The Future of Hydrological and Meteorological Services in Canada

An expert panel report

Public hydro-meteorological services are central to the well-being of people across Canada and play a crucial role in public safety, national defence, transportation, agriculture, and energy.

The Future of Hydrological and Meteorological Services in Canada describes the essential functions of a national weather service and how the Meteorological Service of Canada (MSC) could adapt to meet people's changing needs.

Essential functions of Canada's weather service

The MSC serves the country in a number of ways—but it can't do everything. After careful deliberation, the expert panel identified **three indispensable functions** in the current changing context:

1 Backbone infrastructure

Provide and maintain Canada's **backbone infrastructure**, such as a country-wide observation system and modelling capabilities.

2 Protecting people

Issue accurate and timely **warnings and alerts** to save lives and protect property from extreme weather events.

3 Leadership

Engage in **leadership** through careful planning and effective collaboration with partners and the international weather community.

3 trends are changing the way public hydro-meteorological services are created and delivered:

- An expanding information environment and global weather enterprise
- Technological advances, particularly AI and machine learning
- Climate change causing more extreme weather events

These trends, **coupled with changing geopolitical structures and financial constraints**, underscore the need for greater efficiency and adaptability at the MSC.

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AI is advancing weather prediction—but is a complement to, not a substitute for, traditional approaches

- The role of the private sector in the weather enterprise is evolving as new companies emerge to capitalize on technological advancements.
- Key infrastructure updates and the education and recruitment of highly skilled personnel will need to be in place to benefit from technological advancements.
- Canada depends on international data flow to ensure high quality forecasts, but data sovereignty, interoperability, and access will influence collaboration opportunities.

Meeting the needs of users

Warnings need to reach the people who will be most affected

A baseline of information, including warnings, needs to be accessible and consistent across the country

Relationship-building and engagement are essential to delivering on user needs

A diversified and deliberate media strategy is valuable in maintaining public trust

Forecasts and warnings are only valuable if they influence decision-making

Clear and precise messaging about uncertainty helps decision-making

Leadership, communication, and coordination skills are as relevant to the beneficial delivery of hydro-meteorological services as are modelling and forecasting skills

Forecasting change

Canada's weather service has a considerable opportunity to become more efficient, resilient, and innovative in the face of change. Thoughtful prioritization of the MSC's activities, a strategic increase in partner involvement, and a clear understanding of user needs are critical to ensuring high-quality service.