

**Adaptation to Climate Change
Understanding Water Management Needs**

*Annual Workshop of the Ontario Branch of the
Canadian Water Resources Association*

Tuesday, May 26, 2009
Black Creek Pioneer Village
5 Shoreham Drive, Downsview, Ontario

Program Overview

Adaptation strategies for water management to meet the challenges posed by climate change are under development in Canada. Revisions of design standards for infrastructure and changes in operating procedures are being considered by federal, provincial and municipal governments and by water managers in the private sector.

There is strong consensus in the scientific community that impacts of climate change are being felt in Canada. Although, actions to mitigate climate change are most important, adaptive strategies are required to minimize the deleterious effects of climate change on infrastructures and people. Design and operation of water-management systems has always included adaptive elements that respond to the spatial and temporal variability that characterizes hydrological variables. Climate change introduces a new urgency, and adds complexity, to the choice of suitable adaptive strategies for water management.

In southern Ontario studies point to increased winter runoff, with lower and longer lasting summer and fall low flows, decreased groundwater recharge, increased water temperatures, and greater frequency of extreme precipitation events. These changing climatic conditions will have far reaching impacts on the water resources of southern Ontario. Many municipalities may have already experienced impacts of extreme precipitation events, reduced water quality, rising water temperatures, lower runoff, and increased snowfall.

In response to the challenge of climate change both the Federal Government and the Government of Ontario have programs and action plans that specifically address adaptation. Some municipalities have already developed adaptation policies. Adaptive Management, already a key management tool at the watershed scale in water-resource activities that impinge on aquatic ecosystems, is being employed in the design operation and maintenance of individual elements of water infrastructure.

Workshop Objective: To provide a forum for individuals involved in water resource management to share knowledge, experience and opinions towards furthering our ability to understand and adapt to a changing climate.

Workshop Themes

- 1) Overview of potential impacts of climate change on Ontario hydrology.
- 2) Federal, Provincial and Municipal adaptive management initiatives.
- 3) Experiences in Ontario in developing strategies for climate change.
- 4) Future needs of water management - data, research, strategy development - in adapting to climate change.

Who Should Attend: Water managers, engineers, consultants, who have responsibilities or interests in water resource management and adaptation to climate change.



Adaptation to Climate Change
“Understanding Water Management Needs”
and
Annual General Meeting

Tuesday, May 26, 2009 at Black Creek Pioneer Village, Toronto

- 8:30** Registration and Coffee
- 9:00** Welcoming Remarks & Introduction to the day
- 9:15** **Rob de Loe**, University of Waterloo - *Strategies for Adapting to Climate Change: Taking the Broad View*
- Dr. Quentin Chiotti**, Pollution Probe - *Climate Change and adaptive management: Lessons from Ontario*
- 10:15** Break
- 10:30** **Wendy Leger**, Environment Canada – *The Proposed Development of an Adaptive Management Strategy for Addressing Climate Change - International Upper Great Lakes Study*
- Richard Thomas**, US Army Corps of Engineers - *Adaptive Management Planning for Lake Ontario*
- Linda Mortsch**, Environment Canada - *Expanding the Assessment of Vulnerability: A case Study of the Forks of the Thames in London, Ontario*
- 11:45** Lunch
- 12:30** Panel & Breakout Group Discussion - Thinking about current water resource management issues and practices in Ontario discuss the following questions.
1. Based on the current understanding of climate change what candidate adaptation strategies should be for immediate implementation?
 2. What are the critical knowledge gaps preventing advancement of climate change adaptation and what further efforts are needed to fill these gaps?
 3. What legislative, regulatory or policy changes are required in order to adapt to climate change? What is currently being done and what more is needed?
- Panelists
Climate Change Assessment Techniques (**Robert Walker**, EBNFLO Environmental)
Provincial Adaptation Initiatives (**Kathleen O'Neil**, Ministry of Environment)
Watershed Adaptation Initiatives (**Chandra Sharma**, Toronto & Region CA)
Municipal Adaptation Initiatives (**Cindy Toth**, Town of Oakville)
- 1:30** Breakout Group Discussion
- 2:30** Plenary
- 3:00** Wrap up
- 3:30** CWRA Ontario Branch Annual General Meeting

Workshop Sponsors



Morning Session Speakers

Rob de Loë is the University Research Chair in Water Policy and Governance at the University of Waterloo, and Director of the multi-university Water Policy and Group. Previously he held the Canada Research Chair in Water Management at the University of Guelph.

During the past two decades, Rob has studied and written extensively about water security, water allocation, source water protection and climate change adaptation. He draws on his research to provide policy advice to a wide range of government and non-government organizations in Canada, at scales ranging from local watersheds to the nation.

In January, 2008 Rob was named Chair of the Advisory Panel for the Royal Bank of Canada's Blue Water project, a \$50 million, 10-year charitable grant program to support fresh water conservation, protection and accessibility.

Dr. Quentin Chiotti was appointed the Climate Change Program Director at Pollution Probe in April 2007. He has a Ph. D. in Geography from the University of Western Ontario, and has worked extensively in the area of climate change since 1993, including working for the Adaptation and Impacts Research Group of the Meteorological Service of Canada, Environment Canada (1995-2002). From 1998 - 2002 he was the scientific authority for an Environment Canada led multi-stakeholder study on atmospheric change in the Toronto-Niagara Region. During this period he split his time between Environment Canada and Pollution Probe before joining the latter full time as the Air Program Director and Senior Scientist in June, 2002. He has published over 45 articles in scholarly journals and books, including co-editing a book on agricultural restructuring and sustainability, and was a contributor to the Canada Country Study, the first national assessment on climate change impacts and adaptation. He is the co-lead author for the Ontario chapter to the report From Impacts to Adaptation: Canada in a Changing Climate 2007 led by Natural Resources Canada, and is a contributing author to the 2008 Report Human Health in a Changing Climate: A Canadian Assessment of Vulnerabilities and Adaptive Capacity led by Health Canada. Dr. Chiotti has taught at various Universities across Canada (University of Guelph, Carleton University, The University of Lethbridge, and the University of Toronto), is currently an associate member of the Graduate Faculty at the Centre for Environment, University of Toronto, and was the recipient of the 2007 Canadian Association of Geographers Award for Service to Government or Business. Quentin has been a member of over twenty environment-related advisory boards and committees that currently includes the Clean Air Foundation, the Management Committee of the Air Quality Health Index, Health Canada's Heat Alert and Response Systems Advisory Group, and the Clean Air Regulatory Framework Multi-stakeholder Group.

Wendy Leger is a Water Projects Officer with the Boundary Waters Issues Unit at the Canada Centre for Inland Waters, Environment Canada. She has extensive experience with large multi-disciplinary, multi-decision maker, and multi stakeholder Great Lakes water quantity/management related studies. She began her career with Environment Canada in 1987 and over the past 22 years has worked in areas related to water resource management in the Great Lakes Basin as well as in areas of geographic information systems, information management, internet applications and shared vision planning. Wendy recently served as the Canadian Co-Chair of the Plan Formulation and Evaluation Group on the IJC Lake Ontario St. Lawrence River Study and has been involved with follow-up to that Study. She is currently the Canadian co-lead of the Plan Evaluation Group on the International Upper Great Lakes Study and is involved with the initiation of an adaptive management component for that Study.

Richard Thomas is employed by the US Army Corps of Engineers, Great Lakes and Ohio River Division and is the Technical Specialist for Great Lakes/International Joint Commission support. Richard is responsible for the joint development of United States-Canadian regulation and adaptive management plans, monitoring the operational implementation of such plans,

developing management decision framework procedures and techniques, evaluating program effectiveness, and providing staff support, assistance, and guidance for the Great Lakes basin

Prior to this assignment Richard held several positions in the Buffalo Water Control Section including Chief of the Buffalo District Water Control Section

Richard possesses a Bachelor of Science degree in engineering from the State University of New York, College of Environmental Science and Forestry and is concurrently working on a Masters of Science degree at Syracuse University.

Linda Mortsch is a senior researcher with the Adaptation and Impacts Research Division of Environment Canada and an adjunct in the Faculty of Environment at the University of Waterloo. She has over 20 years research experience in the climate change impact assessment field. Her research interests include climate change vulnerability, impact, and adaptation assessments of the urban environment, water resources and wetlands, and climate change scenario development. Linda has contributed to the Intergovernmental Panel on Climate Change (IPCC), the world's leading forum for assessing climate change that was the co-recipient of the 2007 Nobel Peace Prize. For the 2007 IPCC Fourth Assessment Report she was the Coordinating Lead Author for the North America chapter.

Afternoon Session Panelists

Climate Change Assessment Techniques

Bob Walker is the principal of EBNFLO Environmental in Waterloo. He has provided consulting services in the areas of water resources and environmental assessment for over 30 years. Most projects that Bob undertakes involve setting up watershed or receiving water models. He has extensive experience with HSP-F, the US EPA watershed modelling package. During the recent past he has participated as modeller in the Toronto Wet Weather Flow Management Master Plan study and has developed watershed models for the TRCA and CVC for simulating future streamflow and water quality.

Over the past 12 years Bob has applied climate change assessment techniques in several watersheds including the Rouge, Credit, Trent and Moira River watersheds. Along with colleagues at AquaResource Inc. and Environment Canada he is currently developing a "Guide for Assessment of Hydrologic Effects of Climate Change in Ontario" for use by modellers, especially those engaged in Source Water Protection studies or other water balance and water management assessments. Guidance is provided in the manual for selecting future scenarios and generating future climates to use as input to hydrologic models. He is currently applying the recommended approaches in CVCs Subwatershed 19.

Provincial Adaptation Initiatives

Kathleen O'Neil is Manager with the Strategic Policy Branch, Ministry of the Environment –this branch provides the central strategic policy function for the ministry and works to ensure the integration of cross cutting policy initiatives. Kathleen has a B.A. in political science from the University of Western Ontario and a M.Ed. from the University of Toronto. Over the past ten years, she has held a number of positions in the Ontario Government both in the Ministry of Community and Social Services where her work focused on children's policy and more recently in the Ministry of the Environment. Kathleen has worked on the Clean Water Act, 2006 since its inception including the policy development component of the related regulatory framework and played a lead role in the government's response to the Walkerton Report recommendations. Kathleen is currently leading work to mainstream climate change adaptation into government decision making and supporting the work of the Ontario Expert Panel on Climate Change

Adaptation. This panel, appointed by the Minister of Environment in December 2007, is advising the government on adaptation strategies related to health, environment and infrastructure.

Watershed Adaptation Initiatives

Chandra Sharma is Professional Planner with over 10 years of experience in the environmental field. Chandra is currently working as a Watershed Specialist with the Toronto and Region Conservation Authority (TRCA) and is actively involved as a Board of Director with Ontario Nature and a member of Canadian Institute of Planners Council. Ms. Sharma's field of interest and expertise is in strategic planning and management and she has been instrumental in leading several key strategic climate change initiatives in her current job including the development of TRCA's Climate Action Plan

Municipal Adaptation Initiatives

Cindy Toth is the Director of Environmental Policy for the Town of Oakville. Her responsibilities include environmental and energy policy and program development, implementation of Oakville's Environmental Strategic Plan, environmental education and strategic planning on a broad range of environmental areas. Past experience has been as an environmental scientist in pollution control planning, environmental monitoring and assessment, and water resource management based on continuous education, an Honours Bachelor of Science Degree in Biology from the University of Guelph (1980) and a post-graduate Environmental Science and Technology Diploma (1985) from the Institute of Hydraulic and Environmental Engineering in Delft, Holland.

Canadian Water Resources Association

Ontario Branch

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CWRA ACRH
Canadian Water Resources Association
Association Canadienne des Ressources Hydriques

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Workshop Registration

Ali Sajid	Jeremy Wychreschuk
Amanda Wong	Jo-Anne Lane
Amber Palmer	Joel Fraleigh
Asif Quader	John Kwast
Beatrice Yung	Karen Kraft Sloan
Bob Metcalfe	Kate Sapozhnikova
Bob Sneyde	Kathleen O'Neil
Bob Walker	Kevin Nugent
Bonnie Fox	Linda Mortsch
Bruno Jurak	Linda Nicks
Chandra Sharma	Lucas Pitts
Charley Worte	Marian Pop
Cindy Toth	Mark Brobbel
Craig Mather	Mark Helsten
David Kerr	Meredith Carter
Dean Young	Nazrul Howlader
Dilnesaw Chekol	Nick Kouwen
Don Barkey	P. Nicholas Fitzpatrick
Ed Gazendam	Peter Van Driel
Emma McKinnirey	Quentin Chiotti
Eric Farquahar	Ray Guther
George Sousa	Richard Thomas
Hani Farghaly	Rimma Vedom
Hazel Breton	Rob Bishop
Heather Amirault	Rob Bishop
Heather Loomer	Rob de Loe
Heinz Hecht	Roy Johnson
Hida Manns	Ryan Post
Hugh Simpson	Saleem Sial
Hugh Whiteley	Scott Duff
Ion Corbu	Shizhong Lei
Iryna Shulyarenko	Stephanie Shifflett
Jack Gorrie	Steve Braun
Jane Lewington	Ted Spence
Jason Symington	Tom McAuley,
Jean-Guy Zakrevsky	Tony Smith
Jeff Burgess	Wendy Leger
Jennifer MacGowan	