events as they occur. There is often inadequate consideration of CC projections and risks during infrastructure planning processes as well as less attention to holistic extreme weather contingency funding.

Limitations of Asset Management Plans for Climate-Change Preparedness Decision-Making

The results indicate that there are limitations to the effectiveness of AMPs for evidence-based decision-making. First, communities lack sufficient knowledge about CC impacts to infrastructure and appropriate adaptation measures to adequately inform AMP processes. Second, the AMP process and document was not necessarily well understood by staff and elected officials or by the public, thus limiting its value to local decision makers. Third, since these plans are often completed as point-in-time documents by an outside consultant, the AMPs may not be 'living' documents that are useful in providing up-to-date information or future projections.

Shortage of Integrated and Targeted Climate Change Preparedness Activities

At the local level, given tight budgets and stretched personnel, it has proven difficult for climate change preparedness to be more fully integrated into ongoing municipal activities. Although survey respondents indicated that CC is being integrated into planning, the case study results suggest that rural municipalities are undertaking climate change preparedness activities on a more ad hoc basis, mostly during reconstruction from an extreme weather event such as a culvert washout. Little evidence of the risk of, or preparedness for, CC could be found in the available case study communities' planning,

emergency management or other local documents. Particularly telling were the AMPs, where scant reference to CC considerations could be found.

Impacts from Extreme Weather Events

Virtually all rural municipalities involved with the project had experienced some form of extreme weather event. The most prominent hazard was flooding followed by winter and summer storms, heat related events, and in some jurisdictions, forest fires. Since communities are always the first responders and eventually bear at least some of the reconstruction costs, these events inevitably put additional pressure on already strained local budgets and capacities.

3.3 Opportunities

Rural Municipal Preparedness Within an Interconnected Infrastructure Network

Rural municipalities provide infrastructure services within a nested and interconnected network. For instance, at the simplest level, two municipalities may share responsibility for boundary roads and bridges. Located within watersheds, municipalities may cooperate on flood management with local conservation authorities. Thus, there are multiple ways for municipalities to increase their preparedness through cooperation with broader scale jurisdictions and agencies. Yet, although a municipality may be responsible for roads, bridges, frontline emergency or fire response and other infrastructure services, the capacity to efficiently and effectively deliver services is enabled by broader provincial and federal policy frameworks and infrastructure networks. Effective and cost-efficient rural CC-preparedness is enhanced when these frameworks and networks take into consideration the distinctive needs of rural municipalities.

Predictable, Mitigation-Oriented Funding to Ensure Infrastructure Preparedness

Given that rural municipalities are already facing the impacts of extreme weather events and often have the local knowledge necessary to translate broader directives into doable, effective preparedness, it makes sense to invest in local preparedness. Attainment of rural infrastructure preparedness and long-term planning would be substantially improved if provincial and federal partners established grant programs with reliable annual entitlements and predictable application packages and schedules. Additionally, mitigation funding to proactively address the most likely CC impacts and the recovery of costs incurred when reconstructing infrastructure to more stringent CC standards would further ensure rural municipal preparedness.

Locally Relevant, Down-Scaled Climate Change Projections

Using historic climate trends and extreme weather events does not always capture the future patterns projected under a changing climate. Further, national-level climate models will not give rural municipalities the information they need to make well-informed decisions. Rural municipalities need long-term, locally relevant climatic projections to undertake realistic asset management planning processes and life cycle forecasting. Rural communities might consider obtaining relevant down-scaled climate projections through a cooperative agreement with other jurisdictions within their region or watershed.

3.4 Threats

Demographic Trends

Rural municipalities are often facing the impacts of some larger national demographic trends including aging populations and out-migration. These factors reduce tax dollars and limit the qualified personnel available to address infrastructure needs. However, some municipalities are experiencing overall population growth, seasonal growth due to part-time residents as well as increasing tourism-based industries. These growth factors can also add extra pressure to an already strained rural infrastructure system.

Future Impacts from Climate Change

The project results indicate that extreme weather has impacted rural Ontario municipal infrastructure in the past and that most expect the impacts to continue into the future. The rural infrastructure most affected are roads and bridges, stormwater and wastewater management and fire and emergency services. It will become increasingly important to undertake preparedness activities to mitigate the most likely threats.

4.0 Conclusions

This final report has undertaken a SWOT analysis to address a series of questions related to municipal-controlled infrastructure, asset management planning and climate change preparedness.

Strength/Weaknesses: Overall, municipalities have demonstrated that they are undertaking service cooperation to address some of their infrastructure needs, are using asset management planning processes, to a greater or lesser degree, and have been undertaking some basic CC-preparedness measures. Despite these strengths, rural municipalities are facing a plethora of local circumstances that weaken their capacity to effectively deal with CC. CC-preparedness could be enhanced if rural municipalities could work towards a more proactive agenda. This could involve more fully integrated climate-change considerations into day to day decisions, AMPs more fully addressed the potential infrastructure risks from CC and service cooperation was more fully developed as an option to address service and funding shortfalls.

Opportunities/Threats: There are several broader opportunities and threats that could either bolster or impede the capacity of rural municipalities to use service sharing and AMPs to become more climate-prepared. These include the nested networks within which rural municipalities operate, the need for predictable and mitigation-oriented funding, adequate, down-scaled CC information, demographic trends, and the future impact from extreme weather events. These contexts demonstrate the extent to which rural municipalities are embedded within regional, provincial, national and international scales as well as dependent upon historical and future temporal circumstances. Since these contexts are often beyond local control, a coordinated, multi-scalar approach is needed to support the ongoing efforts of Ontario's rural municipalities.