

Institute for Catastrophic Loss Reduction
IFI Reelated Activities

Expected Output No. 1 (e.g. Research Agenda – Short term Point 4 “Establishment of floods susceptibility indicators based on community vulnerability and resiliency”) OR (new Activity)

ACTIVITY (A) *Survey to identify risk perceptions and mitigative behaviour of homeowners who have experienced sewer backup flooding in Edmonton and Toronto, Canada*

1) Objectives: Identify risk perceptions, perceptions of attribution of responsibility for sewer backup flooding, identify actions taken by homeowners to mitigate sewer backup flood risk. Apply statistical tests to identify factors that affect perception and behavioural adjustments to sewer backup hazard. Discuss municipal approaches to encouraging property-level sewer backup damage mitigation.

2) Type of IFI activity (please mark the relevant, please prioritize)

<input checked="" type="checkbox"/> 1	Research	<input type="checkbox"/>	Education/Training
<input type="checkbox"/>	Information Networking	<input checked="" type="checkbox"/> 2	Technical Assistance

3) Thematic Dimension of IFI (please mark the relevant, also multiple answers)

<input checked="" type="checkbox"/>	Flood Vulnerability	<input checked="" type="checkbox"/>	Flood Risk Management
<input type="checkbox"/>	Governance and Participation	<input type="checkbox"/>	Early Warning / Emergency Management

4) Geographical Scope (international, national, sub-national, local)

Two local/municipal case studies, one located in the province of Ontario, the other in the province of Alberta, Canada

5) Expected Outcomes:

Statistical data and discussion of sewer backup flood risk perceptions and mitigative behaviour

6) Time Schedules:

2007

7) Methodologies used/ applied:

Telephone administered survey, systematic random sampling, geo-targeted to areas with high rates of homeownership, sample of 805. Sub-samples included: 200 homeowners who sustained damages from sewer backup in Edmonton, 200 homeowners who sustained sewer backup damages in Toronto, 200 homeowners who had never sustained damages from sewer backup in Edmonton, 205 homeowners who had never sustained sewer backup damages in Toronto.

8) Partners involved:

Institute for Catastrophic Loss Reduction

9) Related Events (conferences, other projects, initiatives)

n/a

10) **Target Group/End user** (e.g. disaster management, urban planning, science)
Municipal governments, urban planning, urban infrastructure management, private homeowners, insurance industry

11) **Report / Output documents / Website**

Sandink, D. (2007). Sewer Backup: Homeowner Perceptions and Mitigative Behaviour in Edmonton and Toronto. Institute for Catastrophic Loss Reduction, Research Paper Series #44. Institute for Catastrophic Loss Reduction: Toronto. Available from:
<http://www.iclr.org/pdf/ICLR%20Report%20sewer%20backup.pdf>

12) **Interlinkages between activities / Overlaps**

n/a

ACTIVITY (B) *Exploring homeowner flood insurance in Canada*

1) Objectives: Developing discussion paper to explore flood insurance for homeowners in Canada, facilitating dialogue between insurance industry and government on the topic of homeowner-level flood insurance. Understanding the various components necessary to implement homeowner-level insurance program in Canada, assessing current state of components, exploring possible insurance schemes, identifying insurable flood risks, discussion of integration of flood insurance into current flood management processes in Canada. Proposing possible flood insurance products.

2) Type of IFI activity (please mark the relevant, please prioritize)

- | | | | |
|---------------------------------------|------------------------|---------------------------------------|----------------------|
| <input checked="" type="checkbox"/> 1 | Research | <input type="checkbox"/> | Education/Training |
| <input checked="" type="checkbox"/> 3 | Information Networking | <input checked="" type="checkbox"/> 2 | Technical Assistance |
-

3) Thematic Dimension of IFI (please mark the relevant, also multiple answers)

- | | | | |
|-------------------------------------|------------------------------|-------------------------------------|--------------------------------------|
| <input checked="" type="checkbox"/> | Flood Vulnerability | <input checked="" type="checkbox"/> | Flood Risk Management |
| <input checked="" type="checkbox"/> | Governance and Participation | <input type="checkbox"/> | Early Warning / Emergency Management |
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4) Geographical Scope (international, national, sub-national, local)

National

5) Expected Outcomes:

Discussion papers on insuring flood damages for private homeowners in Canada, exploration of a homeowner-level flood insurance product.

6) Time Schedules:

2008-2010

7) Methodologies used/ applied:

Discussions with stakeholders from federal, provincial, local, municipal governments, primary insurance industry, reinsurance industry, academia, NGOs. Literature reviews, modeling of expected flood losses in Canada under insurance scenarios. Initially, case studies of Alberta, British Columbia, Quebec and Ontario will be explored.

8) Partners involved:

Institute for Catastrophic Loss Reduction, Swiss Re Canada

9) Related Events (conferences, other projects, initiatives)

n/a

10) Target Group/End user (e.g. disaster management, urban planning, science)

Federal government, provincial governments, local/municipal governments, primary insurance industry, government relief program stakeholders, watershed management groups, emergency managers, finance departments, reinsurance industry, academia, flood management stakeholders

11) Report / Output documents / Website

n/a

12) Interlinkages between activities / Overlaps

n/a

ACTIVITY (C) *Development of a System Dynamics Model for Integrated Flood Management*

1) Objectives: The objective of this research is to develop a system dynamics model which will help to foresee the future needs for balancing development needs and flood risk. The proposed model would help to minimize loss of life and as well help to alleviate poverty assisting to maintain a pristine environment. This research also considers the adaptive capacity to climate variability and changes.

2) Type of IFI activity (please mark the relevant, please prioritize)

- | | | | |
|----------------------------|------------------------|----------------------------|----------------------|
| <input type="checkbox"/> 1 | Research | <input type="checkbox"/> 3 | Education/Training |
| <input type="checkbox"/> 1 | Information Networking | <input type="checkbox"/> 2 | Technical Assistance |

3) Thematic Dimension of IFI (please mark the relevant, also multiple answers)

- | | | | |
|-------------------------------------|------------------------------|-------------------------------------|--------------------------------------|
| <input checked="" type="checkbox"/> | Flood Vulnerability | <input checked="" type="checkbox"/> | Flood Risk Management |
| <input checked="" type="checkbox"/> | Governance and Participation | <input type="checkbox"/> | Early Warning / Emergency Management |

4) Geographical Scope (international, national, sub-national, local)
International

5) Expected Outcomes:

Methodology and computer based decision support tool for the implementation of main principles of integrated flood management.

6) Time Schedules:

2008-2011

7) Methodologies used/ applied:

System dynamics simulation.

8) Partners involved:

Institute for Catastrophic Loss Reduction, The University of Western Ontario, Institute of Water Modelling - Bangladesh

9) Related Events (conferences, other projects, initiatives)

n/a

10) Target Group/End user (e.g. disaster management, urban planning, science)

Federal government, provincial governments, local/municipal government, watershed management groups, emergency managers, flood management stakeholders

11) Report / Output documents / Website

Website: <http://www.eng.uwo.ca/research/iclr/fids/nserc-floodmgmt.html>

12) Interlinkages between activities / Overlaps

n/a

ACTIVITY (D) A New Methodology for Flood Forecasting

1) Objectives: A real-time flood-forecasting system which integrates different hydrometeorological factors will be developed in this study. The Artificial Neural Network (ANN) approach will be applied in modeling rainfall-runoff in the Upper Thames river basin, Ontario, Canada. With the help of proposed system, the likelihood of flood occurrence in the near future will be quantified and then used as a basis for decision-making and operational management in the flood affected locations.

2) Type of IFI activity (please mark the relevant, please prioritize)

<input type="checkbox"/> 1	Research	<input type="checkbox"/> 3	Education/Training
<input type="checkbox"/>	Information Networking	<input type="checkbox"/> 2	Technical Assistance

3) Thematic Dimension of IFI (please mark the relevant, also multiple answers)

<input checked="" type="checkbox"/>	Flood Vulnerability	<input checked="" type="checkbox"/>	Flood Risk Management
<input type="checkbox"/>	Governance and Participation	<input checked="" type="checkbox"/>	Early Warning / Emergency Management

4) Geographical Scope (international, national, sub-national, local)

International

5) Expected Outcomes:

Methodology and computer based flood forecasting tool.

6) Time Schedules:

2007-2010

7) Methodologies used/ applied:

Artificial Neural Networks.

8) Partners involved:

Institute for Catastrophic Loss Reduction, The University of Western Ontario, Ministry of Higher Education of Malaysia, University of Technology, Malaysia

9) Related Events (conferences, other projects, initiatives)

n/a

10) Target Group/End user (e.g. disaster management, urban planning, science)

Federal government, provincial governments, local/municipal government, watershed management groups, emergency managers, flood management stakeholders

11) Report / Output documents / Website

Website: <http://www.eng.uwo.ca/research/iclr/fids/mhem-flood.html>

12) Interlinkages between activities / Overlaps

n/a

ACTIVITY (E) *Water Resources Decision Making Under Spatially Variable Risk in the Urban Environment*

1) Objectives: The main objective of the proposed research is to develop a risk-based methodology for design, planning and management of water supply and drainage systems that is (a) able to equally treat qualitative and quantitative uncertainty through the use of fuzzy reliability criteria; and is (b) able to assess spatial variability of risks. In order to evaluate utility of the developed methodology we will focus on the practical problem of water supply mains replacement prioritization as a strategy for leakage reduction.

2) Type of IFI activity (please mark the relevant, please prioritize)

Research

Education/Training

Information Networking

Technical Assistance

3) Thematic Dimension of IFI (please mark the relevant, also multiple answers)

Flood Vulnerability

Flood Risk Management

Governance and Participation

Early Warning / Emergency Management

4) Geographical Scope (international, national, sub-national, local)

International

5) Expected Outcomes:

Methodology and computer based tools for spatial flood risk management.

6) Time Schedules:

2007-2010

7) Methodologies used/ applied:

GIS, Fuzzy set theory, System dynamics simulation.

8) Partners involved:

Institute for Catastrophic Loss Reduction, The University of Western Ontario, Public Safety and Emergency Management Canada

9) Related Events (conferences, other projects, initiatives)

CSCE, 4th ISFD, CWRA

10) Target Group/End user (e.g. disaster management, urban planning, science)

Federal government, provincial governments, local/municipal government, watershed management groups, emergency managers, flood management stakeholders

11) Report / Output documents / Website

Publications:

- Ahmad, S., and S.P. Simonovic, (2007) "A Methodology for Spatial Fuzzy Reliability Analysis", *Applied GIS Journal*, 3(1):1-42, (<http://arrowprod.lib.monash.edu.au:8000/access/detail.php?pid=monash:5115>).
- Simonovic, S.P., and S. Ahmad, (2007) "A New Method for Spatial Fuzzy Reliability Analysis of Risk in Water Resources Engineering Management", *Open Civil Engineering Journal*, 1:1-12, (<http://www.bentham.org/open/tociej/openaccess2.htm>).
- Ahmad, S.S. and S.P. Simonovic, (2007) "A New Method for Spatial and Temporal Analysis of Flood Risk", Proceedings of the *18th Canadian Hydrotechnical Conference-Challenges for Water Resources Engineering in a Changing World*, August 21-24, CD-ROM paper HYD-059, 10 pages.
- Simonovic, S.P., (2007) "Fuzzy reliability analysis of floods: an approach for integration of objective and subjective risks", in *Reducing the Vulnerability of Societies to Water Related Risks at the Basin Scale*, editors A. Schumann and M. Pahlow, IAHS Publ. no. 317,362-372.
- Ahmad, S., and S.P. Simonovic, (2008), "2-D hydrodynamic modeling for evaluation of flood risk in space and time", *CD Proceedings*, 4th International Symposium on Flood Defence: Managing Flood Risk, Reliability and Vulnerability, edited by S.P. Simonovic, and P. Bourget, Paper 30, 9 pages.

Website: <http://www.eng.uwo.ca/research/iclr/fids/mhem-flood.html>

12) Interlinkages between activities / Overlaps

n/a

ACTIVITY (F) *Floodplain Mapping in the Upper Thames River Basin*

1) Climate change impact study completed for the Upper Thames River Basin suggests that the floods in the basin will be more frequent and more severe. In this project with assistance of the Upper Thames River Conservation Authority we will assess the potential change of the floodplains under the impact of climate change.

2) Type of IFI activity (please mark the relevant, please prioritize)

<input type="checkbox"/> 1	Research	<input type="checkbox"/> 3	Education/Training
<input type="checkbox"/>	Information Networking	<input type="checkbox"/> 2	Technical Assistance

3) Thematic Dimension of IFI (please mark the relevant, also multiple answers)

<input checked="" type="checkbox"/>	Flood Vulnerability	<input checked="" type="checkbox"/>	Flood Risk Management
<input checked="" type="checkbox"/>	Governance and Participation	<input checked="" type="checkbox"/>	Early Warning / Emergency Management

4) Geographical Scope (international, national, sub-national, local)

Local

5) Expected Outcomes:

Floodplain maps

6) Time Schedules:

2008-2009

7) Methodologies used/ applied:

GIS, Hydraulic flood routing,

8) Partners involved:

Institute for Catastrophic Loss Reduction, The University of Western Ontario, Upper Thames River Basin Conservation Authority

9) Related Events (conferences, other projects, initiatives)

10) Target Group/End user (e.g. disaster management, urban planning, science)

Provincial governments, local/municipal government, watershed management groups, emergency managers, flood management stakeholders

11) Report / Output documents / Website

Website: <http://www.eng.uwo.ca/research/iclr/fids/nserc-floodmap.html>

12) **Interlinkages between activities / Overlaps**

n/a
