

# *Québec Initiatives on Climate Change*

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**Robert Noël de Tilly**  
Senior Policy Advisor  
Ministry of Sustainable Development,  
Environment and Parks, Québec



**Développement durable,  
Environnement  
et Parcs**

**Québec** 

# Presentation

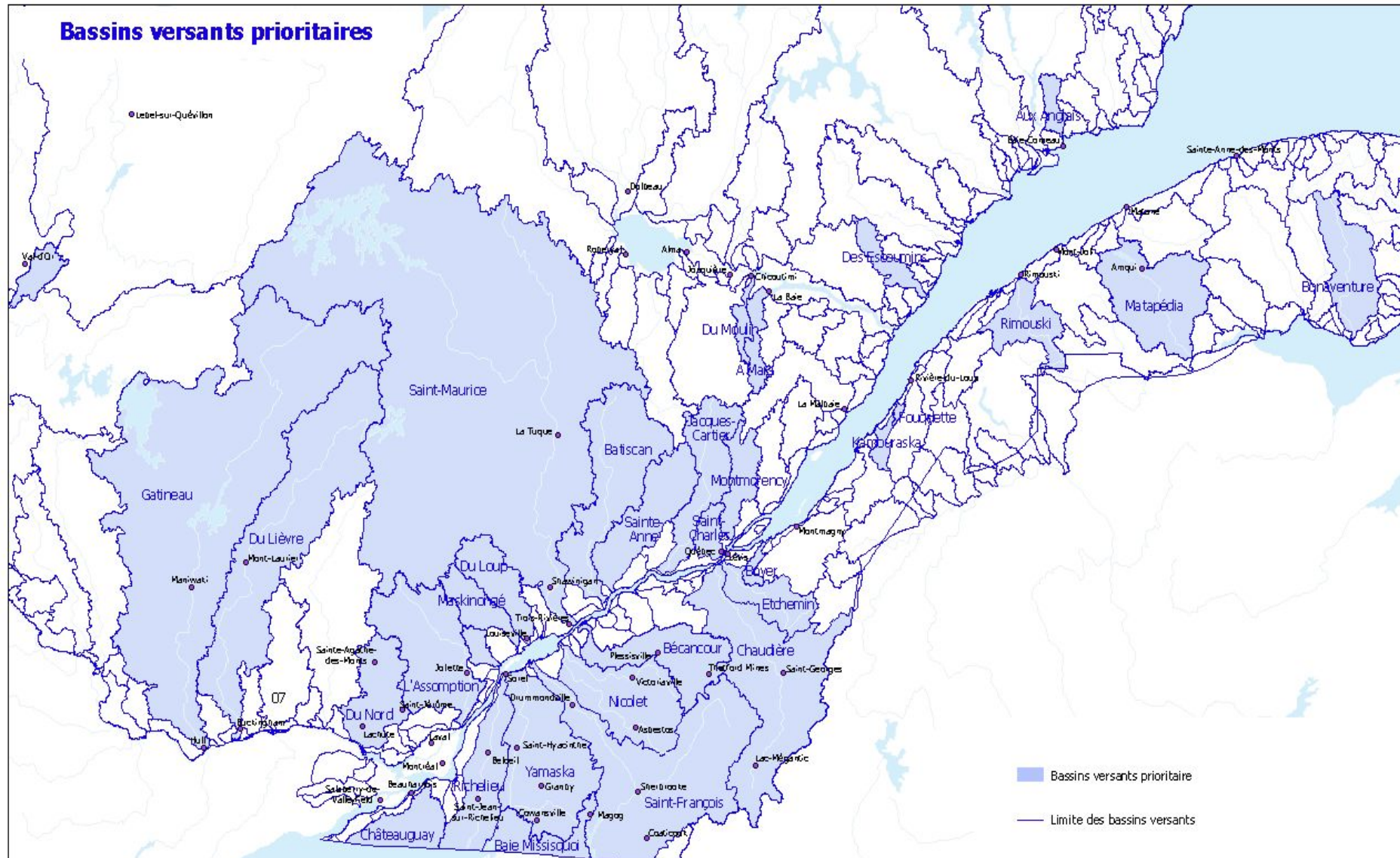
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- **Water in Québec**
- **Climate change in Québec**
- **Ouranos**
- **Climate Change Action Plan 2006-2012**
- **Partnerships**

# Water in Québec

- 500 000 lakes
- >4500 rivers
- 430 watersheds
- 3 % of the world's renewable fresh water
- The St. Lawrence River (12 000 m<sup>3</sup>/s  
→ 273 894 MGD)
- **Water Policy**
  - Integrated water management
  - Watershed approach
  - Protection of public health and aquatic ecosystems
  - Public participation

# 33 Priority watersheds



# Integrated management of St. Lawrence River

- **Québec-Canada Agreement  
on the St. Lawrence, 2005-2010**
  - Contribution to sustainable development
  - Implementation of an informed and integrated governance of the St. Lawrence
  - Development of a joint integrated management concept and the tools to implement it
  - Adaptation to climate change will be among priorities of this new governance model

# Climate change

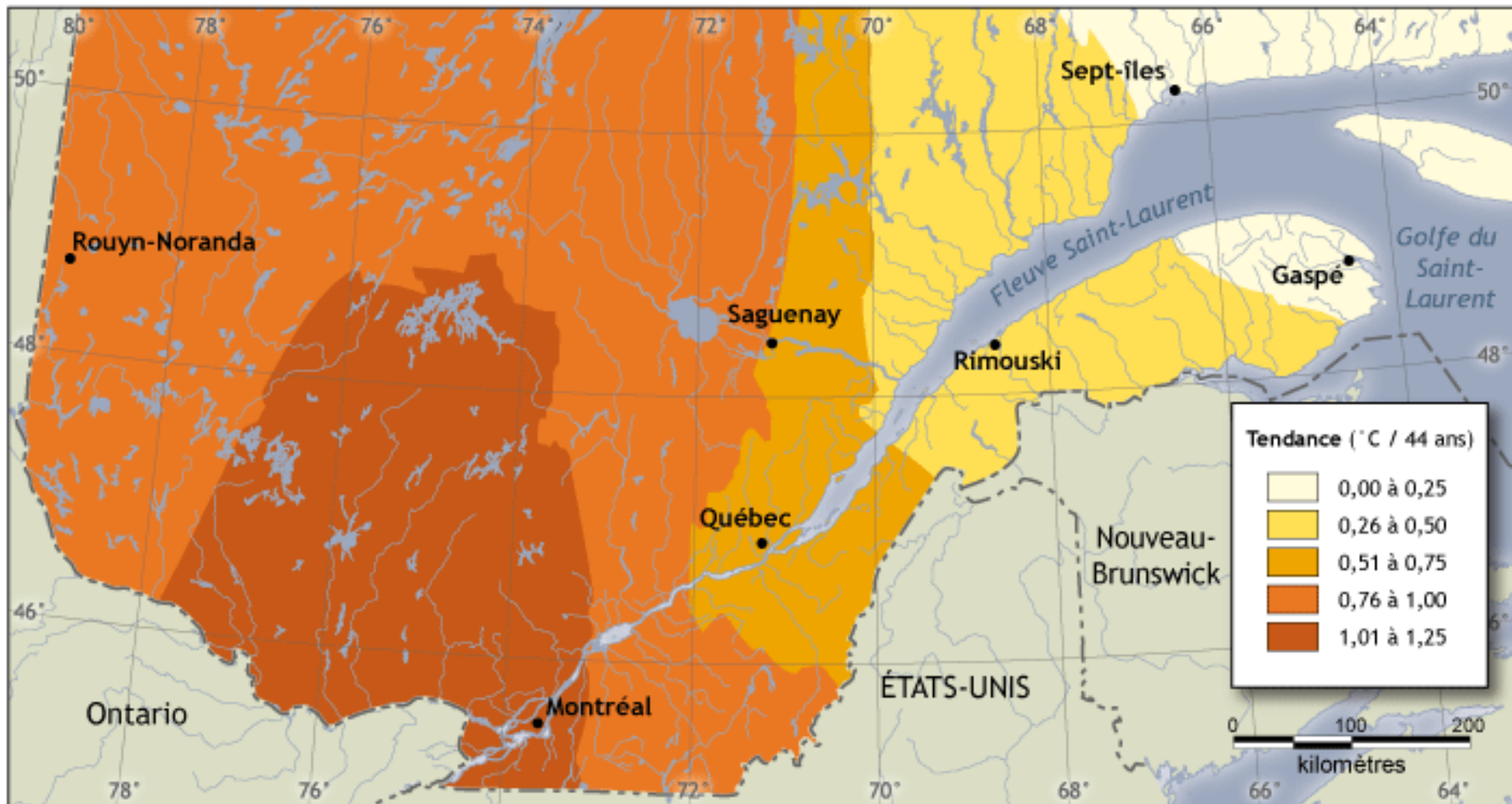
## A concern in Québec

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- **Significant rise in temperature in southern Québec 1960-2003**
- **Evidence of regional warming in northern Québec (melting of permafrost)**

# Trends in temperature 1960-2003

Évolution des températures annuelles moyennes entre 1960 et 2003



SOURCES :

Données : MDDEP, Programme québécois de surveillance du climat

Réalisation : Laboratoire de cartographie, département de géographie, Université Laval



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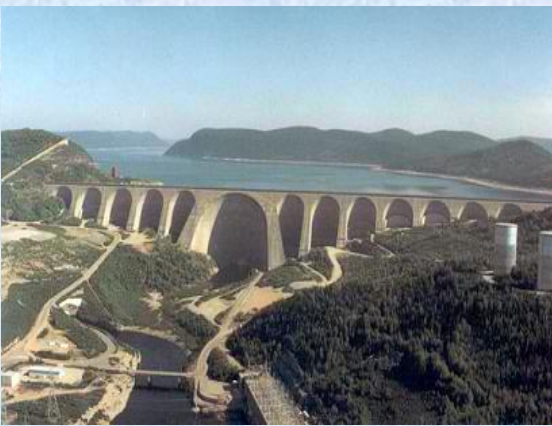


# Climate change

## A concern in Québec

### ■ Québec, a leader in clean energy

- 96 % of electricity used in Québec comes from hydraulic sources
- **Wind energy:**
  - 2007: installed capacity 471 MW
  - 2015: 4 500 MW will be installed



### ■ *Changes in precipitation and evaporation could impact hydroelectricity*

- *Likely positively in the North*
- *But in the South...*

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# Climate change in Québec

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- **Climate change will worsen:**
  - Coastal erosion in the Gulf of St. Lawrence
  - Low water levels in St. Lawrence River between Montréal and Québec City

# Sainte-Luce (Lower St.Lawrence)

December 2, 2005



**Matane (Gaspé Region)**

**October 15-16, 2005**



# Climate change in Québec

- **Low water levels in the St. Lawrence and in other important rivers is worrisome**



Rosemère (Near Montréal)

# Climate change in Québec

Montréal (Pointe-aux-Trembles)

Courtesy: C. Hudon



**1994:** water level comparable to the average for the last 30 years of the 20th Century



**1999:** extreme situation, 1 meter below the average

*Through evaporation, lower levels and flow reduction to the St. Lawrence River?*

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# Climate change in Québec

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- In order to understand the links between climate change and those phenomena (and many others), Québec created Ouranos Consortium

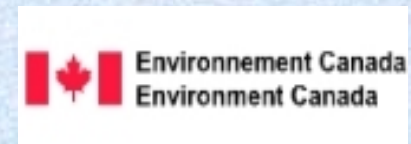


- Created 2001

- Members

- Ministries

- Public Security
    - Sustainable Development, Environment and Parks
    - Natural Resources and Wildlife
    - Municipal Affairs and Regions
    - Transport
    - Agriculture, Fisheries and Food
    - Health and Social Services
    - Economic Development, Innovation and Export Trade



- More than 100 scientists + 150 collaborators

- 12 millions CAD\$/year

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## Historical and Observed Data

- Data collection, storage, validation
- Indirect Data (satellites, dendrochronological)
- Derived products and Indicators
- Metadata

Available Data

## Hydro-Climatic Research

- Regional Climate Model
- Hudson Bay coupling
- Hydrological modelling
- Extreme Events
- Statistical Analysis

## Climate Simulations

- CRCM Development
- Production and Validation

## Hydro-Climatic Analysis

- Hydrological and climate scenarios
- Downscaling
- Natural Variability and Extreme Analysis

Available Information

## Populations and Infrastructures Security

- Permafrost (transportation and communities)
- Access to territory

## Water and Energy Resources

- Peatlands moisture regime
- Snow cover analysis
- Northern hydrological modelling
- Wind power potential (plan)

## Maritime Environment

- Coastal erosion
- Sea levels
- Ice dynamics

## Forestry Resources

- Productivity, Fertility
- Natural disturbances
- Operations and winter length (plan)
- Insects

## Water System (St. Lawrence)

- Fluctuation in supplies (Outaouais River)
- Sediments from tributaries
- Adaptation to water level changes
- Water level evaluation (plan)
- Biophysical impacts (plan)

## Impacts « Society and Environment »

- Agriculture : adaptation, agriculture vulnerabilities
- Water Resources: drinking water supply, aquifer levels, floods and low water (Châteauguay)
- Transportation and Urban Infrastructures: urban drainage
- Health: allergies, hot spots, atlas of vulnerabilities, morbidity - mortality
- Economy and Society: tourism, energy demand, evaluation guide, risk perception (plan)
- Natural Environment: ecosystems (plan)

# Québec Government response to climate change

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- **A two-pronged response :**
  - Adaptation of public policy & OURANOS
  - Mitigation : Climate Change Action Plan (2006-2012);  
Target : 14 million tonnes CO<sub>2</sub> equivalent with additional federal funding  
→ 6 % below 1990 level in 2012

# Climate Change Action Plan 2006-2012

## ■ 24 actions divided in two themes

### Reduce or avoid GHG emissions (20 actions)

- Energy (Energy efficiency Fund)
- Transport
- Industry
- Residual Materials
- Agriculture
- Governmental leadership
- Public awareness
- Research, development and deployment of technologies

### Adaptation (4 actions)

- Human health
- Monitoring network for climate and water
- Transportation in the North
- Forests



# Climate Change Action Plan 2006-2012

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- Cost of Action Plan implementation
  - Total: 1,2 billion \$ Can over 6 years
  
- Action Plan financing
  - Duty on fossil fuels:
    - Legislative changes
    - New regulation
  - Green fund:
    - Accountability mechanism

# New England Governors/ Eastern Canadian Premiers Action Plan on Climate Change

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- Adopted August 2001
- Regional objectives:
  - Bring back GHG emissions at 1990 level by 2010
  - Reduce emissions to 10 % under 1990 level by 2020
  - Reduce emissions by 75-85 % by 2050
- Other actions: adaptation, public awareness
- Québec is actively involved in NEG-ECP Action Plan implementation

# Carbon Market

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- Efficient tool to reach environmental goals
- Very important market in Europe
- Chicago Climate Exchange (CCX)
- Expanding American Market
- Montréal Climate exchange (MCeX)

# In brief

- **Climate change has already begun in Québec**
- **Impacts are now observable**
- **Creating OURANOS has been a major initiative in adaptation**
- **St.Lawrence River and water management are important concerns in Québec**
- **Québec is involved both in mitigation and adaptation through:**
  - **Its own Climate Change Action Plan**
  - **NEG-ECP Climate Change Action Plan**
- **In climate change, partnerships and collaborations are important**

# Québec partnerships and collaborations on climate change

## ■ Partnerships

- Canada
  - Council of the Federation
  - Canadian Council of Ministers of the Environment
- U.S.A.
  - New England Governors/Eastern Canadian Premiers
- North America
  - Climate Registry

## ■ Potential collaborations

- Regional Greenhouse Gas Initiative
- Western Climate Initiative

# Québec future partnerships in climate change

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*With the Great Lakes ?*

# Thank you for your attention!

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*Thanks to Ouranos for most of the photos*

**Robert Noël de Tilly**

Ministry of Sustainable Development,  
Environment and Parks

675, René-Lévesque Blvd East, 6th Floor, Box 30  
Québec (Qc) G1R 5V7

E-mail : [robert.noeldetilly@mddep.gouv.qc.ca](mailto:robert.noeldetilly@mddep.gouv.qc.ca)

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