

Risk Management Process in Climate Change Adaptation

Risk is the chance of injury or loss as defined as a measure of the probability and severity of an adverse effect to health, property, the environment or other things of value.¹

Climate Change in Ontario

In Ontario, the average annual temperature has increased by 1.4°C over the last 60 years, and scientists project that by 2050 the average annual temperature in Ontario could increase by 2.5°C to 3.7°C.² Extreme weather events, prolonged heatwaves and wind storms have also become more common.² As our climate continues to change, Ontario will become exposed to more and more climate-related risks (e.g. road washouts², heat related health risks³, and sewer backups⁴).

Even though climate models provide an idea of what the future might look like, there are uncertainties associated with them. Uncertainty is often used as an excuse for action on climate change.⁵

What is Risk Management?

A **risk management process** provides a systematic, information and science-based tool to help decision-makers analyze risks (and potential benefits), and select optimal courses of action¹ even under high uncertainty.⁵ Risk Management helps stakeholders **identify and prioritize** risks associated with climate- (or weather-) related events.¹

Once the risks are identified and prioritized, **adaptation actions or measures** can be developed for risks with the greatest consequence and the greatest likelihood of occurrence.¹

What is Risk Assessment?

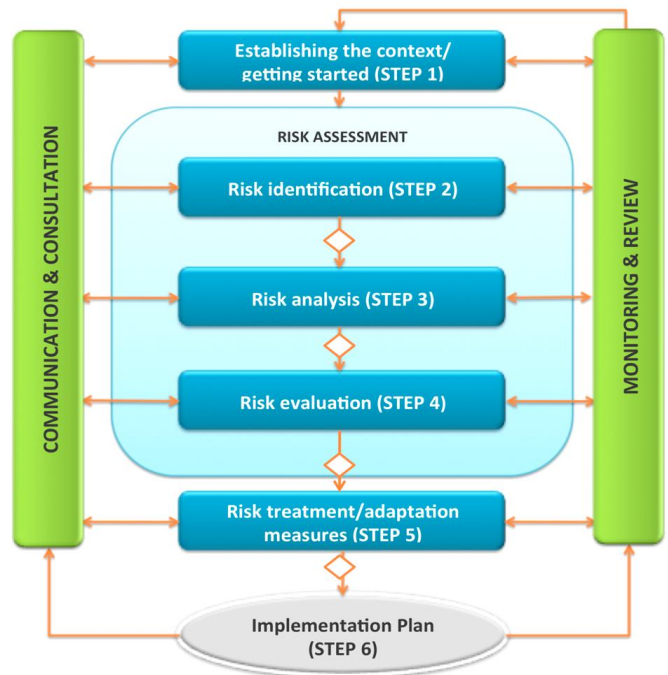
Risk assessment is the part of the risk management process that measures the two attributes that comprise risk - the **magnitude of the consequences**, and the **likelihood that it will occur**.¹

The purpose of risk assessment in the context of climate change is to identify risks and events that may be induced or exacerbated by climate change, and to evaluate the magnitude of their consequences and the likelihood that they will occur.¹

Risk assessment can be a useful tool in adapting to the negative aspects of climate change since it can be used to address a range of climate-related impacts with both a high or low likelihood of occurrence.¹

The completion of each step leads logically to the next or ends the process if the hazard/risk is resolved. It is iterative, and each step can be revisited if new information becomes available.¹

Steps involved in the Risk Management Process (Based on ISO 31000⁶)



Example of a Risk Matrix⁶ – it assists in comparing or prioritizing the various identified risks

Consequences	Very High	Yellow	Orange	Red	Red	Red
	High	Blue	Yellow	Orange	Red	Red
	Moderate	Blue	Blue	Yellow	Orange	Orange
	Low	Green	Blue	Blue	Yellow	Orange
	Very Low	Green	Green	Blue	Blue	Yellow
		Very Low	Low	Moderate	High	Very High
		Likelihood				

Red	Extreme Risk – immediate controls required
Orange	High Risk – high priority control measure required
Yellow	Moderate – some controls required to reduce risk
Blue	Low Risk – controls likely not required
Green	Very Low – do not require further consideration

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Costs of climate and weather related impacts

Ontario has already experienced the impacts of a changing climate:

- In August 2005, a rainstorm washed out Finch Avenue in Toronto severing utility and communication lines and flooding more than 4,200 basements at a cost of almost \$550 million.²
- In 2009, a tornado in Vaughn and Grey County resulted in \$76 million in insurance claims.⁷
- The Town of Goderich was hit by a tornado in 2011, causing \$110 million in damage to the city's downtown core and disruptions in electricity and natural gas utilities.⁷
- The leading cause of property damage in Canada is water from flooding and sewer backups. Water damage costs Canadian insurers and policy holders at least \$1.3 billion every year.⁸

There are several tools and guides available to help:

1. **Adapting to Climate Change: A Guide for Ontario Municipalities** was written to assist Ontario municipalities understand the risks and opportunities of climate impacts and how to manage them.^{3,6}
2. **ICLEI's Changing Climate, Changing Communities: Guide and Workbook for Municipal Climate Adaptation** is a compendium of resources that provide a milestone based framework to assist local governments in the creation of adaptation plans to address the relevant climate change impacts associated with their communities.⁹
3. Insurance Bureau of Canada's **Municipal Risk Assessment Tool** is a web-based tool that will help communities and insurers assess potential infrastructure failure.¹⁰



References

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7. Ontario Ministry of the Environment. 2012. Climate Ready: Ontario's Adaptation Strategy and Action Plan (2011-2014). Presentation at Adaptation Planning in Eastern Ontario
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10. Insurance Bureau of Canada. Municipal Risk Assessment Tool. Accessed from: http://www.ibc.ca/en/Natural_Disasters/Municipal_Risk_Assessment_Tool.asp

Ontario Centre for Climate Impacts and Adaptation Resources

OCCAR

OCCAR specializes in communication of climate impacts and supports adaptation planning to a wide range of stakeholders throughout the province of Ontario.

For more information please visit:

www.climateontario.ca