

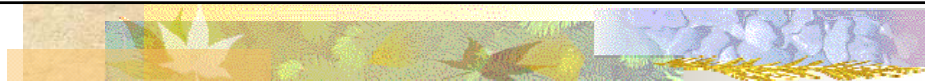


Climate SMART Risk Management Guide for Development



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Alliance for Resilient Cities
January 15, 2008



Halifax Regional Municipality Nova Scotia, Canada



- Capital of Nova Scotia
- Area: 5 500 km²
- Population: 370 000
- Language: English
- Business, medical, academic centre
- Moderate, North Atlantic climate





Climate SMART

- Objective: Mainstreaming of climate change into municipal decision making.
- Partners:
 - Federation of Canadian Municipalities
 - Natural Resources Canada
 - Environment Canada
 - Province of Nova Scotia



Why Is Climate Change Important to HRM?

- Clean air.
- Impacts from extreme events.
- Sea level rise.
- Sustainability of the community.
- Public health and safety.





Why Is Climate Change Important to HRM?

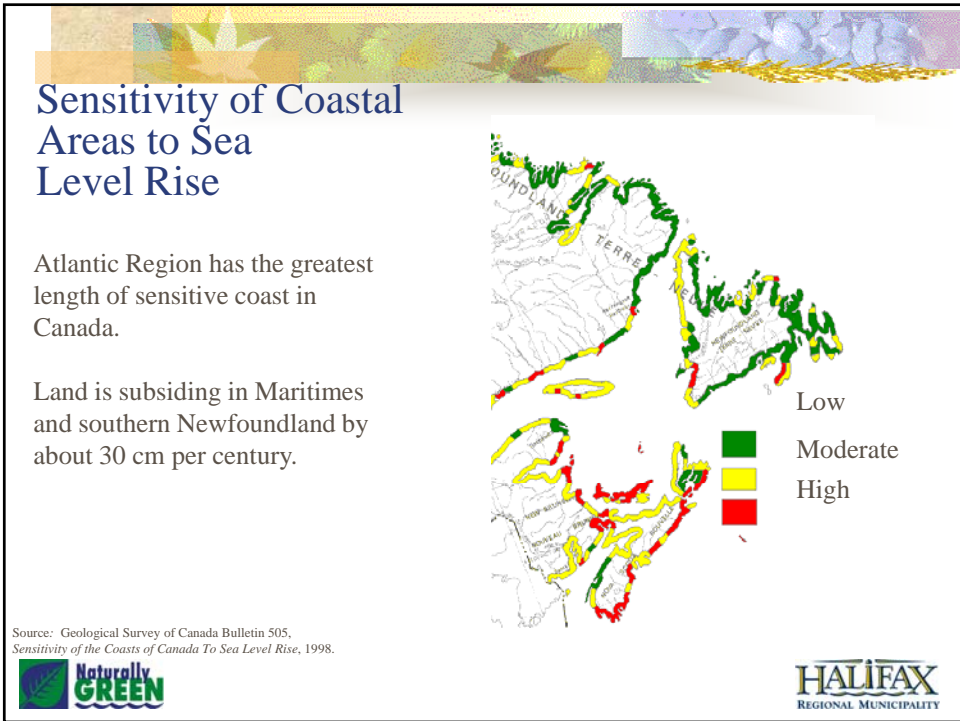
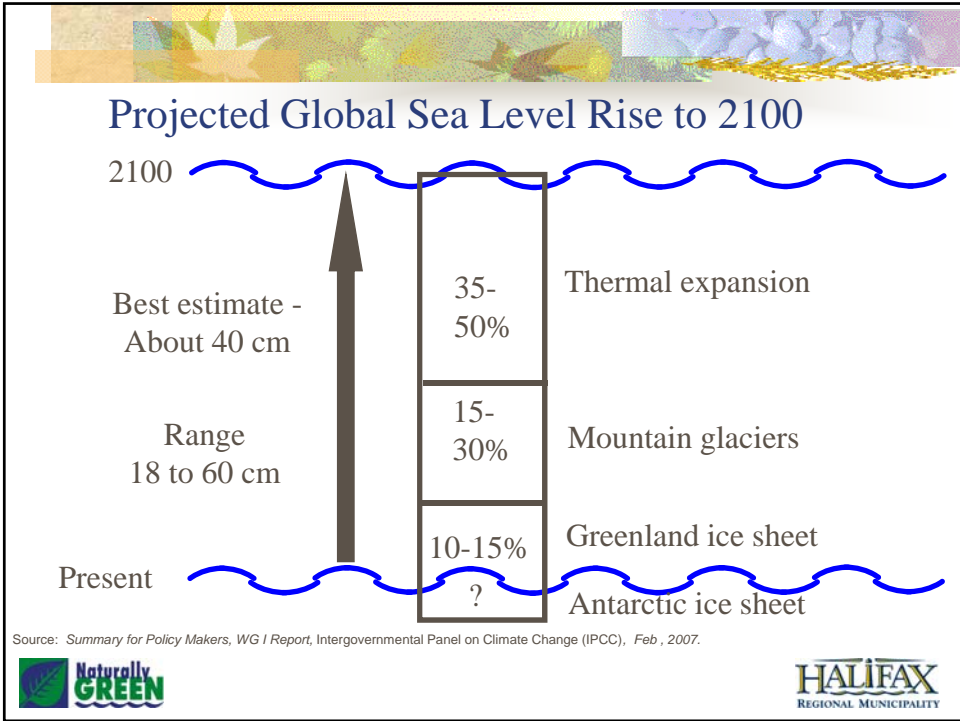
- Recent Extreme Events:
 - 2003 - Hurricane Juan
 - 2004 – “White Juan”
 - 2007 – Hurricane Noel
- Resulted in:
 - Disruption of essential services.
 - Loss of life.
 - Increased awareness of vulnerability.



Climate Change Projections

- *Very likely* that **hot extremes, heat waves, and heavy precipitation events** will continue to become more frequent.
- *Likely* that future **tropical cyclones** will become more intense, with larger peak wind speeds and more heavy precipitation.
- **Extra-tropical storm tracks** projected to move poleward.







How Vulnerable is HRM?

- Sea level is expected to rise.
- Potential for an increase in extreme events e.g. storm events, heat waves
- Changes in climate variability.

References:

<http://www.halifax.ca/climate/index.html>

<http://www.halifax.ca/climate/documents/CommunityActionGuideforClimateChange.pdf>

<http://www.gov.ns.ca/energy/AbsPage.aspx?id=1392&siteid=1&lang=1>



Why is HRM Vulnerable?

- Old and aging infrastructure.
- Coastal based development and economy.



Step-Wise Approach

- Climate Change Issues Paper.
- Validate and identify options.
- Overlay climate change hazards e.g. storm surge.
- Risk management measures.
- Replicable tools.



Sectors Impacted

- Coastal Zones
 - Erosion
 - Flooding
- Communities/Infrastructure/Transportation
 - Damage from extreme events e.g. heat waves; storm events
 - Increased operational costs e.g. maintenance





Sectors Impacted (cont'd)

- Water Resources

- Water supply
- Salt water intrusion

- Human Health & Safety

- Vector and food borne disease
- Physical safety



Sectors Impacted (cont'd)

- Fisheries and Marine Resources

- Water quality and temperature
- Changes in fish distribution

- Forestry and Agriculture

- Increase in production
- Change in pests and disease





Example Adaptation Responses

- Develop vulnerability mapping.
- Protect or relocate critical infrastructure.
- *Incorporate climate change risk management in planning activities.*
- Revise design criteria.
- Expand water conservation and watershed protection.
- Acquire additional lands to preserve water supplies.



Identified Priorities

- Innovative and responsive funding.
- Community outreach; HRM in-reach.
- Hazard and risk mapping.
- Integrate climate change as a risk in business plans.
- Life cycle assessment approach.
- Better intergovernmental collaboration, communication and coordination.





Why Do We Need Risk Management?

- Climate change introduces complexities and uncertainties.
- Provides a consistent framework for decision making in light of the above.
- Assists in prioritization and identification of preferred approaches.

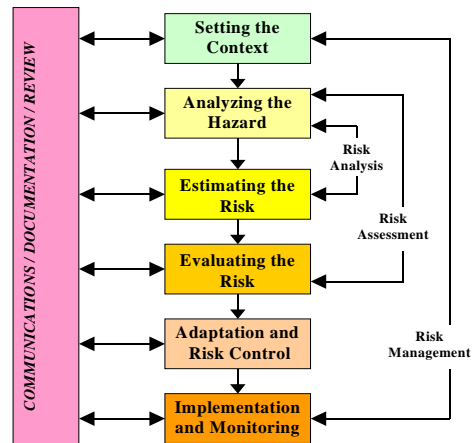


How Do We Apply Risk Management?

- Developer's Risk Management Guide provides approach and information needs.
- Approach based on Canadian Standards Association's *Risk Management: Guidelines for Decision Makers* and guidance from other vulnerable coastal jurisdictions e.g. Caribbean community.



Risk Assessment Process



Step 1 – Setting the Context

- Describe project and alternatives.
- Site setting – environmental, known hazards, and social setting.





Step 2 – Analyzing the Hazard(s)

- Identification of climate change hazards.
- Assessment of vulnerability to climate change impacts/hazards.
- Use information provided in EC and other agencies to identify potential impacts on the development.



Step 3 – Estimating the Risk

- Identify the frequency/likelihood of the impacts occurring.
- Estimate the severity of impact on social, economic and environmental factors.





Step 4 – Evaluating the Risk

- Assess implications of the risks identified in Step 3 on the development.
- Will the development exacerbate risks?
- Identify options to reduce or eliminate risks.



Step 5 – Adaptation and Risk Control

- Develop an adaptation plan based on key strategies:
 - Preventing, Tolerating, Sharing Loss
 - Change Use
 - Relocate
 - Restoration
- Provide highlights of an adaptation plan for the development.
- The HRM Guide provides a listing of potential measures that can be included.





Step 6 – Implementation and Monitoring

- Documentation of risk evaluation and measures proposed.
- Project design incorporates adaptation measures.
- Development of monitoring program and performance indicators.



Questions?



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