



HOW CAN WE BETTER PREPARE FOR FLOODING?

Our monthly science question: a series that demystifies complex topics with simple, effective answers.

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WHY ARE FLOODS SO COMMON IN QUEBEC?

In Quebec, like in many northern regions where large amounts of snow accumulate, flooding is a recurring issue. Each season brings its own triggers: spring snowmelt, heavy rainfall and flash floods in summer and fall, and ice jams in winter. All these weather-related phenomena can directly and sometimes dramatically increase flood risk.

MODELLING TO BETTER ANTICIPATE FLOODS

To better understand and anticipate these risks, which are becoming more pronounced with climate change, scientists develop different forecasting and analysis tools. That's exactly the expertise of Professor Alain N. Rousseau at the Institut national de la recherche scientifique (INRS)! As an engineer specializing in hydrological modelling, based at the INRS Eau Terre Environnement Research Centre, he and his team create software tools to predict, manage, and analyze flooding hazards.



TWO APPROACHES, TWO PERSPECTIVES, COUNTLESS INSIGHTS

Professor Rousseau's work relies on two key complementary methods: Hydrological forecasting: This method uses weather forecasts as inputs to a mathematical model that predicts river flow rates and identifies potential flood risks. Floodplain mapping: Using hydraulic modelling, this approach defines the areas most likely to flood and helps guide land-use planning decisions.



WHEN METHODS INTERSECT, PREPAREDNESS STRENGTHENS

By combining the results of both approaches, scientists can produce detailed flood-hazard maps that show not just where flooding may occur, but also how severe it could be under different rainfall and river-flow forecasts. These maps support public safety authorities in planning and implementing appropriate emergency measures based on local realities.



SUPPORTING MUNICIPALITIES ON THE GROUND

A concrete example: Professor Rousseau, along with Étienne Foulon (engineer-in-training and research associate at INRS) and Michel Leclerc (engineer and INRS associate professor, retired since 2007), recently helped the regional county municipalities (RCM) of Vaudreuil-Soulanges and Argenteuil update their flood-zone maps.

These maps will help municipalities identify vulnerable sectors, strengthen local resilience, and advise residents on preventive measures for their homes. Highlighting the importance of this work for public safety, the project is funded by the Quebec Ministry of Municipal Affairs and Housing, supporting efforts to prepare for the unpredictable.