

This publication is part of the *xTREME toolkit* (eXtreme events Toolkit for Rural Emergency Management Enhancement) which is available online www.resilientresearch.ca as part of a project titled “Ontario Rural Municipal Emergency Management and Critical Infrastructure: Enhancing Planning and Preparedness Capacities for Climate Change Resilience”

Authors

Bryce Gunson (Wilfrid Laurier University)
Dr. Brenda Murphy (Wilfrid Laurier University)

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eXtreme events Toolkit for Rural Emergency Management Enhancement (xTREME) – Summary



A section of washed-out trans-Canada highway 17 and damaged motel from the 2012 flood in Wawa, Ontario. CBC

Given the hazards and risks that rural communities currently face, and can anticipate in the future with a changing climate, it is essential for municipalities to be prepared. The goal of this three year project, entitled '*Rural Ontario Municipal Emergency Management and Critical Infrastructure: Enhancing Planning and Preparedness Capacities for Climate Change Resilience*' was to assess the current emergency management planning and preparedness capacities of rural Ontario municipalities to climate change-related threats across key critical infrastructure sectors. Funded by OMAFRA (Ontario Ministry of Agriculture, Food, and Rural Affairs) and Wilfrid Laurier University (WLU) the project

addresses climate change impacts (particularly on critical infrastructure) and enhances rural community emergency preparedness through a number of sub-projects. The project used a mixed method approach to maximize the validity, reliability and applicability of the study's results¹. Initial key informant interviews and a comprehensive, province-wide survey provided a broad overview of the resiliencies and challenges in managing extreme events across Ontario communities. To delve deeper, two case studies were then undertaken in Wawa and Goderich, Ontario. For each case study, a workshop for disaster responders was followed by participatory community research using photovoice. Photovoice puts cameras into the hands of citizens to visually record their perceptions and ideas. Follow up activities have included the development of a tabletop exercise for emergency responders and climate change projections for the case study communities. The research benefited tremendously from the ongoing feedback of a Project Advisory Board consisting of a range of community, government, and academic stakeholders.

¹ For these and other publications associated with this project, please see: <http://www.resilientresearch.ca/research-publications/> The results of the case study projects can be found at: http://scholars.wlu.ca/ges_mrp/6/ and http://scholars.wlu.ca/ges_mrp/5/



Damaged trees and Sifto salt mine from 2011 tornado in Goderich. Achival photograph from photovoice participant 2 (2016)

The findings from across all sub-projects were used to produce a toolkit entitled xTREME (eXtreme events Toolkit for Rural Emergency Management Enhancement) that draws together the significant findings about the strengths, challenges and opportunities facing rural emergency management in Ontario that takes into consideration the diversity of rural spaces. The toolkit includes a policy brief for decision-makers, a resource guide for practitioners, a tabletop exercise for rural communities, climate change projection methodology and an executive summary. The toolkit can be accessed online through our website at www.resilientresearch.ca under ‘research publications’.

xTREME Toolkit

The policy brief is directed towards decision-makers, particularly at the municipal and provincial government levels. In the policy recommendations we blend identified best practices with specific examples and insights arising from the work completed for this project. After more general recommendations, the brief outlines six strategic recommendations for policy makers.

The resource guide is directed towards emergency management practitioners, particularly at the municipal level. Despite notable strengths, rural municipalities will require ongoing and targeted support from emergency management practitioners to be able to 1) address the distinct vulnerabilities and resiliencies in rural spaces, and 2) actively cope with climate change impacts, including the effects from extreme events on rural critical infrastructure. The guide pulls together key insights drawn from a background review of the literature, interviews, an Ontario-wide survey and two case studies. Practitioners may be particularly interested in two of our final products: a Tabletop exercise focused on an extreme flooding scenario and information about how to obtain locally-relevant climate change projections.

The climate change methodology report focuses on 1) providing the two case study communities with projections of the likely impacts from climate change and associated extreme weather for their locations, and 2) an explanation of the methods used so that other communities can generate their own future climate projections to make relevant decisions on climate adaptation and mitigation. In addition to written instructions, a series of short videos was also produced.



Photovoice participants emphasized the importance of lost trees in Goderich. This picture shows a grove that was affected by the 2011 tornado, now named '*not like any other Sunday grove*' (tornado struck on a Sunday afternoon). Photovoice participant 3 (2016)

The tabletop exercise (TTX) is directed towards community emergency management coordinators and other municipal level practitioners who are involved in emergency management planning (e.g. fire chiefs). A table top exercise (TTX) is a discussion-based exercise used to familiarize players with, or develop new plans, policies, agreements, and procedures. A TTX focuses on strategic, policy-oriented issues. The xTREME TTX is based on a climate change-informed scenario of a flash flood that follows a prolonged period of drought where damage is caused to critical infrastructure. Given that the most onerous part of undertaking a TTX is putting together the simulation package, the suite of documents created provides practitioners a customizable set of tools to run a TTX emergency exercise. The TTX is designed to be used by a wide range of rural communities (very small to large) and incorporates some of the rural challenges identified during the empirical research phases. The scenario is applicable or customizable to a wide range of locations across the province of Ontario.



Flood damaged homes remain in Wawa. Photovoice participant 4 (2016).

The key findings from the project are:

- Sufficient government funding is needed to allow rural communities to upgrade critical infrastructure after a disaster event to mitigate future risk.
- Further government support for rural efforts to access targeted, community-specific knowledge about climate change impacts would be beneficial.
- There is no one-size-fits all definition of ‘rural’. Policy development and levels of support should be tailored to the specific strengths and challenges facing these municipalities.
- There is a need to consider climate change impacts into all local planning initiatives – this is called ‘mainstreaming’ adaptation.
- For rural communities there is a need to broaden the definition of what is considered key infrastructure to include elements of the natural environment and to increase related opportunities to access funding to protect and upgrade such green infrastructure.
- Rural practitioners should advocate for sufficient time and resources to adequately undertake the tasks needed to help their rural community adapt to the expected impacts from climate change.
- Communities could consider coordinating their climate change upgrading efforts with their neighbours to increase the efficiency and effectiveness of adaptation efforts.

We hope that this project and the xTREME toolkit documents will help rural Ontario communities prepare for climate change-related threats across key critical infrastructure sectors. The research team wants to emphasize that outstanding work is already being undertaken to address climate change by communities in Ontario’s rural sector and to advocate for the ‘rural proofing’ and ‘mainstreaming’ of all climate change adaption measures aimed at addressing the impacts from extreme events.

To access and download the xTREME events toolkit documents (free of charge) please see our website www.resilientresearch.ca and click on ‘research publications’.

Please contact the project manager Bryce Gunson at bgunson@wlu.ca or 519-756-8228 Ext. 5405 or the principal investigator Dr. Brenda Murphy bmurphy@wlu.ca with any questions. Our website www.resilientresearch.ca also contains further information on this project, and our other research projects.

