



The Adaptation Platform

FUNDED PROJECTS AND RESULTS TO DATE
OCTOBER 2014

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COASTAL MANAGEMENT

Title: Greening Shorelines, Enhancing Resilience: An evaluation of the effectiveness of Green Shores approaches to coastal shoreline development

Objective: The objective of this project is to advance coastline protection policy and practices in British Columbia, and more broadly in Canada, by evaluating soft shore armouring measures. The evaluation will compare soft shore armouring with more conventional hard shore approaches with particular attention to the performance and cost-effectiveness of soft shore measures.

Project Lead: Stewardship Centre for British Columbia

Contact: D.G. Blair, Executive Director, Stewardship for British Columbia, E-mail: dg@stewardshpcentre.bc.ca

Partner

organisations: BC Ministry of Environment, Emergency Management BC, District of West Vancouver, Town of Qualicum Beach, West Vancouver Shoreline Preservation Society, University of Victoria, Sea Grant Program University of Washington

Region: British Columbia

NRCan funding: \$96,160

Total funding: \$192,508

Status: Complete

Results: *Greening Shorelines to Enhance Resilience: An Evaluation of Approaches for Adaptation to Sea Level Rise*

- This report compares the effectiveness and relative cost of several “soft” and “hard” shore armouring options in British Columbia. It considers sea level rise, flooding, and economical resilience. This information will be useful to coastal zone planners, engineers and decision-makers for assessing adaptation options.

Title: Assessment of the Risk to PEI's Coastal Residences, Infrastructure and Heritage from a Changing Climate

Objective: The purpose of this project is to conduct a quantitative assessment of the risk posed by coastal erosion caused by climate change to Prince Edward Island's coastal residences, safety and security, infrastructure and heritage.

Project Lead: University of Prince Edward Island

Contact: Adam Fenech, Director, Climate Lab, University of Prince Edward Island, E-mail: afenech@upe.ca

Partner

organisations: PEI Environment, Labour and Justice, PEI Office of Public Safety, Mi'kmaq Confederacy of PEI, GeoNet Technologies Inc.

Region: Atlantic Provinces

NRCan funding: \$66,800

Total funding: \$152,910

Status: Complete

Results: *Risk Assessment to Prince Edward Island's Coastal Residences, Infrastructure and Heritage from Receding Coastlines in 2040, 2070 and 2100*

- The report presents a quantitative risk assessment of future projections for coastal erosion on Prince Edward Island's coastal residences, infrastructure and heritage. Practitioners and decision-makers can utilize this information to increase resilience along PEI's coasts.

Prince Edward Island Land Area Changes: 1968 - 2010

- This report, accompanied by a series of maps, provides information on historic land area and coastline change rates on Prince Edward Island from 1968-2010. This information was used to assess risks to Prince Edward Island's coastal residences, infrastructure and heritage from receding coastlines in 2040, 2070 and 2100.

Methods for Projecting the 2010 Prince Edward Island Coastline into Future Coastlines for 2040, 2070 and 2100

- This report documents the method developed for quantitatively assessing Prince Edward Island's coastline considering future sea level rise projections. This methodology and lessons learned could inform similar assessments in other regions.

Title: Risk Assessment Framework for Coastal Bedrock Aquifers

Objective: The purpose of this project is to develop a risk assessment methodology for source-water protection in coastal bedrock aquifers that will inform climate change adaptation decision-making. The outputs are expected to be used for land use planning, directing monitoring efforts, and building community preparedness.

Project Lead: Simon Fraser University

Contact: Dr. Diana M. Allen, P.Geo., Professor, Department of Earth Sciences, Simon Fraser University Email: dallen@sfu.ca

Region: British Columbia

NRCan funding: \$116,610

Total funding: \$233,845

Status: On-going

Title: City of Vancouver Coastal Flood Risk Assessment

Objective: The results of the project contribute to the implementation of Vancouver's Climate Change Adaptation Strategy and support immediate work on upcoming developments, transportation projects and flood-proofing policies, and will inform long term capital and infrastructure planning.

Project Lead: City of Vancouver

Contact: Tamsin Mills, Climate Change Adaptation Planner, Sustainability Group, City of Vancouver, E-mail: Tamsin.mills@vancouver.ca

Partner

organisations: Simon Fraser University; University of British Columbia; City of Vancouver

Region: British Columbia

NRCan funding: \$145,000

Total funding: \$592,500

Status: Complete

Results: Coming

Title: Development of Best Management Practices to Address Extreme High Rainfall Events that Affect Coastal Regions of Canada

Objective: This project will fill gaps in existing knowledge of coastal impacts of extreme precipitation events such as atmospheric rivers (high precipitation events that occur over short durations) on transportation infrastructure in British Columbia. The project will also synthesize findings from British Columbia highway case studies and other assessments to develop a cohesive approach to addressing these issues for the entire British Columbia highway system.

Project Lead: BC Transport/Infrastructure

Contact: Dirk Nyland, P.Eng., British Columbia Ministry of Transportation and Infrastructure, E-mail: Dirk.Nyland@gov.bc.ca

Partner

organisations: Nodelcorp Consulting Inc., Pacific Climate Impacts Consortium, BC Ministry of Environment, Engineers Canada

Region: British Columbia

NRCan funding: \$96,800

Total funding: \$209,269

Status: Complete

Results: *Considerations for Addressing Climate Change for Water Handling Infrastructure In Highway Management, Design, Operation and Maintenance in British Columbia - Best Practices Document*

- This “Best Practices” document provides guidance to the BC Ministry of Transportation and Infrastructure on integrating climate change considerations into highway water handling infrastructure management including planning, engineering, and operations activities. The general approaches that are outlined for adapting practices will be useful to practitioners in other regions of Canada.

Developing Effective Dialogue between Practitioners Of Climate Change Vulnerability--- Risk Assessments: A Primer for Understanding Concepts, Principles and Language Use Across Disciplines

- This Primer outlines concepts, principles and language used across climate science and engineering disciplines to facilitate effective communication in climate change engineering vulnerability assessments. This report may be of interest to practitioners across Canada.

Analysis of Climate Change Projections for the Ministry of Transportation and Infrastructure Highways Risk Assessment

- This report provides climate change projection information for specific infrastructure risk assessments in BC.

Engineering Analysis Report for the Climate Change Engineering Vulnerability Assessment

- This report describes detailed engineering analysis of several water infrastructure examples using climate change projections for extreme precipitation and the PIEVC Engineering Protocol for Infrastructure Vulnerability Assessment and Adaptation to a Changing Climate protocol.

Review and Analysis of Climate Change Vulnerability Assessments of Canadian Water Management and Drainage Infrastructure

- This report details the findings of a review of climate change vulnerability assessments from across Canada and identifies common risks to water management and drainage infrastructure standards. These assessments used the PIEVC Engineering Protocol for Infrastructure Vulnerability Assessment and Adaptation to a Changing Climate. This information will be of interest to infrastructure owners and engineering professionals.

Climate Change Engineering Vulnerability Assessment of Three British Columbia Highway Segments: Highway 20 in the Bella Coola Region; Highway 37A in the Stewart Region; Highway 97 in the Pine Pass Region

- This report details the findings of climate change risk assessments of three highway segments in BC that used the PIEVC Engineering Protocol for Infrastructure Vulnerability Assessment and Adaptation to a Changing Climate. This information will be of interest to practitioners and decision-makers conducting similar assessments.

Title: Atmospheric Rivers: A multi-agency risk assessment for British Columbia

Objective: This project will conduct a high-level risk assessment of atmospheric rivers (meteorological systems associated with intense rainfall events that can lead to flooding and landslides) in British Columbia. The project will also assess options for detection/warning systems in British Columbia, engage flood management professionals, and communicate the results to professional planning and flood management communities.

Project Lead: BC Ministry of Environment

Contact: Jennifer Pouliotte, Email : Jennifer.Pouliotte@gov.bc.ca

Partner

organisations: BC Ministry of Environment, Pacific Institute for Climate Solutions, BC Ministry of Justice, BC Ministry of Community, Sport and Cultural Development, BC Ministry of Forests, Lands and Natural Resource Operations, BC Ministry of Transportation and Infrastructure

Region: British Columbia

NRCan funding: \$57,000

Total funding: \$173,500

Status: Complete

Results: *Atmospheric Rivers State of Knowledge Report*

- This paper summarizes the state of knowledge on risks from and responses to atmospheric rivers (meteorological systems associated with intense rainfall events that can lead to flooding and landslides) in British Columbia. This will be useful to BC emergency, flood management, planning, and engineering communities.

The Future of Atmospheric Rivers & Actions to Reduce Impacts on British Columbians: A Multi-Agency Qualitative Risk Exploration

- This report presents a summary of a multi-disciplinary workshop which explored high impact risks from future projections of extreme events. This will be useful to BC emergency, flood management, planning, and engineering communities.

Title: Targeted Coastal Archaeological Resources Risk Assessment

Objective: This project will contribute to a larger plan to address the impacts of climate change on Newfoundland and Labrador's heritage and archaeological resources which exist in coastal regions of the province. Results are expected to be relevant for coastal archaeological resources in Atlantic Canada, and will be transferable to other regions of Canada.

Project Lead: Memorial University of Newfoundland

Contact: Trevor Bell, Professor, Departments of Geography and Archaeology, E-mail: tbell@mun.ca

Partner

organisations: Department of Tourism, Culture and Recreation and Department of Environment and Conservation, Government of Newfoundland and Labrador; Heritage Conservation and Commemoration Directorate, Parks Canada; Geological Survey of Newfoundland and Labrador.

Region: Atlantic Provinces

NRCan funding: \$139,900

Total funding: \$472,801

Status: On-going

Title: Information Accessibility Policy Best Practices for Coastal Adaptation

Objective: This project will help advance the adoption of best practices for the collection, management and dissemination of data and information that supports climate change adaptation by providing a comprehensive inventory of present practices, and a benchmark of best practices. Organizations can use the results to modify their policies and operational procedures.

Project Lead: Atlantic Coastal Zone Information Steering Committee

Contact: Andrew Sherin, Atlantic Coastal Zone Information Steering Committee (ACZISC) Secretariat, Dalhousie University, Email: a.sherin@dal.ca

Partner

organisations: Department of Environment and Conservation, Government of Newfoundland and Labrador; Department of Fisheries and Aquaculture, Government of Newfoundland and Labrador; Department of Environment, Energy and Forestry, Province of Prince Edward Island; Department of Fisheries and Aquaculture, Province of Nova Scotia; Memorial University of Newfoundland; Dalhousie University; University of Prince Edward Island

Region: Atlantic Provinces

NRCan funding: \$35,500

Total funding: \$92,015

Status: Complete

Results: Coming

Title: Evaluation of BC Flood Policy Performance for Coastal Areas in a Changing Climate

Objective: The purpose of this project is to identify provincial government policies and programs that support, and those that create barriers to, implementation of climate change adaptation measures in coastal areas. The project will also propose alternatives and options for integrating climate change considerations into flood policies and programs to promote mainstreaming of climate change adaptation.

Project Lead: BC Ministry of Environment

Contact: Tina Neale, British Columbia Ministry of Environment E-mail: tina.neale@gov.bc.ca

Partner

organisations: BC Ministry of Justice; BC Ministry of Community, Sport and Cultural Development; BC Ministry of Forests, Lands and Natural Resource Operations; BC Ministry of Transportation and Infrastructure

Region: British Columbia

NRCan funding: \$40,000

Total funding: \$109,000

Status: Complete

Results: *Evaluation of B.C. -Flood Policy for Coastal Areas in a Changing Climate*

- This report evaluates British Columbia flood policies and programs for coastal areas and identifies those that support, and those that create barriers to, implementation of climate change adaptation measures. This will be of interest to water management practitioners, policy-makers and decision-makers.

Title: Understanding Policy Enablers and Barriers for the Adaptive Management and Resilience of Coastal Communities in the Hudson Bay Inland Sea Region

Objective: The objective of this project is to undertake an analysis of existing policies and practices relevant to coastal management in the Hudson Bay Inland Sea region in order to identify enablers and barriers to adaptation at the community and regional level. The project will inform future governance approaches across the region for anticipating and managing risks and opportunities associated with a changing climate.

Project Lead: Northern Sustainable Prosperity Initiative
Contact: Terry Duguid, Director, Northern and Sustainable Prosperity Initiative, E-mail: tduguid@mymts.net

Partner

organisations: University of Winnipeg; International Institute for Sustainable Development (IISD); Manitoba Conservation and Water Stewardship; Nunavut Tunngavik Incorporated; Government of Nunavut - Department of Executive and Intergovernmental Affairs; Ontario Centre for Climate Impacts and Adaptation Resources OCCAR
MIRARCO/Laurentian University.

Region: Manitoba, Nunavut

NRCan funding: \$65,600

Total funding: \$131,200

Status: Complete

Results: *Understanding Policy Enablers and Barriers for the Adaptive Management and Resilience of Coastal Communities in the Hudson Bay Inland Sea Region*

- This report describes the results of using the ADAPTTool to analyse selected policies relevant to the transportation sector along the coast in the Hudson Bay Inland Sea region in order to identify enablers and barriers to climate change adaptation.

Title: Coastal Sea-Level Risk Assessment and Model By-law Development

Objective: The purpose of this project is to increase understanding of coastal vulnerabilities of Capital Regional District of British Columbia due to sea-level rise, and to create a tool (a model bylaw) for use in the Capital Regional District and other coastal communities to manage the sea-level rise challenge.

Project Lead: Capital Regional District, Victoria

Contact: Sarah Webb, Climate Action Program Manager, Capital Regional District, E-mail: scwebb@crd.bc.ca

Partner

organisations: City of Victoria; District of Saanich; BC Ministry of the Environment

Region: British Columbia

NRCan funding: \$22,500

Total funding: \$45,054

Status: On-going

Title: Developing a Decision Key on Planning and Engineering Guidance for the Selection of Sustainable Coastal Adaptation Strategies to Climate Change in Rural Communities

Objective: The purpose of the project is to develop a web-based decision tool that will provide planning and engineering guidance for the selection of sustainable coastal adaptation strategies and measures for rural communities in the Atlantic region.

Project Lead: University of Prince Edward Island

Contact: Adam Fenech, Director, Climate Research Lab, University of Prince Edward Island, E-mail: afenech@upei.ca

Partner

organisations: Saint Mary's University; Dalhousie University; Nova Scotia Sustainability and Innovation; PEI Environment, Labour and Justice; PEI Transportation and Infrastructure; PEI Department of Finance, Energy and Municipal Affairs; PEI Transportation and Infrastructure, Land and Environment; Newfoundland and Labrador Environment and Conservation; Service Nova Scotia and Municipal Relations; Nova Scotia Transportation and Infrastructure; Nova Scotia Department of Natural Resources; New Brunswick Environment; Newfoundland and Labrador Municipalities; NEXUS Coastal Resource Management; Engineers PEI; Risk Sciences International; CBCL Limited; Ecology Action Centre; Union of Nova Scotia Municipalities; Municipality of Shelbourne

Region: Atlantic Provinces

NRCan funding: \$360,387

Total funding: \$866,707

Status: On-going

ECONOMICS

Title: Economic Tools to Incent Climate Change Adaptation in Land Use Decisions by Private Actors

Objective: The purpose of the project is to identify decision points by private actors in land use that could lead to outcomes well adapted to climate change hazards, and assess how provincial policies interact with these decisions. Recommendations on economic tools that can incentivize (not finance) adaptation choices will be developed.

Project Lead: BC Ministry of Environment

Contact: Jenny Fraser, Senior Policy Analyst - Adaptation, Climate Action Secretariat, British Columbia Ministry of Environment, E-mail: jenny.fraser@gov.bc.ca

Partner

organisations: Western University; Insurance Bureau of Canada

Region: National

NRCan funding: \$35,000

Total funding: \$70,200

Status: Ongoing

Title: Economic Instruments to Advance Adaptation in Natural Resource Management: Applications in Forestry

Objective: The purpose of this project is to identify economic instruments (financial, behavioural, informational and governmental) currently in use in agriculture, forestry, and land use that have shown success/promise for facilitating adaptation. The project will develop criteria to evaluate their potential for addressing adaptation within forestry, use case studies to show how selected instruments can advance adaptation, and propose where new instruments could be introduced and implemented.

Project Lead: University of British Columbia

Contact: Dr. Harry Nelson, Faculty of Forestry, University of British Columbia, E-mail: harry.nelson@ubc.ca

Partner

organisations: BC Ministry of Forests, Lands and Natural Resource Operations; BC Ministry of Environment

Region: National

NRCan funding: \$69,978

Total funding: \$171,378

Status: Ongoing

Title: Analysis of Existing and Potential Economic Instruments Designed to Facilitate Adaptation Actions in Canada

Objective: The purpose of the project is to explore existing economic instruments currently in use in the Canadian and international public, private, and/or non-profit sectors and explore how these instruments might be modified and applied to finance adaptation measures in Canada, especially in the local government context. The project will undertake applied analysis for the City of Vancouver, to help this city adopt economic instruments that promote adaptation.

Project Lead: Simon Fraser University

Contact: Deborah Harford, Executive Director, ACT (Adaptation to Climate Change Team) Association, E-mail: adapt@sfu.ca

Partner

organisations: West Coast Environmental Law; City of Vancouver

Region: National

NRCan funding: \$60,000

Total funding: \$120,000

Status: Ongoing

Title: A Comparative Evaluation of Payments for Ecosystem Services and Other Economic Incentives to Encourage Adaptation to Climate Change - Case Studies in OECD Countries

Objective: The objective of this project is to analyze the advantages and disadvantages of various economic incentives related to two issues: 1) floodproofing in urban areas; and (2) maintaining wetland / floodplain environments in rural and urban areas. This analysis will help to increase the skills and capacity of the City of Montreal (and other municipalities) and the Government of Quebec to Utilizer economic incentives for Addresser adaptation to climate change.

Project Lead: Groupe AGÉCO

Contact: Jean-Pierre Revéret, Groupe AGÉCO Courriel : jean-pierre.reveret@groupeageco.ca

Partner organisations: Ouranos

Region: National

NRCan funding: \$51,800

Total funding: \$107,100

Status: Ongoing

Title: Enabling Canadian Chartered Professional Accountants to Adapt to a Changing Climate and Emerging Operating Environment

Objective: The purpose of this project is to integrate climate change adaptation into the professional certification process of the Canadian Chartered Professional Accountants, continuing professional education requirements, higher education programs and professional communities of practice. This will increase the capacity of accountants and their business clients to manage the risks and opportunities of climate change and provide an additional lens through which they can identify risk management and value-protecting and value-creating opportunities. By enabling the mainstreaming of adaptation in the financial sector, the project will help reduce the costs of climate change to Canadian business and to increase economic competitiveness.

Project Lead: Chartered Professional Accountants of Canada

Contact: Todd Scaletta, Chartered Professional Accountants of Canada, E-mail: tscaletta@cpacanada.ca

Region: National

NRCan funding: \$374,375

Total funding: \$803,750

Status: Ongoing

Title: Atlantic Coastal Infrastructure and Property in the Atlantic Provinces

Objective: This project will address climate change impacts on sectors and industries critical to Atlantic Canada's economy. It will reflect existing knowledge and bring sector specific insights into an integrated regional framework. Project will provide economic estimates of climate change damage to coastal infrastructure/property and cost-benefit analysis of adaptation options for six case study sites:

1. Chignecto Isthmus (NB/NS) – A strategic land bridge and transport corridor with road, rail, electricity and gas infrastructure;
2. Halifax Harbour – Shipping, road and rail infrastructure;

3. Tracadie Harbour, PEI – Fishing fleet and mussel aquaculture;
4. North Cape Coastal Drive, PEI – Key tourist attraction;
5. Bay Bulls – Witless Bay, NFLD – Harbour for cargo and offshore petroleum service industry;
6. Marystown, NFLD – Ship-building facility; one of deepest ice-free sheltered ports.

Project Lead: University of Prince Edward Island

Contact: Adam Fenech, Director, Climate Research Lab, E-mail: afenech@upe.ca

Partner

organisations: Nova Scotia Department of Environment, New Brunswick Department of Environment and Local Government, New Brunswick Department of Transportation and Infrastructure, New Brunswick Power Corp, Newfoundland Environment and Conservation, Newfoundland and Labrador Office of Climate Change and Energy Efficiency, Halifax Regional Municipality, Prince Edward Island Department of Environment, Labour and Justice, Prince Edward Island Department of Transportation and Infrastructure Renewal, Prince Edward Island Department of Fisheries, Aquaculture and Rural Development, Prince Edward Island Department of Tourism and Culture, St. Francis Xavier University, Northeast Avalon Atlantic Coastal Action Program, Town of Marystown, Newfoundland

Region: Atlantic Provinces

NRCan funding: \$473,160

Total funding: \$1,025,160

Status: Ongoing

Title: Economic Assessment of Climate Change Impacts and cost-benefit analysis of adaptation options in coastal areas in Quebec

Objective: The overall aim is to achieve three main objectives:

1. A comprehensive economic assessment of climate change impacts on the coastal region of Quebec;
2. Five cost-benefit analysis associated with the implementation of adaptation options to climate change in representative locations in coastal areas in Quebec; and
3. The integration of results obtained under the different cost-benefit analyzes conducted in Quebec and those of economic evaluations in the Atlantic provinces.

Project Lead: Ouranos

Contact: Claude Desjarlais, Directeur de l'analyse économique, Ouranos Inc., Courriel : desjarlais.claude@ouranos.ca

Partner

organisations: Université du Québec à Rimouski; Gouvernement du Québec; Carleton-sur-mer; Ville de Percé; Îles-de-la-Madeleine; et municipalités de la MRC de la Mitis.

Region: Québec

NRCan funding: \$841,159

Total funding: \$1,682,342

Status: Ongoing

Title: Adaptation Strategies to Climate Change Induced Low Water Levels in the Great Lakes Basin: a Cost Benefit Analysis

Objective: The objectives of this project are to:

1. Provide a detailed analysis of the economic costs (regionally, sub-regionally, and by sector) of the decline in water levels in the Great Lakes-St. Lawrence system;
2. Analyze the economic costs and benefits of proposed adaptation and mitigation options to respond to this decline; and
3. Provide public and private decision-makers with the economic analysis needed to make better policy decisions and efficient investment choices in responding to the basin's declining water levels.

The project will undertake case studies of the following sectors: commercial shipping and harbours, tourism and recreation, waterfront properties, hydroelectric generation, commercial fishing, and domestic, municipal and industrial water use.

Project Lead: Council of the Great Lakes Region

Contact: Mark Fisher, Chief Executive Officer, Council of the Great Lakes Region, E-mail: info@councilgreatlakesregion.org

Partner

organisations: Georgian Bay Forever

Region: Ontario

NRCan funding: \$244,995

Total funding: \$500,035

Status: Ongoing

Title: Regional economic impact studies and Adaptation to Climate Change: The St. Lawrence River

Objective: The Project is aimed to achieve three main objectives:

1. Produce an economic assessment of the cost of climate change impacts, especially those related to low water levels for key areas related to the St. Lawrence River;
2. Conduct an analysis of the costs and benefits of adaptation options for different sectors studied; and
3. Perform integrated analysis of economic sector work.

Project Lead: Ouranos

Contact: Claude Desjarlais, Directeur de l'analyse économique , Ouranos Inc., Courriel : desjarlais.claude@ouranos.ca

Partner

organisations: Centre interuniversitaire de recherche sur les réseaux d'entreprise, la logistique et le transport (CIRRELT) ; Université de Sherbrooke; AECOM; Chaire en tourisme Transat- Université du Québec à Montréal; Gouvernement du Québec; Hydro-Québec

Region: Québec

NRCan funding: \$530,059

Total funding: \$1,081,197

Status: Ongoing

Title: A Study of Economic Impacts on the Weather Effects of Climate Change on Vulnerable Communities

Objective: The purpose of the project is to conduct an economic analysis of the impacts of climate change at the community level. The project will provide:

1. Economic analysis of the net costs of climate change at the local level on case study communities (Halifax and Mississauga),
2. Analysis to help make the business case to governments, business and property owners that investments in adaptation measures reduce costs over the long-term, and
3. A practical methodology for projecting economic impact of weather effects of climate change that can be adapted for use by communities.

Project Lead: Insurance Bureau of Canada

Contact: Chris Rol, Senior Policy Advisor, Insurance Bureau of Canada (IBC), E-mail: crol@ibc.ca

Region: National

NRCan funding: \$200,000

Total funding: \$425,587

Status: Ongoing

ENERGY

Title: Manitoba Assessment of Potential Temperature Trends under Climate Change Scenarios and the Impact on Energy Demand

Objective: The purpose of this project is to study the potential impacts of climate change on energy demand in Manitoba.

Project Lead: Manitoba Hydro

Contact: Michael J.F. Vieira, Water Resources Engineering Department, E-mail: mvieira@hydro.mb.ca

Region: Manitoba

NRCan funding: \$30,000

Total funding: \$67,730

Status: Ongoing

Title: Risk and Opportunities Assessment: BC Electricity Demand in a Changing Climate

Objective: The goal of this project is to explore the risks and opportunities posed by projected climate change temperature scenarios for electricity demand in British Columbia.

Project Lead: BC Ministry of Environment

Contact: Jennifer Pouliotte; Email: Jennifer.Pouliotte@gov.bc.ca

Partner

organisations: Pacific Climate Impacts Consortium; Government of BC; BC Hydro

Region: British Columbia

NRCan funding: \$30,000

Total funding: \$65,230

Status: Ongoing

Title: Yukon assessment of potential temperature trends under climate change scenarios and the impact on energy demand

Objective: The goal of this project is to explore the potential of climate change to affect the management of energy demand in order to identify potential risks and opportunities for the Yukon energy sector.

Project Lead: Government of Yukon

Contact: Ryan Hennessey, Energy Mines and Resources, E-mail: ryan.hennessey@gov.yk.ca

Partner

organisations: Energy Solutions Centre; Yukon Energy Corporation

Region: Yukon

NRCan funding: \$6,700

Total funding: \$17,845

Status: Ongoing

Title: Climate Change Risk Assessment of Electrical Distribution Infrastructure

Objective: The objective of this project is to assess climate change risks to electrical distribution infrastructure through a case study of Toronto Hydro.

Project Lead: Clean Air Partnership

Contact: Kevin Behan, Deputy Director, E-mail: kbehan@cleanairpartnership.org

Partner

organisations: Toronto Hydro; Hydro One; Ontario Power Generation; Engineers Canada; City of Toronto; Ontario Power Authority

Region: Ontario

NRCan funding: \$142,610

Total funding: \$286,870

Status: Ongoing

Title: Climate Change Implications for Small Waterpower Facilities - A Watershed Perspective

Objective: This project will conduct a climate change risk and opportunity assessment for small waterpower facilities, identify and assess adaptation options and provide recommendations.

Project Lead: Mississippi Valley Conservation Authority

Contact: Paul Lehman, P. Eng., General Manager, E-mail: plehman@mvc.on.ca

Partner

organisations: Bonnechere River Watershed Project; TransAlta; Mississippi River Power Corporation; Ontario Power Generation; Ontario Ministry of Natural Resources

Region: Ontario

NRCan funding: \$102,390

Total funding: \$267,537

Status: Ongoing

Title: Risk and Opportunities for the Oil and Gas Sector in a Changing Climate in Northeast BC

Objective: The purpose of this project is to increase the awareness of the potential impacts of climate change to the energy sector in Northeast British Columbia and identify the vulnerabilities, adaptive capacities, risks and opportunities.

Project Lead: Fraser Basin Council

Contact: Jim Vanderwal, Senior Manager, E-mail: jvanderwal@fraserbasin.bc.ca

Partner

organisations: Treaty 8 Tribal Association; Resources North Association; BC Government; BC Oil and Gas Commission; Peace River Regional District; Northern Rockies Regional District

Region: British Columbia

NRCan funding: \$129,850

Total funding: \$259,740

Status: Ongoing

Title: Enhancing Resilience to Severe Weather and Climate Change: Assessing Risks and Opportunities for Key Elements of Ontario's Electrical Transmission Grid

Objective: The purpose of this project is to conduct a climate change risk and opportunity assessment and develop adaptation options for the electricity transmission sector in Ontario to support adaptation planning and strengthening the resilience of the electricity system.

Project Lead: Toronto Region Conservation Authority

Contact: Chandra Sharma, Watershed Specialist & Senior Manager, E-mail: csharma@trca.on.ca

Partner

organisations: Risk Sciences International; Nodelcorp Consulting Inc.; Engineers Canada; Consulting Engineers of Canada; Western University; York University; Public Infrastructure Engineering Vulnerability Committee; Ontario Ministry of Energy

Region: Ontario

NRCan funding: \$130,000

Total funding: \$260,582

Status: Ongoing

Title: A tool for adaptation decision-making in oil sands reclamation under risk of climate change

Objective: This Project will develop a regionally applicable tool and methodology that incorporates climate change considerations for use in oil sands reclamation which will improve consistency among operators, and provide a means of assessing current best management practices.

Project Lead: University of British Columbia

Contact: Dr. Harry Nelson, Assistant Professor, Forestry Economics, Faculty of Forestry, E-mail: harry.nelson@ubc.ca

Partner

organisations: Oil Sands Research Information Network; Cumulative Environmental Management Association; Canadian Natural Resources Ltd.; Fort McKay First Nation; Alberta Environment and Sustainable Resource Development

Region: Alberta

NRCan funding: \$193,019

Total funding: \$493,719

Status: Ongoing

Title: Risks to the Energy Sector related to Extreme Climate Events: Case Studies of Adaptation Actions Focusing on the Upper and Lower Souris River Watersheds

Objective: The objective of this project is to increase understanding of energy sector risks and adaptation actions to extreme wet and dry climate events using the Souris River watershed as a case study area.

Project Lead: Environmental Systems Assessment Canada Ltd.

Contact: Dennis Sherratt, Environmental Systems Assessment Canada Ltd, E-mail: sherratt@sasktel.net

Partner

organisations: Government of Manitoba; Saskatchewan Research Council; International Institute for Sustainable Development; Saskatchewan Ministry of the Environment; Saskatchewan Ministry of Economy; Government of Manitoba; SaskPower

Region: Saskatchewan, Manitoba

NRCan funding: \$84,000

Total funding: \$168,300

Status: Ongoing

Title: Resilient Pipes and Wires: Assessing policies as Drivers and Barriers to Integration of Adaptation in the Planning and Operation of the Energy Distribution Sub-sector

Objective: The objective of this project is to identify policies relevant to the integration of climate change adaptation into planning and operations in the Canadian energy distribution sector, to document how these policies are acting as barriers or drivers to adaptation actions, and to provide recommendations on how to address the identified barriers and leverage drivers.

Project Lead: QUEST

Contact: Richard Laszlo, Director of Research and Education, E-mail: rlaszlo@questcanada.org

Partner

organisations: Canadian Gas Association; Canadian Electricity Association; International District Energy Association

Region: National

NRCan funding: \$75,000

Total funding: \$150,000

Status: Ongoing

Title: In-depth Review of Policy Drivers and Barriers to Oil and Gas Adaptation in Alberta Region

Objective: The objective of the project is to assess policies impacting Canadian oil and gas sector operations for their relevance as drivers or barriers to climate change adaptation. The research and analysis will provide information and recommendations relevant for private and public sector policy-makers.

Project Lead: MIRARCO, Laurentian University

Contact: Al Douglas, E-mail: adouglas@mirarco.org

Partner

organisations: Dr. John Stone; JE & M Consulting; Canadian Association of Petroleum Producers; Government of Alberta

Region: Alberta

NRCan funding: \$78,600

Total funding: \$157,200

Status: Ongoing

Title: Evaluating Opportunities and Implications of Integrating Adaptation and Mitigation Programs within the Energy Sector. Lessons from the Energy Sector in British Columbia, Alberta, Saskatchewan, Ontario and the Yukon

Objective: The objective of this project is to assess synergies between mitigation and adaptation in the Canadian energy sector in order to maximize the benefits from investments in responding to climate change and enhance the competitiveness of the energy sector.

Project Lead: MIRARCO, Laurentian University

Contact: Al Douglas, E-mail: adouglas@mirarco.org

Partner

organisations: Government of Yukon; Government of Saskatchewan; Government of BC

Region: Various

NRCan funding: \$80,110

Total funding: \$160,910

Status: Ongoing

Title: Understanding the Current State of Awareness and Action on Adaptation in the Electricity Generation, Transmission and Local Distribution Sector

Objective: The objective of the project is to determine the current state of information, planning and action on adaptation to climate change in the electricity generation and transmission sectors in Canada, to inform decision-making, and reduce risks from a changing climate.

Project Lead: Zizzo Allan Professional Corporation

Contact: Laura Zizzo, E-mail: laura@zizzoallan.com

Partner

organisations: University of Waterloo; Horizon Utilities; New Brunswick Power Holding Corporation

Region: National

NRCan funding: \$60,000

Total funding: \$144,500

Status: Ongoing

Title: Climate Change Impacts to the Oil and Gas Sector – Are we prepared?

Objective: This project will determine the current state of information, planning and action on adaptation to climate change among oil and gas companies operating in Western Canada. The focus will be on both the upstream and transmission oil and gas industries in British Columbia, Alberta, and Saskatchewan who have an existing commitment to improve coordination of oil and gas economic development.

Project Lead: Resources North Association

Contact: Melanie Karjala, Business Development Strategist, E-mail: Melanie@resourcesnorth.org

Partner

organisations: Science and Community Environmental Knowledge; Canadian Association of Petroleum Producers; BC Ministry of Environment; Saskatchewan Ministry of Environment; Canadian Energy Pipeline Association; Alberta Environment and Sustainable Resource Development; BC Oil and Gas Commission.

Region: National

NRCan funding: \$50,000
Total funding: \$100,750

Status: Ongoing

Title: Resilient Pipes and Wires: A Survey of Adaptation Awareness and Action in the Energy Distribution Sub-sector

Objective: The objective of the project is to determine the current state of information, planning and action on adaptation to climate change in the electricity distribution sector in Canada to inform decision-making and reduce risks from a changing climate.

Project Lead: Quest

Contact: Richard Laszlo, Director of Research and Education, E-mail: rlaszlo@questcanada.org

Partner

organisations: Canadian Gas Association; Canadian Electricity Association; International District Energy Association; International Council for Local Environment Initiatives - Canada

Region: National

NRCan funding: \$50,000
Total funding: \$100,000

Status: Ongoing

Title: The Impact of Climate Change on Electricity Infrastructure Investments: A National Perspective

Objective: The purpose of this project is to identify ways to improve planned electricity infrastructure investments in order to incorporate climate change adaptation considerations into investment projections.

Project Lead: Canadian Electricity Association

Contact: Michelle Turner, Director, Generation and Environment, E-mail: turner@electricity.ca

Partner

organisations: Conference Board of Canada; University of Waterloo; Ouranos; Toronto Hydro; New Brunswick Power Corporation; Manitoba Hydro; Ontario Power Generation

Region: National

NRCan funding: \$163,500

Total funding: \$354,200

Status: Ongoing

MEASURING PROGRESS

Title: Measuring Progress on Climate Change Adaptation: Lessons from The Community Well-being Analogue

Objective: The objective of this project is to evaluate approaches to measurement of community well-being to identify lessons that may be applicable for the measurement of adaptation to climate change.

Project Lead: Wilfrid Laurier University

Contact: Dr. Brenda L. Murphy, Associate Professor, E-mail: bmurphy@wlu.ca

Partner

organisations: Ontario Ministry of Agriculture, Food and Rural Affairs

Region: National

NRCan funding: \$17,137

Total funding: \$78,387

Status: Ongoing

Title: Learning through similar approaches for measuring the progress of climate change adaptation

Project Lead: Ouranos

Contact: Liza Leclerc, email: liza.leclerc@ouranos.ca

Partner

organisations: Hydro-Québec; Direction de la santé publique de Montréal

Region: National

NRCan funding: \$61,250

Total funding: \$134,175

Status: Complete

Results: *Developing Knowledge on Monitoring and Evaluation Through the study of Analogues for Climate Change Adaptation Measurement*

http://www.ouranos.ca/media/publication/326_RapportRaphoz2014.pdf

- This report reviews the monitoring and evaluation of a public health and an energy initiative to identify lessons that can be applied to the measurement of adaptation

to climate change. The information will be useful to people who are planning to monitor and evaluate adaptation programs and actions.

Title: Research and Analysis of Measuring and Evaluation Programs in Climate Change Adaptation Analogues

Objective: The objective of this project is to evaluate approaches to measurement of progress and success in other policy issues to identify lessons that may be applicable for the measurement of adaptation to climate change.

Project Lead: MIRARCO

Contact: Al Douglas, E-mail: adouglas@mirarco.org

Partner organisations: Risk Sciences International

Region: National

NRCan funding: \$140,366

Total funding: \$281,045

Status: Complete

Results: *Research and Analysis of Monitoring and Evaluation Programs as Analogues for Climate Change Adaptation Measurement*

http://www.climateontario.ca/doc/p_ECCC/AP048-Executive_Summary_FINAL-MIRARCO.pdf

- This report pulls out lessons on monitoring and evaluation that are relevant to the measurement of climate change adaptation from two diverse programs: British Columbia's Forest and Range Evaluation Program; and, the School Health Action, Planning and Evaluation System program.

Research and Analysis of Monitoring and Evaluation Programs as Analogues for Climate Change Adaptation Measurement – Executive Summary

http://www.climateontario.ca/doc/p_ECCC/AP048-Executive_Summary_FINAL-MIRARCO.pdf

Title: Transferability of the adaptation indicators selected and reported in the United Kingdom to the Canadian context

Objective: The objective of this project is to review United Kingdom's selection and use of indicators to measure progress and effectiveness of climate change adaptation and identify lessons that may be applicable for measurement of adaptation in Canada.

Project Lead: Ernst & Young LLP
Contact: Cathy Cobey, Associate Partner, E-mail: cathy.r.cobey@ca.ey.com

Partner organisations: United Kingdom Adaptation Sub-committee

Region: National

NRCan funding: \$75,000

Total funding: \$150,000

Status: Ongoing

Title: Research into the Use of Climate Change Adaptation Indicators in OECD Countries: Lessons for Canadian Public Agencies

Objective: The purpose of this project is to review the selection and use of indicators to measure progress and effectiveness of climate change adaptation in selected Organization for Economic Cooperation and Development (OECD) countries and identify lessons that are applicable for measurement of adaptation in Canada.

Project Lead: ICLEI
Contact: Megan Meaney, Director, E-mail: megan.meaney@iclei.org

Partner organisations: Simon Fraser University; ICLEI USA; ICLEI Europe; ICLEI Korea; ICLEI World Secretariat

Region: National

NRCan funding: \$100,350

Total funding: \$210,150

Status: Ongoing

Title: Analysis of indicators in climate change adaptation used in countries of the Organisation for Economic Cooperation and Development (OECD): the case of coastal management

Objective : The objective of this project is to conduct a review of international initiatives that use indicators to measure progress on adaptation in coastal areas.

Project Lead: École nationale d'administration publique (ÉNAP)
Contact: Moktar Lamari, Ph. D., Professeur et Directeur, Centre de recherche et d'expertise en évaluation (CREXE), Courriel : moktar.lamari@enap.ca

Partner organisations: Ouranos

Region: National

NRCan funding: \$92,943

Total funding: \$227,987

Status: Ongoing

Title: Measuring Progress: An analysis of indicators used in seven Canadian sectors and their transferability to adaptation

Objective: The objective of this project is to review indicators of sustainability to determine their usefulness for measurement of adaptation in Canada.

Project Lead: Clean Air Partnership

Contact: Kevin Behan, Deputy Director, E-mail: kbehan@cleanairpartnership.org

Partner organisations: International Council for Local Environmental Initiatives – Canada; Institute for Catastrophic Loss Reduction; Mining Innovation Rehabilitation and Applied Research Corporation; University of Prince Edward Island; Greater Toronto Area Clean Air Council

Region: National

NRCan funding: \$126,350

Total funding: \$253,800

Status: Ongoing

Title: Using Columbia Basin 'State of the Basin' Indicators to Measure Climate Adaptation: A Case Study

Objective: The objective of this project is to review existing Columbia Basin State of the Basin indicators to assess their ability to measure the effectiveness of climate change adaptation.

Project Lead: Columbia Basin Trust

Contact: Tim Hicks, Manager, Water and Environment, E-mail: thicks@cbt.org

Partner

organisations: Rural Development Institute – Selkirk College; Engineers Canada; Pacific Climate Impacts Consortium; West Coast Environmental Law; BC Ministry of Environment; BC Ministry of Community, Sport and Cultural; Emergency Management BC.

Region: National

NRCan funding: \$74,600

Total funding: \$150,129

Status: Ongoing

MINING

Title: Understanding Policy Enablers and Barriers for Adaptation Mainstreaming in the Mining Sector in the Prairies

Objective: The purpose of the project is to assess Saskatchewan and Manitoba's provincial government policies and programs in identified priority areas related to the mining sector for their ability to support or hinder adaptation under a changing climate.

Project Lead: Saskatchewan Watershed Authority

Contact: Tom Harrison, Director, E-mail: Tom.Harrison@wsask.ca

Partner

organisations: Government of Saskatchewan; Government of Manitoba

Region: Manitoba, Saskatchewan

NRCan funding: \$52,000

Total funding: \$104,000

Status: Ongoing

Title: Policy drivers and barriers to adaptation for the mining sector in British Columbia

Objective: The purpose of the project is to assess B.C. Government provincial policies and programs related to the mining sector for their ability to support adaptation under current climate risks, extreme weather events and future climate change.

Project Lead: BC Ministry of Environment

Contact: Jennifer Pouliotte, Email: Jennifer.Pouliotte@gov.bc.ca

Region: British Columbia

NRCan funding: \$40,000

Total funding: \$91,500

Status: Complete

Results: *Policy Issues and Barriers to Climate Change Adaptation for the B.C. Mining Sector*

- This report is an analysis of government policies and programs affecting climate change adaptation in B.C.'s mining sector. It examined their ability to enable or hinder adaptation. The report includes detailed information regarding specific government acts, how they relate to adaptation, and recommendations for future action.

Title: Understanding Mining Policy Drivers and Barriers in the Context of Climate Change Impacts and Adaptation

Objective: The purpose of the project is to analyze Ontario Government provincial policies and programs related to the mining sector for their ability to support or hinder adaptation to climate change.

Project Lead: MIRARCO
Contact: Al Douglas, E-mail: adouglas@mirarco.org

Partner organisations: Centre of Excellence in Mining Innovation

Region: Ontario

NRCan funding: \$70,000
Total funding: \$140,400

Status: Complete
Results: *Understanding Mining Policy Drivers and Barriers in the Context of Climate Change Impacts and Adaptation*
http://www.climateontario.ca/doc/p_ECCC/AP049_MIRARCO_RSI_Mining_Policy_Report-Final.pdf

- This study assesses the ability of 10 of Ontario's existing mining policy tools to support climate change adaptation. It focuses on policy instruments relating to tailings facility design and management, and mine closure planning.

Title: Incorporation of Climate Change in Environmental Assessments of Mining Projects

Objective: The purpose of the project is to provide insights about actions recommended and/or taken to address the risks related to a changing climate based on a review of past environmental assessments.

Project Lead: MIRARCO
Contact: Al Douglas, E-mail: adouglas@mirarco.org

Partner organisations: Centre for Excellence in Mining Innovation; Golder Associates; Risk Sciences International

Region: National

NRCan funding: \$103,000
Total funding: \$206,000

Status: Ongoing

Title: Case Studies of Adaptation to Climate Change in the Canadian Mining Sector

Objective: The objective of this project is to undertake case studies of adaptation to climate change by mining companies from across Canada and share this information with Canada's mining sector.

Project Lead: Arctic North Consulting

Contact: Dr. Tristan Pearce, Partner, E-mail: tristanpearce@gmail.com

Partner organisations: Northern Climate ExChange; Pittman Sustainability Consulting; Frank Duerden Consulting

Region: Saskatchewan, Yukon

NRCan funding: \$80,600

Total funding: \$167,910

Status: Complete

Results: *Case Studies of Adaptation to Climate Change in the Yukon Mining Sector*
<http://testing.arctic-north.com/wp-content/uploads/2012/09/yukon-web.pdf>

- A case study that examines climate change vulnerabilities and adaptation in three life stages of mines (planning, operation, post-closure) located in Yukon Territory.

Adaptive Policy Analysis of Mining Policies in Saskatchewan
http://www.iisd.org/sites/default/files/publications/adapttool_saskatchewan_mining.pdf

- A report on the ability of nine of Saskatchewan's mining-related policies and programs to enable adaptation in the mining sector.

Title: Risks to Mining Companies related to Extreme Climate Events: Case Studies of Adaptation Actions Focusing on the Qu'Appelle River Watersheds

Objective: The objective of this project is to undertake case studies of adaptation to climate change by mining companies of the Qu'Appelle River watershed and share this information with Canada's mining sector.

Project Lead: Saskatchewan Water Authority

Contact: Tom Harrison, Director, Partnerships and Plan Implementation, E-mail: Tom.harrison@swa.ca

Partner organisations: Saskatchewan Research Council; Watershed Implementation Fund; WUQWATR; Lower Qu'Appelle Watershed Stewardship; Saskatchewan Mining Association; Elaine Wheaton (consultant); Government of Saskatchewan

Region: Saskatchewan

NRCan funding: \$80,000

Total funding: \$179,200

Status: Complete

Results: *Adaptation to Climate Change and Potash Mining in Saskatchewan*

http://testing.arctic-north.com/wp-content/uploads/2012/09/saskatchewan_web.pdf

- This case study documents how six mines in the Qu'Appelle River Watershed are adapting to risks related to water scarcity, flooding and extreme weather by investing in infrastructure, innovative sourcing of water, water reuse, and proactive planning. The lessons from this case study may be useful to the practitioners in the mining sector.

Case Studies of Adaptation to Climate Change in the Yukon Mining Sector

<http://testing.arctic-north.com/wp-content/uploads/2012/09/yukon-web.pdf>

- This report examines climate change risks and adaptive strategies in Yukon mines that can be applied to manage these risks in three stages in the life of a mine: planning, operation, and remediation. The lessons from this case study may be useful to the practitioners in the mining sector.

Adaptive Policy Analysis of Mining Policies in Manitoba

http://www.iisd.org/sites/default/files/publications/adapttool_manitoba_mining.pdf

- This report summarizes the results of a review of six provincial policies related to the mining sector. The review examined their ability to enable or hinder adaptation actions in the sector. Policies examined included the Manitoba Mines Act and Mine closure regulations.

Adaptive Policy Analysis of Mining Policies in Saskatchewan

http://www.iisd.org/sites/default/files/publications/adapttool_saskatchewan_mining.pdf

- This report summarizes the results of a review of nine provincial policies and programs related to the mining sector. The review examined their ability to enable or hinder adaptation actions in the sector. Policies examined included the Guidelines for Northern Mine Decommissioning and the Drainage Approval Process.

Past, Present and Future Vulnerability and Risk Assessment to Climate Extremes for Potash Mines in the Qu'Appelle River Watershed: Literature Review

- This report examines historic climate risks to the potash industry, estimates future impacts due to climate change, proposes potential solutions, and includes a preliminary cost-benefit analysis for the adaptation strategies.

Characterization of Historical Drought and Excess Moisture in the Qu'Appelle River Watershed

<http://www.parc.ca/rac/fileManagement/upload/1TLandofExtremesDEM%20report%202011-12%20v2.pdf>

- This study provides an overview of the climate of the Qu'Appelle River Watershed over the last 110 years, including temperature, precipitation, drought, and evapo-transpiration. Knowledge of historical climate extremes can help inform adaptation decisions to reduce the impact of future events.

Risks of Dry and Wet Extremes in Southeast Saskatchewan: From the Past into the Future

- This short overview covers the basics of climate change and climate impacts due to extreme weather in southern Saskatchewan, a region which holds the records for some of the greatest wet and hot extremes in Canada.

Future Possible Dry and Wet Extremes in Saskatchewan

- This literature review characterizes projections of future severe weather events and identifies worst-case scenarios for drought and precipitation for the Upper and Lower Qu'Appelle Valley in Saskatchewan. Although prepared to support case studies in the mining sector, the report will be useful for those planning for future climate change in the region.

What Risks to Potash Mining are Posed by Droughts?

- This presentation communicates the risks to potash mining in Saskatchewan posed by climate change. Information on different types of droughts and the impacts they have on industrial mining activity is included.

Title: Adaptation in the Mining Sector in Canada: A Compilation of Case Studies

Objective: The objective of this project is to undertake case studies of adaptation to climate change by mining companies from across Canada to provide information about what companies are already doing about adaptation and share this information with Canada's mining sector.

Project Lead: Fraser Basin Council

Contact: Bob Purdy, Director, External Relations & Corporate Development, Email: bpurdy@fraserbasin.bc.ca

Partner

organisations: Mining Innovations Rehabilitation and Applied Research Corporation; Centre for Excellence in Mining Innovation; Golder Associates

Region: British Columbia, Ontario

NRCan funding: \$100,000

Total funding: \$244,508

Status: Complete

Results: *Climate Change Planning at Glencore in Sudbury, Ontario*

http://www.retooling.ca/Library/Mining_Essentials/mining_case_study_glencore.pdf

- This case study outlines the climate change adaptation planning and action currently underway at Glencore's integrated nickel mining operations in Sudbury. It is intended to be a source of information for other mining operations in Canada seeking to understand how their business will be impacted by climate change.

Enhancing Weather Resiliency at Nyrstar Myra Falls

http://www.retooling.ca/Library/Mining_Essentials/mining_case_study_nyrstar.pdf

- This case study describes the efforts of Nyrstar to deal with weather-related challenges at its Myra Falls operation on Vancouver Island. It is intended to be a source of information for other mining operations seeking to understand how their business will be impacted by climate change.

Title: Economic impacts of a changing climate on the operations and reclamation of mines: A comparison of proactive and reactive approaches

Objective: The objective of this project is to prepare four case studies that examine the economic impacts of climate change on the mining sector and the adaptation actions that can be used to address them.

Project Lead: Ernst & Young LLP

Contact: Cathy Cobey, Associate Partner, E-mail: cathy.r.cobey@ca.ey.com

Partner

organisations: IAMGOLD Corporation; Rio Tinto Alcan

Region: British Columbia, Québec

NRCan funding: \$100,000

Total funding: \$215,000

Status: Ongoing

Title: Economic Implications of Climate Change Adaptations for Mine Access Roads in Northern Canada

Objective: The objective of this project is to prepare a case study that examines the economic impacts of climate change on a seasonal mine access road in northern Canada and of the adaptation actions that can be used to address them.

Project Lead: Northern Climate ExChange

Contact: Lacia Kinneer, Manager, E-mail: lkinnear@yukoncollege.yk.ca

Partner

organisations: Risk Sciences International; International Institute for Sustainable Development;
Government of Northwest Territories

Region: North

NRCan funding: \$122,502

Total funding: \$287,002

Status: Ongoing

Title: Development of Climate Change Economic Case Analyses for the Mining Sector

Objective: This project will develop four case studies that examine the economic impacts of climate change on the mining sector and the adaptation actions that can be used to address them.

Project Lead: MIRARCO

Contact: Al Douglas, E-mail: adouglas@mirarco.org

Partner

organisations: Centre for Excellence in Mining Innovation; Golder Associates; Province of Manitoba;
Province of British Columbia

Region: Manitoba, Ontario

NRCan funding: \$95,000

Total funding: \$190,500

Status: Ongoing

Title: Climate Change Impacts and Adaptation Mining Survey

Objective: The objective of this Project is to survey mining companies in Canada to identify the current state of adaptation activity.

Project Lead: Mining Association of Canada

Contact: Ben Chalmers, Vice President, Sustainable Development, E-mail: bchalmers@mining.ca

Partner

organisations: Members of the Mining Association of Canada

Region: National

NRCan funding: \$20,000
Total funding: \$42,300

Status: Ongoing

NORTHERN

Title: A systematic review of climate change hazard-related mapping activities and vulnerability assessments of the built environment in Canada's North to inform climate change adaptation

Objective: The project will identify and evaluate climate hazard mapping and vulnerability assessments of the built environment in Canada's North to inform future hazard mapping and vulnerability assessments relevant to the built environment in Canada's North.

Project Leads: McGill University and Risk Sciences International

Contacts: Dr James D. Ford, Asst. Professor, Climate Change Adaptation Research Group, Dept. of Geography, Email: james.ford@mcgill.ca; Mr. Erik Sparling, Director, Climate Risk Decision Support, Email: esparling@risksciencesint.com

Partner

organisations: Ouranos; Memorial University

Region: North

NRCan funding: \$129,490

Total funding: \$261,005

Status: Complete

Results: *Adapting the Built Environment in a Changing Northern Climate*

http://www.nwtclimatechange.ca/sites/default/files/Adapting_Built_Environment.pdf

- This report reviews climate-related hazard and vulnerability assessments in Canada's North and their applicability for use in adaptation activities. The document identifies vulnerabilities, evaluates current adaptation activities, identifies priorities, and includes recommendations aimed at advancing hazard identification in the North.

Adapting the Built Environment in a Changing Northern Climate: Searchable Database

<http://www.jamesford.ca/searchable-database>

- This online database provides a searchable listing of climate change adaptation information affecting Canada's North. Reports included were published during 2007-2012, and cover all three territories, Yukon, Northwest Territories and Nunavut.

Title: Enhancing Knowledge Transfer to Decision-Makers with Respect to Climate Change Impacts on the Cryosphere

Objective: This project will assess the evidence of current changes to permafrost and snow conditions as well as information about projected changes, and developed and tested

information and communication products for climate change adaptation decision-making in the northern mining and land transportation sectors.

Project Lead: Yukon College

Contact: Lacia Kinnear, E-mail: lkinnear@yukoncollege.yk.ca

Partner

organisations: Risk Sciences International; Mining Innovation Rehabilitation and Applied Research Corporation; Government of Northwest Territories Department of Transportation

Region: North

NRCan funding: \$99,832

Total funding: \$239,952

Status: Complete

Results: *Enhancing Knowledge Transfer to Decision Makers with Respect to Climate Change Impacts on the Cryosphere: Literature Review Report*

http://www.nwtclimatechange.ca/sites/default/files/Enhancing_knowledge_transfer_a_daptation_and_impacts_on_cryosphere.pdf

- This literature review focuses on the impacts of changes to snow and permafrost on transportation and mining in the Yukon and Northwest Territories.

Title: Baseline Analysis of Mainstreaming Adaptation into Natural Resources Development Activities in the Hudson Bay Inland Sea Region

Objective: This project will identify how existing natural resource companies and government sectors operating in Canada's North (specifically within the Hudson Bay Inland Sea region) currently integrate climate change in their operations, identify how risks related to future climate change are being addressed in planned resource development in Canada's North, and develop recommendations for future consideration to support sustainable resource development in a changing climate.

Project Lead: International Institute for Sustainable Development

Contact: Darren Swanson, Deputy Director, Natural and Social Capital Program, E-mail: dswanson@iisd.ca

Partner

organisations: Hydro Quebec; Manitoba Hydro; University of Winnipeg; Centre for the North; Government of Manitoba; Government of Nunavut; Government of Ontario

Region: Manitoba, Ontario

NRCan funding: \$52,000

Total funding: \$104,000

Status: Complete
Results: *Baseline Analysis of Mainstreaming Adaptation into Natural Resource Development Activities in the Hudson Bay Inland Sea Region*

- This report provide a baseline of how climate adaptation is being incorporated into development planning by government and industry in the context of community level adaptive capacity in the Hudson Bay Inland Sea Region.

Title: Climate risk assessment of transportation requirements for the MB-NU supply chain

Objective: This project will undertake a climate vulnerability risk assessment of the transportation infrastructure that supports the supply chain between Manitoba and Nunavut. The outcomes of this project will increase awareness of climate related vulnerabilities among policy makers and planners in the Governments of Manitoba and Nunavut, and key private-sector stakeholders who rely on transportation for the development and expansion of their operations in this region.

Project Lead: University of Winnipeg

Contact: Terry Duguid, Director, Northern Sustainable Prosperity Initiative, E-mail: tduguid@mymts.net

Partner

organisations: Calm Air; Centre Port Canada; Engineers Canada; Gardewine Group; International Institute for Sustainable Development; Kivalliq Inuit Association; Mining Association of Manitoba; North West Company; Omni Trax Inc.; Winnipeg Airport Authority; Stantec Consulting Ltd.; Government of Manitoba; Government of Nunavut; City of Thompson; Town of Churchill

Region: North

NRCan funding: \$125,000

Total funding: \$267,500

Status: Ongoing

Title: Risk assessment of key buildings and infrastructure in Ross River, Yukon, related to permafrost degradation

Objective: The objective of this project is to assess the risks to public infrastructure managed by Yukon Government's Property Management Division (PMD), and supporting current and future economic development, posed by permafrost degradation in Ross River. The outcome of this project will inform the maintenance and design of existing and new infrastructure in northern communities supporting non-renewable resource extraction, ensuring their continued contribution to Canada's northern economy.

Project Lead: Northern Climate ExChange Yukon College
Contact: Dr. Fabrice Calmels, Research Associate, Northern Climate ExChange, E-mail: fcalmels@yukoncollege.yk.ca

Partner organisations: Government of Yukon; Yukon Geological Society

Region: Yukon

NRCan funding: \$186,499

Total funding: \$401,546

Status: Ongoing

Title: Impacts of change on storminess and storm surges in Hudson Bay and James Bay

Objective: The objective of this project is to estimate the impact of climate change on existing and future infrastructure for selected sites along the shores of James Bay sites and Hudson Bay.

Project Lead: Ouranos
Contact: Jean Pierre Savard, Oceanographer Email : savard.jean-pierre@ouranos.ca

Partner organisations: Ministère de Transport Québec

Region: Quebec, Ontario, Manitoba

NRCan funding: \$131,400

Total funding: \$263,900

Status: Ongoing

Title: Arctic Council Information Portal

Objective: The objective of this project is to develop an online adaptation information portal for the circumpolar Northern region that will enhance adaptive capacity, foster innovation and learning-by-doing, and facilitate the development of best practices in climate change adaptation for governments, industry, and Arctic indigenous peoples.

Project Lead: Yukon Government
Contact: Stephen Roddick, Adaptation and Outreach Coordinator, Climate Change Secretariat, Department of Environment, E-mail: Stephen.Roddick@gov.yk.ca

Partner
organisations: University of Alaska Fairbanks

Region: North

NRCan funding: \$100,000

Total funding: \$332,000

Status: Ongoing

REGIONAL ADAPTATION

COLLABORATIVE AND TOOLS

SYNTHESIS PROJECTS

Title: Community-related Adaptation Resources Compendium and Guidance based on RAC and Tools Program Products

Objective: The purpose of this project is to create an on-line accessible compendium of climate change adaptation resources, focused on community-level issues.

Project Lead: ICLEI-Canada

Contact: Megan Meaney, Director, E-mail: megan.meaney@iclei.org

Region: National

NRCan funding: \$116,840

Total funding: \$235,318

Status: Complete

Results: *Adaptation Library*

<http://www.adaptationlibrary.com/>

- The Adaptation Library is a publicly accessible and searchable collection of community-related products developed through the Natural Resources Canada Regional Adaptation Collaborative (RACs) and Tools for Adaptation Programs. The goal of the Library is to connect community and municipal users with relevant information related to local climate change adaptation.

Title: Sea Level Rise Primer Version 2 and Companion Materials

Objective: The objectives of this project are to: update the existing “Sea Level Rise Primer” content to include case studies and stakeholder feedback published/gathered since May 2012; prepare an on-line “Sea Level Rise Primer” publication; and develop regionally relevant companion materials to assist decision-makers in demonstrating the benefits of adapting to sea level rise.

Project Lead: BC Ministry of Environment

Contact: Jennifer Pouliette; Email: Jennifer.Pouliotte@gov.bc.ca

Partner

organisations: Ouranos; Atlantic Climate Adaptation Solutions Association; BC Ministry of Environment; BC Ministry of Community, Sport and Cultural Development; BC Ministry of Forests, Lands and Natural Resource Operation; Nova Scotia Environment

Region: British Columbia

NRCan funding: \$60,000

Total funding: \$123,250

Status: Complete

Results: *Sea Level Rise Adaptation Primer: A Toolkit to Build Adaptive Capacity on Canada's South Coasts*

<http://www.env.gov.bc.ca/cas/adaptation/pdf/SLR-Primer.pdf>

- This Primer is a resource for coastal management authorities to help identify and evaluate options for adapting to the impacts of sea level rise and associated hazards. The Primer provides an introduction to past and future sea level, an overview of four adaptation strategies, a recommended framework for decision making and 21 adaptation tools to support local adaptation action. It is relevant for southern coastal regions across Canada.

Title: British Columbia Regional Adaptation Collaborative Case Studies

Objective: The objective of the project is to produce two case studies that document innovative Regional Adaptation Collaborative projects from British Columbia from which key learning experiences and methods/approaches can be promoted to other targeted adaptation decision-makers and practitioners across Canada.

Project Lead: BC Ministry of Environment

Contact: Jennifer Pouliotte, Climate Action Secretariat, E-mail: Jennifer.pouliotte@gov.bc.ca

Partner

organisations: BC Ministry of Forests, Lands and Natural Resource Operations; BC Ministry of Community, Sport and Cultural Development

Region: British Columbia

NRCan funding: \$25,000

Total funding: \$50,000

Status: Complete

Results: *Sea Level Rise in British Columbia: Mobilizing Science into Action*

http://www.retooling.ca/Library/docs/bc_sea_level_rise_en.pdf

- This case study examines the conditions that lead to successful integration of climate change science into B.C. government policy, and in particular, sea level rise studies and how they affected awareness of sea level rise issues in the province.

Adaptation Planning: The Local Government Experience in B.C.

http://www.retooling.ca/Library/docs/bc_community_adaptation_en.pdf

- This case study looks at the drivers and barriers to action on climate change by local governments. The results provide a better understanding of these factors, and encourage cooperation and collaboration among local government when faced with climate change issues.

Title: Climate Scenarios: A Guide for Decision-Makers

Objective: This project will produce a guide to help various user groups use of climate information for decision-making in the context of uncertainty.

Project Lead: Ouranos

Contact: Isabelle Charron, Scenario Chief, email: Charron.Isabelle@ouranos.ca

Partner

organisations: Prairie Adaptation Research Collaborative, Pacific Climate Impacts Consortium, Hydro-Québec

Region: National

NRCan funding: \$92,400

Total funding: \$216,265

Status: Complete

Results: *A Guidebook on Climate Scenarios: Using Climate Information to Guide Adaptation Research and Decisions*

http://www.ouranos.ca/media/publication/352_GuideCharron_ENG.pdf

- This guide provides information on categories and types of products for future climate scenarios. It also describes what type of information may be most appropriate for different types of analysis and decision situations. This guide will be useful to practitioners, researchers and decision-makers across all sectors.

Title: Policy Analysis for Mainstreaming Adaptation in Four Provinces using the ADAPTTool

Objective: The objective of this project is to produce an improved version of the *ADAPTTool – For Existing Policies* with a guidance manual for users, as well as a beta version of the *ADAPTTool – for New Policy Design*.

Project Lead: Saskatchewan Watershed Authority
Contact: Tom Harrison, Director, E-mail: Tom.Harrison@wsask.ca

Partner

organisations: Government of BC; Government of Nova Scotia; Government of Saskatchewan;
Government of Manitoba

Region: National

NRCan funding: \$117,650

Total funding: \$236,300

Status: Complete

Results: *The Adaptive Design and Policy ADAPTool*

The ADAPTool is a web-based tool developed by the International Institute for Sustainable Development which can be used to assess government policies for their resilience to climate change. There are 2 versions of this tool – one for new policies and one for existing policies:

The Adaptive Design & Assessment Policy Tool (ADAPTool) for Creating New Policies

http://www.iisd.org/pdf/2014/adapttool_overview.pdf

- This fact sheet summarizes a beta version of the ADAPTool which helps decision-makers create new policies that will be more responsive to future changes or stressors that can have an impact on policy performance including climate change.

The Adaptive Design and Policy Tool (ADAPTool) for Existing Policies and Guide

http://www.iisd.org/pdf/2014/adapttool_guidebook.pdf

- This tool was designed to assess existing programs and policies for their adaptability and resilience to stressors including climate change. This version of the tool was further modified based on pilot assessments in four Provinces as listed below. The pilot results have informed government decision-makers on how policies encourage and do not restrict adaptation measures.

Strengthening Adaptive Capacity in Four Canadian Provinces: ADAPTool analysis of selected sectoral policies – a Synthesis Report

http://www.iisd.org/pdf/2014/adapttool_synthesis.pdf

Adaptive Design & Assessment Policy Tool (ADAPTool), Government of B.C. Agriculture Programs

http://www.iisd.org/pdf/2014/adapttool_bc_ag.pdf

Adaptive Design & Assessment Policy Tool (ADAPTool), B.C. Ministry of Agriculture, Marine Fisheries and Seafood Program

http://www.iisd.org/pdf/2014/adapttool_bc_fisheries.pdf

Analysis of Nova Scotia: Selected policies and programs of N.S. Environment (water withdrawal and parks and protected areas)

http://www.iisd.org/sites/default/files/pdf/2014/adapttool_nova_scotia.pdf

Adaptive Policy Analysis of Saskatchewan's 25-year Water Security Plan

http://www.iisd.org/sites/default/files/publications/adapttool_saskatchewan_water.pdf