PRAC
Prairies Regional
Adaptation Collaborative

MOVING FORWARD ON CLIMATE CHANGE ADAPTATION IN THE PRAIRIE PROVINCES

"The PRAC is back!" Foundation Paper for prioritizing activities, 2014-2016

March 3, 2014

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A) Introduction

Evidence of climate change is growing across the Canadian Prairies—from rising mean annual temperatures, to melting permafrost, to longer growing degree days. These and other changes are anticipated to adversely impact economic activities, social well-being and the long-term sustainability of prairie ecosystems. Efforts to strengthen the capacity of policy makers in Alberta, Saskatchewan and Manitoba to prepare for these impacts were made between 2010 and 2012 through the Prairies Regional Adaptation Collaborative (PRAC), a federal-provincial cost-share program. The objective of the PRAC was to increase the capacity of decision-makers to advance the integration of adaptation into policies, programs and planning (Anon., n.d.).

A second phase of the PRAC (2013 to 2016) is currently being re-launched. The new round of PRAC aims to advance adaptive capacity within the Prairies by sharing and applying existing and new knowledge, information and tools. Activities within PRAC are also intended to complement and be informed by the work of the Adaptation Platform, a five-year national initiative of Natural Resources Canada (NRCan) working to enhance adaptation action by the Canadian public and private sectors.

Although the general objectives of the new phase of the PRAC have been identified, key decisions remain regarding its strategic direction. These include identification of specific activities to be undertaken, stakeholders to be engaged, and how the PRAC will be operationalized. A series of workshops will take place in March 2014 across the Prairies to determine the strategic direction of the next phase of the PRAC. This background paper has been prepared to inform these workshop discussions. It begins by providing an overview of the current context for adaptation on the Canadian Prairies, noting current and anticipated vulnerabilities and provincial level commitments to addressing these vulnerabilities. This is followed by a more detailed introduction to the PRAC that describes activities completed during its first phase and the opportunities, barriers, gaps and lessons learned through their implementation. An overview of current adaptation actions on the Prairies, highlighting initiatives related to the Adaptation Platform, is provided. Finally, the paper closes by presenting options for consideration regarding the activities and management structure associated with the next phase of the PRAC.

B) Setting the context

Climate on the Prairies is characterized by variability, with significant changes in temperature and precipitation levels occurring from season to season, year to year, and decade to decade. However, within this variability the region has experienced a long-term increase in mean annual temperatures of 1.6^{o}C since 1895. The greatest rate of warming occurred in the past 50 years, with warming being particularly apparent during the winter (Sauchyn & Kulshreshtha, 2008). Concurrently, winter precipitation has also decreased (Sauchyn & Kulshreshtha, 2008).

Current projections indicate that mean annual temperatures across the Prairies will continue to rise in the future, potentially by 3^{o}C (with a potential range of 2 to 5^{o}C) by 2100 (Sauchyn & Kulshreshtha, 2008). A greater degree of warming is projected to occur in the winter compared to the summer, with the summer also experiencing more frequent heat waves and a continuing increase in growing degree days (Blair, 2012). Although there is less certainty regarding how precipitation patterns will change, there is a general expectation that the region will experience an increase in mean annual precipitation, with levels increasing more in the northern forest zone compared to the southern grasslands (Sauchyn & Kulshreshtha, 2008). The degree of change is also projected to vary from season to season, with a greater increase in precipitation occurring in the winter and spring, and summer rainfall increasingly occurring in fewer but more intense heavy rainfall events (Sauchyn & Kulshreshtha, 2008; Sauchyn,

2009). A greater degree of variability in climatic conditions may also occur, along with greater risk of extremes, including more intense droughts, excessive moisture conditions and flooding.

POTENTIAL IMPACTS

These projected changes will lead to a diverse array of economic, social and ecological impacts across the Prairies. The **agriculture and forestry** sectors are among those most at risk due to their direct dependence on climatic conditions for productivity. Although an increase in temperature could lengthen the agriculture growing season and allow forests to expand northward, drier conditions could lead to reduced crop yields, higher evapotranspiration levels, increased risks of forest fires, and reduce trees' defenses against diseases and pests (Cloutis et al, 2001; Sauchyn & Kulshreshtha, 2008; MANA, 2011; Thorpe, 2011).

The **energy** sector also will be affected. Hydropower generation will be influenced by more variable hydrologic conditions as well as changes in energy demand patterns—including the potential for peak demand to switch from the winter to the summer due to heat extremes. More frequent excessive moisture conditions could impede access to oil and gas sites and damage infrastructure, while low water levels could reduce access to critical water supplies needed by, for example, multi-stage fracking technologies. **Transportation** infrastructure is also anticipated to be adversely affected by permafrost melt, more frequent heavy rainfall and flooding, heat stress and a shorter winter road season.

The consequences of climate change experienced by different groups of people will vary depending on their location, economic livelihoods, physical health and level of enfranchisement. **Aboriginal peoples** are among the most vulnerable to the impacts of climate change due to their greater dependence on the land for livelihoods activities and more limited access to resources required to enhance adaptive capacity. Individuals with compromised health conditions are also more vulnerable to the impacts of climate change. Climate change will affect human **health** through slow onset processes that alter vector borne diseases and pathogen development (such as Lyme disease, West Nile and E. coli) and the physical and emotional harm caused by extreme weather events (Henderson & Sauchyn, 2008; MANA, 2011).

Recent extreme weather events demonstrate the scale of impact these events can have on local and provincial economies and communities. This includes the floods in southern Saskatchewan and Manitoba in 2011, which saw the highest water levels and flows along rivers in parts of these provinces. Manitoba experienced its largest flood in recorded history due to flooding along 13 rivers and the shores of Lake Manitoba. One person died and more than 7,100 people were evacuated, mostly from First Nations communities; 2,000 evacuees remained out of their home communities in early 2013. The flood cost an estimated $1.2 billion (Manitoba Infrastructure and Transportation, 2013). In Saskatchewan, significant flooding occurred along the Souris River following heavy rainfall events in May and June, leading to the evacuation of 4,800 people (Environment Canada, 2013). The province had allocated $34 million to its Emergency Flood Damage Reduction Program by September 2011 (Saskatchewan Water Security Agency, n.d.)

While significant, the 2011 Manitoba floods are dwarfed by the impact of the flooding in southern Alberta last June. The torrential rains that fell between June 20 and 24, 2013 led to the evacuation of 100,000 people, four deaths and significant damage to property—particularly in the Town of High River. The estimated cost of the flood as of September 2013 was $5-billion, including more than $1.7 billion in insured losses. The 2013 Alberta floods were the most costly natural disaster in Canadian history (Insurance Bureau of Canada 2013)—exceeding the cost of the 1997 Red River flood (at $3.5 billion) and the 1998 Quebec, Ontario and New Brunswick Ice Storms (at $3.0 billion) (Alberta Construction Magazine, 2013). Although governments and citizens across the Prairies have developed and utilize a

number of strategies to cope with the region's natural climatic variability, there is a growing need to increase capacity to prepare for and manage the climate risks of today while also preparing for greater variability, intensity and frequency of climatic risks in the future.

POLICY RESPONSES ACROSS THE PRAIRIES

Across the Prairies, provincial governments are responding to these threats and opportunities through a combination of policy commitments, research initiatives and implementation of on-the-ground adaptation actions.

Alberta committed to development of an adaptation strategy in *Alberta's Climate Change Strategy* (2008) that will "provide overall direction, identify measures and indicators of climate change, provide a source of information about the impacts, and identify risks and vulnerabilities" (Alberta, 2008). A strategy focused on provincial government operations is in preparation (Alberta 2013a) and could include: core measures, such as capacity building, research, technology development and facilitating collaboration; and targeted measures, such as those focused on extreme weather events, reduced water availability, wildfires, ecological change and socio-economic risks (Alberta, 2013b). Once completed, the government adaptation strategy will be used to inform a provincial level strategy (Alberta, 2013b).

Development of the adaptation strategy is being overseen by the Alberta Climate Change Adaptation Team led by Alberta Environment and Sustainable Resource Development. The team promotes coordination and consultation between ministries and fosters awareness and understanding of climate change adaptation within government (Alberta, 2013b). To inform development of its adaptation strategy, the Province has completed a number of vulnerability studies in various locations and sectors. Ten departments[3] have also prepared assessments that identify key risks and opportunities over the next 40 to 50 years. Preparation of these assessments aided in increasing awareness of potential impacts and adaptation options amongst department officials (Alberta 2013b). The risk assessment undertaken by Alberta Sustainable Resource Development (now Alberta Environment and Sustainable Resource Development) was informed by the Climate Change Adaptation Framework[4] it developed and applied over a period of three years.

Saskatchewan passed climate change legislation, *The Management and Reduction of Greenhouse Gases Act*, in April 2013, which supports adaptation planning through policy and program initiatives that increase the resiliency of industry, communities, and other stakeholders in responding to extreme weather events and long-term climate impacts. This includes the development of risk management strategies designed to reduce vulnerability by mainstreaming adaptation planning in collaboration with key industry and community groups. Research and demonstration projects and industry-specific risk assessments have also increased public awareness of priority adaptation issues.

In addition, the Saskatchewan Water Security Agency has developed the 25 Year Saskatchewan Water Security Plan, which includes provisions for managing increasing variability in flows in provincial watersheds to address the challenges associated with flooding and ensuring a sustainable water supply and to support the needs of industry, the business community, and municipalities.

[3] Risk assessments have been prepared by the following departments: Alberta Environment, Sustainable Resource Development, Energy, Agriculture and Rural Development, Tourism, Parks and Recreation, Transportation, Infrastructure, Health and Wellness, Aboriginal Relations and Municipal Affairs (Alberta, 2013).

[4] The Climate Change Adaptation Framework is an evidence-based decision-support tool that supports integration of adaptation into corporate planning process. It was applied by ASRD's internal climate change working group with the support of an outside consultant.

Climate change adaptation is a priority identified in **Manitoba's** *Tomorrow Now – Manitoba's Green Plan*, an eight-year strategic plan for addressing environmental priorities released in 2012. It puts forward a three phase Adaptation Pathway, namely: (1) undertake a government-wide risk assessment to identify potential impediments to the delivery of essential programs and services; (2) undertake a province-wide assessment of the risk climate change poses for Manitoba's communities, ecosystems and economy; and (3) prepare an adaptation strategy and action plan, along with an associated monitoring and evaluation framework (Manitoba, 2012).

Implementation of Manitoba's Adaptation Pathway is being supported by an Inter-departmental Adaptation Working Group established in 2013. The Working Group is tasked with ensuring implementation of the province's three phase adaptation pathway. Its objectives also include enhancing awareness, improving coordination and cooperation, mainstreaming climate change adaptation planning and identifying and bridging research and knowledge gaps (Manitoba, 2013).

Additional policy efforts by the province to promote adaptation to climate change include preparation of a high-level climate change adaptation strategy by the Ministry of Agriculture, Food and Rural Development. The need to adapt to climate change also has been integrated into Manitoba's Provincial Land Use Policy. As well, Manitoba's Climate Change and Emissions Reduction Act requires the submission of a report every four years that assesses the impacts of climate change and identifies policies and measures to address these impacts (Manitoba, 2013).

C) Where have we come from?

In addition to the policy responses noted above, each province also participated in the first round of PRAC. NRCan launched the Regional Adaptation Collaborative Climate Change Program in 2009, a three-year, $30 million federal-provincial cost share program that aimed to "catalyze coordinated and sustained adaptation planning, decision-making and action across Canada's diverse regions" (NRCan, 2011). One of six collaboratives formed as part of this program was the Prairies Regional Adaptation Collaborative. The PRAC was formed by the Provinces of Alberta, Saskatchewan and Manitoba, and administered by the University of Regina. Its specific objective was to increase the capacity of decision-makers to advance the integration of adaptation into policies, programs and planning by providing them with regionally relevant networks, knowledge and tools (Anon., n.d.). A total of $6.6 million was provided by the provinces and NRCan to support implementation of the PRAC program between April 2010 and March 2012 (Anon., n.d.).

Reflecting a shared concern regarding the impacts of climate change on the hydrological regime of the Prairies, the original PRAC work was organized around the following themes (see Appendix 1 for a detailed overview of activities).

- **Water Resource Management**. Led by Alberta Environment (now Alberta Environment and Sustainable Resource Development), the Prairie Adaptation Research Collaborative (PARC) in Saskatchewan, and Manitoba Conservation and Water Stewardship (MCWS), projects under this theme focused on assessing historic hydro-climate variability, characterizing water supply and demand under climate change, program tools for advancing water conservation and soft path approaches, and synthesizing initial recommendations for integrating adaptation in water policy.
- **Drought and excessive moisture.** Led by Alberta Agriculture and Rural Development, the Saskatchewan Watershed Authority (now the Saskatchewan Water Security Agency) and MCWS and Manitoba Agriculture, Food, and Rural Initiatives (MAFRI), projects under this theme focused on hydro-climate extremes preparedness planning in municipalities, watersheds and at the provincial level, monitoring and simulating extreme climate conditions, and enhancing interprovincial communication for drought management.

- **Terrestrial ecosystems.** Led by Alberta Sustainable Resource Development (now Alberta Environment and Sustainable Resource Development), the Saskatchewan Research Council, and MCWS and MAFRI, projects under this theme focused on assessing the impacts, vulnerability and resilience of grassland and forest ecosystems to climate change and mainstreaming adaptation within provincial forestry and agricultural policies.
- **Interprovincial coordination and collaboration.** Four forums were held that aimed to share knowledge from PRAC projects, promote collaboration, and increase awareness around the need for climate change adaptation in provincial ministries and departments.

Although the PRAC aimed to promote the sharing of information, capacity building and mutual learning through its partial focus on interprovincial collaboration, most PRAC activities under the various themes were implemented separately by each jurisdiction to meet their distinct needs, goals and objectives.

At the end of the first round of PRAC funding, a number of synthesis projects were undertaken that provide recommendations for advancing adaptation in each jurisdiction and across the Prairies region (see Archibald 2011; Parry et al. 2012; Rescan 2012a; Rescan 2012b). The synthesis reports built on learning from the PRAC projects and forums to summarize the state of knowledge at the time and provide direction for targeted work under subsequent rounds of funding (see Appendix 2 for a detailed overview). There were two main broadly recognized **opportunities** for advancing adaptation highlighted by the synthesis work. The first was mainstreaming. Mainstreaming refers to integrating climate adaptation into relevant policies, plans, programs, projects, decision-making cycles or processes in systematic and rigorous ways (Klein et al. 2007; OECD 2009; USAID 2009). Under the PRAC, a number of initial attempts at mainstreaming were undertaken (see AB SRD 2010; IISD 2012) that sparked interest in the approach amongst a number of PRAC partners. The synthesis reports identified multiple ways that adaptation could be mainstreamed within agricultural, water and forestry policies (Archibald 2011; Parry et al. 2012; Rescan 2012b). For example, the promotion of sustainable grazing and grassland conservation within existing agri-environmental programs was identified as an opportunity to mainstream climate change adaptation (Steinley and Mowchenko 2011; Thorpe 2012; IISD 2012). However, further work was required to provide detailed guidance on mainstreaming in most cases.

The second opportunity was to build on the established interdisciplinary coordination and collaboration that the PRAC established. The PRAC helped build interdepartmental and interprovincial relationships that could be leveraged for future adaptation programs or projects. However, action was limited by the very different levels of existing interdepartmental coordination and collaboration on adaptation in each jurisdiction. Alberta's Climate Change Adaptation Team was operating prior to the PRAC, but neither Saskatchewan nor Manitoba had done much interdepartmental work on adaptation. The PRAC helped advance collaboration in the latter two cases, but still further work was needed to create more formal and inclusive arrangements. Between the provinces, PRAC helped establish relationships between the key ministries and departments working on adaptation that fostered a degree of coordination on PRAC activities. However, there were few instances where formal collaboration took place across the provinces[5]. Despite the challenges, PRAC contributed to a significant amount of capacity for coordination and collaboration both within and across jurisdictions that could be foundational for future work.

[5] There are a few exceptions where fruitful interprovincial collaboration occurred. These exceptions include many of IISD's ADAPT Tool projects as well as the Saskatchewan Research Council's forestry and grassland vulnerability and adaptation work.

Nevertheless, there were multiple, interrelated **barriers** to taking advantage of these opportunities, as highlighted by the synthesis reports. First, each jurisdiction noted that climate change adaptation lacked commitment from high-level decision makers. This lack of commitment can adversely affect the ability of ministries and departments to pursue adaptation-related projects since, in many cases, high level agreement is required to participate in or undertake projects. Second, the lack of commitment has led to adaptation being a low priority in many work plans, meaning adaptation projects are typically sacrificed to address other concerns. Third, there are typically limited resources in place to participate in adaptation projects, and the resources that are available are subject to time horizons that are too short to make sustained progress towards adaptation. And fourth, political support for adaptation projects in the public is limited, which is partially related to a lack of meaningful stakeholder and industry engagement by provincial ministries on adaptation.

In light of these barriers and opportunities, three main strategies were put forward within the synthesis reports to advance adaptation:

1. **Establish interdisciplinary committees** both within and across jurisdictions to help govern adaptation. As noted earlier, Alberta already has an operating interdepartmental committee and Manitoba established one in 2013 following the first of the PRAC. Saskatchewan could benefit from establishing a similar committee (Rescan 2012b). An additional committee for coordinating and collaborating across Prairie Provinces could also be beneficial.
2. **Expand the thematic scope of PRAC activities.** There were a number of thematic gaps in the first round of the PRAC, with health, aboriginal and northern communities, oil and gas, mining being cited. Filling these gaps could help ensure that particular sectors or groups are not excluded from adaptation activities and may also help promote support for and commitment to climate change adaptation programming.
3. **Better engage stakeholders in adaptation activities.** Some PRAC work engaged municipal stakeholders or watershed stewardship groups, but broader engagement of industry and community groups was identified as being required to help operationalize adaptation within collaborative settings.

D) Where are we now?

Following completion of the Regional Adaptation Collaborative Climate Change Program, NRCan initiated the Adaptation Platform in March 2012. The Adaptation Platform is a four year (2012 to 2016), $13 million (Manitoba 2013) cross-sector, multi-stakeholder program aimed at enabling effective and efficient development and uptake of adaptation tools and products and mobilizing collaborative action towards climate change adaptation across levels of government and within industry (Figure 1). The Adaptation Platform is organized into a plenary body and multiple working groups, with each working group responsible for a specific theme or sector. The Plenary consists of senior personnel from federal and provincial governments and industry or professional organizations. The Working Groups consist of experts from government, industry and academia.

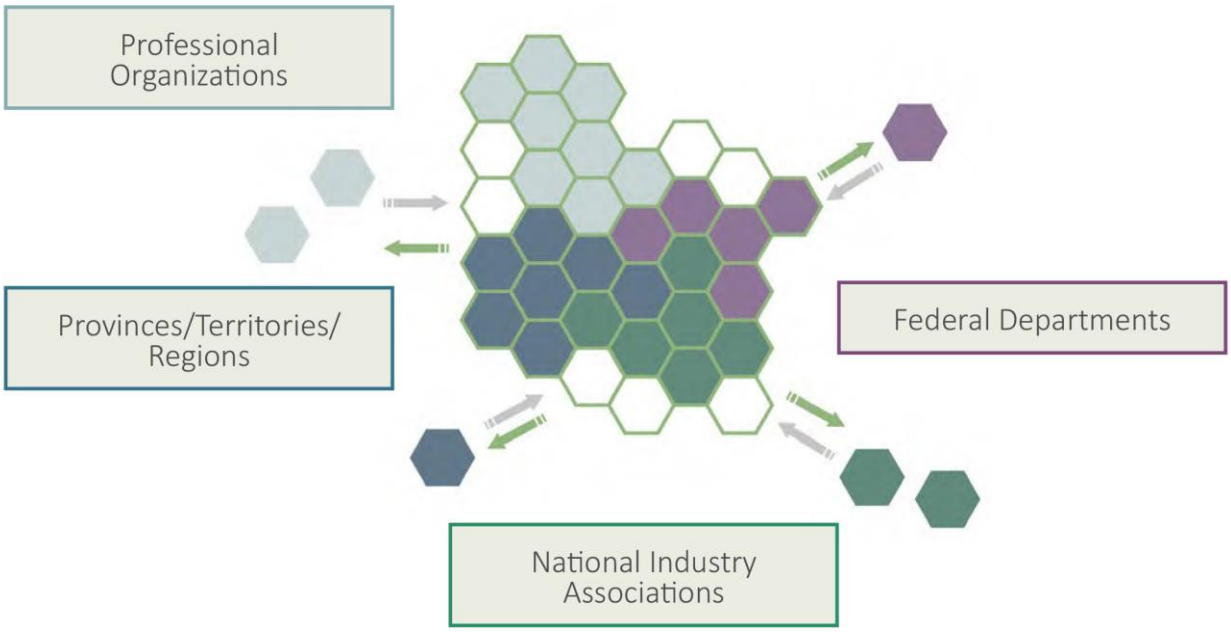

Figure 1. The Adaptation Platform (NRCan 2013).

Working Groups collaboratively design and deliver programming based on the priorities set by the Plenary. Their tasks have included identifying adaptation needs, developing guidance documents, establishing methods of practice, undertaking vulnerability assessments, capacity building, engagement, and identifying adaptation drivers (Figure 2). There are eight Working Groups with relevance to the Prairies region: Mining, Energy, Forestry, Coastal, Economics of Adaptation, Measuring Progress in Adaptation, Northern Regions, Regional Adaptation Collaboratives and Tools Synthesis, and Science Assessment. Each of these Working Groups is discussed below. Figure 3 provides an overview of the extent to which projects related to these Working Groups are being undertaken in the Prairie Provinces, while Table 1 contains a list of ongoing and potential projects.

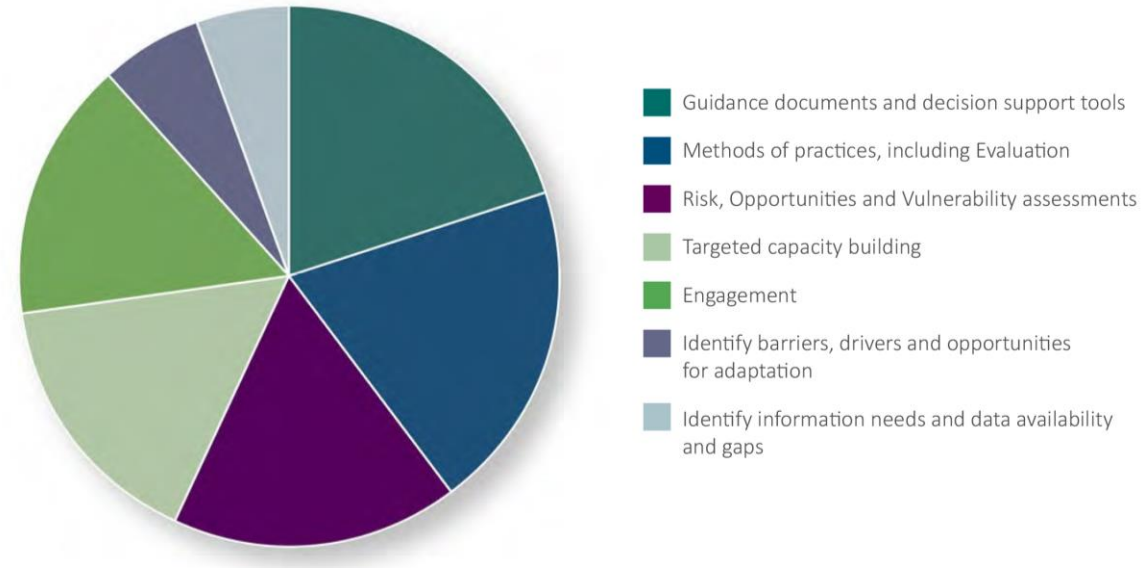

Figure 2. Breakdown of Working Group activities in 2012-2013 (NRCan 2013).

The **Mining Working Group** has worked to fill information gaps regarding the impacts and vulnerabilities of Canada's mining sector from climate change and developed tools to aid in adaptation of the sector. In 2012-2013, this Working Group undertook a number of projects, including assessments of mainstreaming opportunities, cases studies of existing adaptation, surveying industry perspectives and developing plans for a national assessment of the sector's vulnerability and adaptation options. This Working Group has been very active in the Prairies Region, with three ongoing projects currently in the region. These projects have included vulnerability and adaptation assessments of targeted mining industries and evaluations of policy enablers and barriers for the sector.

The **Energy Working Group** focuses on the oil and gas and electricity sectors and aims to better understand the extent to which these sectors are undertaking adaptation actions and to increase consideration within the sector of potential climate risks and impacts. Its activities include assessing climate change impacts on energy systems, preparing the business case for investing in adaptation, and exploring the potential for synergies and trade-offs between mitigation and adaptation. Activities in the Prairies supported by this Working Group include: an assessment of the impact of potential temperature trends on future energy demand by Manitoba Hydro; an ongoing review of the policy drivers and barriers of adaptation in Alberta's oil and gas sector; development of a tool to support adaptation decision-making in oil sands reclamation; and preparation of a case study exploring the opportunities in Alberta for integrating mitigation and adaptation programs.[6]

The **Forestry Working Group** promotes sustainable forest management within changing climatic conditions through awareness raising, enhancing collaboration, sharing lessons learned and disseminating tools. Its activities complement work being done by the Canadian Council of Forestry Ministers and the Forestry Adaptation Community of Practice. No projects related to forestry are presently being supported by the Adaptation Platform.

The **Coastal Working Group** has worked to understand climate change impacts on the human and ecological dimensions of Canada's coasts. In 2012-2013, this Working Group has largely worked to assess risk in targeted case studies and to assess the role of coastal ecosystems in fostering resilience. Although this Working Group's focus is largely outside the Prairies Region, a project in this theme aiming to understand policy barriers and enablers to adaptation in the Hudson Bay Inland Sea Region recently concluded.

The **Economics of Adaptation Working Group** aims to inform adaptation choices through the provision of economic information (such as cost-benefit analysis and efficiency assessment). The Working Group supports regional assessments, including the potential for an examination of the economics of adaptation and water on the Prairies. Additional activities include efforts to coordinate economic tools between the private and public sectors, identifying entry points in the financial services sector for climate impacts and adaptation information, and helping municipalities make the business case for adaptation investments.

The **Measuring Progress in Adaptation Working Group** works to help decision makers monitor and track the progress and effectiveness of adaptation strategies and programs. This Working Group has endeavoured thus far to test approaches developed in other regions but will focus on developing

[6] Implementation of a second project focused on identification of options for adaptation action by the energy sector in the Souris River Watershed is being discussed with Natural Resources Canada.

guidance specific to the Canadian context in subsequent work. There have been no funded projects to date with explicit relevance to the Prairies Region.

The **Northern Regions Working Group** aims to "provide northern decision-makers with the information and tools necessary to advance adaptation" (NRCan, 2013: 7). This includes support for vulnerability assessments of built and natural environments, informing decision-makers about adaptation, and promoting the integration of climate change into decision-making and planning. Current projects include an assessment of the climate risk for transportation along the Manitoba-Nunavut supply chain**.**

The **Regional Adaptation Collaboratives (RAC) and Tools Synthesis Working Group** works to develop products of multi-regional significance from previous programs (i.e., the Regional Adaptation Collaboratives program and the Tools for Adaptation program, which were part of the Government of Canada's Clean Air Agenda [2007–2012]). In 2012-2013, this Working Group undertook a number of case studies, developed compendiums and guidance documents, and tested tools for broad application. There are two ongoing projects under this Working Group for the Prairies Region: one developing a compendium of tools for municipalities and the other assessing the adaptiveness of provincial policies. Activities under this Working Group are to be completed by the end of March 2014.

The **Science Assessment Working Group** works to deliver timely information to decision makers about climate change science by improving how science assessments are developed, delivered and used. In 2012-2013, this Working Group undertook a number of engagement activities and prepared an update to the 2008 National Assessment (Lemmen et al. 2008). The updated National Assessment will be released in 2013-2014.

The common focal themes across the Prairie Provinces are Energy, RAC and Tools Synthesis and, to some degree, Mining (see Figure 3). The Energy and RAC and Tools Synthesis Working Groups have undertaken projects in all three provinces, while the Mining Working Group has projects in Saskatchewan and Manitoba. Projects under both the Northern and Coastal Working Groups are unique to Manitoba within the Prairies Region. These similarities and differences likely reflect, to some degree, the different priorities and contexts of the jurisdictions.

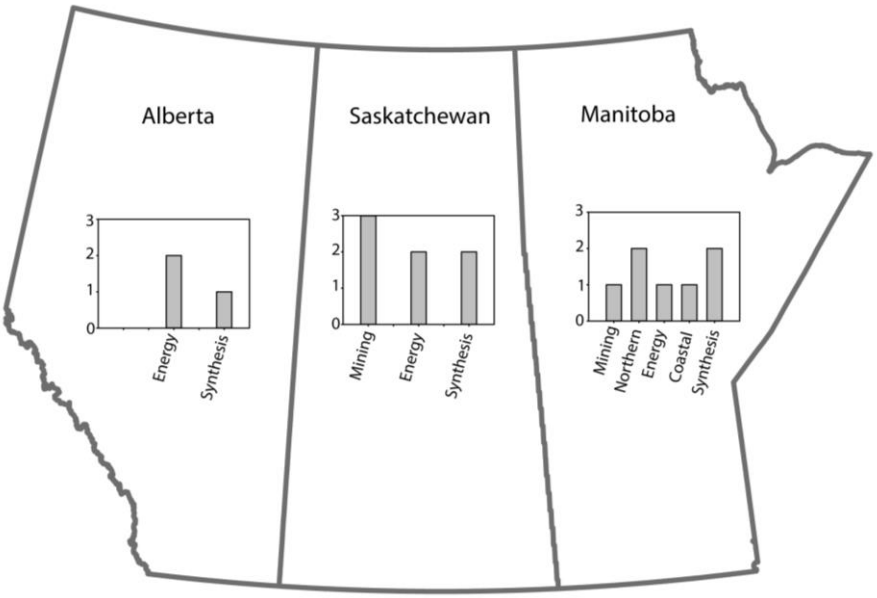

Figure 3. Number of projects under each Working Group by jurisdiction

Table 1. List of Adaptation Platform projects in the Prairies Region.

Working Group	***Project name***	***Jurisdiction***	***Status***
Mining	Understanding Policy Enablers and Barriers for Adaptation Mainstreaming in the Mining Sector in the Prairies	SK, MB	Ongoing
	Risks to Mining Companies related to Extreme Climate Events: Case Studies of Adaptation Actions Focusing on the Qu'Appelle Watershed	SK	Ongoing
	Case Studies of Adaptation to Climate Change in the Canadian Mining Sector	SK	Ongoing
Northern	Baseline Analysis of Mainstreaming Adaptation into Natural Resources Development Activities in the Hudson Bay Inland Sea Region	MB	Ongoing
	Climate risk assessment of transportation requirements for the MB-NU supply chain	MB	Ongoing
Energy	Manitoba assessment of potential temperature trends under climate change scenarios and the impact on energy demand	MB	Ongoing
	Risks to the Energy Sector related to Extreme Climate Events: Case Studies of Adaptation Actions Focusing on the Upper and Lower Souris River Watersheds	SK	Potential
	In-depth Review of Policy Drivers and Barriers to Oil and Gas Adaptation in Alberta Region	AB	Potential
	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	AB, SK	Potential
Coastal	Understanding Policy Enablers and Barriers for the Adaptive Management and Resilience of Coastal Communities in the Hudson Bay Inland Sea Region	MB	Ongoing
RAC & Tools Synthesis	Policy Analysis for Mainstreaming Adaptation in Four Provinces using the ADAPTool	SK, MB	Ongoing
	Synthesis of products from the Regional Adaptation Collaboratives (RAC) and Tools Programs: Community-related adaptation resources compendium and guidance based on RAC and Tools Program products	SK, MB, AB	Ongoing

E) Where do we go from here?

The new phase of the PRAC will implement activities between April 2014 and March 2016. Within this time period it will strive to improve adaptive capacity within the Prairies by sharing and applying existing and new knowledge, information and tools. Activities will also strive to connect outcomes of the Adaptation Platform with the priority sectors identified by the provinces. The following objectives have been set to support achievement of these goals:

1. "Engage priority sector decision makers within government and industry and established stakeholder networks to build and strengthen partnerships and collaboration on climate adaptation within the Prairie Provinces and beyond;
2. Promote sharing and application of existing and new knowledge, information, and tools to enhance adaptive capacity among priority sector decision makers and stakeholder networks;
3. Develop improved guidance on integrating and mainstreaming climate change adaptation outputs and outcomes into provincial and regional policies, plans, programs and targeted sectors."[7]

In pursuing these objectives it is expected that the PRAC will strive to build strong partnerships with decision-makers in priority sectors, build a shared understanding of climate risks and emerging opportunities, and work to mainstream climate change adaptation needs into regional adaptation programming, planning and policy. Activities to support these objectives could include strategic engagement of networks and decision-makers within priority sectors, development and implementation of an integrated, Prairie-wide communications strategy, meetings with priority stakeholder groups, hosting annual interprovincial forums, holding workshops focused on priority sectors, and developing guidance tools and filling information gaps to support mainstreaming.

Although the broad outline of plans for the next phase of the PRAC have been drawn, the specific strategy by which its goals will be achieved remains to be determined. To set the strategic direction of the PRAC, a series of workshops will take place in March 2014, including provincial workshops in each of Alberta, Saskatchewan and Manitoba and a final interprovincial workshop in Manitoba. Collectively these workshops aim to cultivate a shared vision for climate change adaptation action in the Prairies, and determine how this vision might be supported through strategic and targeted work during the PRAC. The provincial workshops will provide participants with an opportunity to identify priority sectors and adaptation needs within their province. Outcomes of the provincial workshops will feed into the final interprovincial workshop that will focus on determining how best the PRAC will contribute to adaptation action on the Prairies. The specific objectives of the interprovincial workshop are to:

- Review the current adaptation priorities of Manitoba, Saskatchewan and Alberta and develop the foundations on which to build effective climate change adaptation programs within and across provincial jurisdictions;
- Cultivate a shared vision for advancing climate change adaptation across the Prairies Region;
- Identify key priority areas for strategic and targeted work on climate change adaptation in the Prairie Provinces to be undertaken within the next PRAC funding cycle (2014-2016); and
- Formulate an initial plan for managing interprovincial collaboration that will enable continued progress towards adaptation to climate change

[7] From the draft proposal submitted by the Prairie Provinces to NRCan in December 2013.

Within the upcoming strategic planning workshops, participants will work to develop common responses to the following questions:

- **What should be the focus areas of work for the PRAC?** Options that may be considered include:
    - Focus on priority sectors, such as:
        - Energy, an area in which all provinces have already initiated some adaptation action through the Adaptation Platform. This action could focus particularly on the oil and gas sector, given its existing or growing importance to all three provinces.
        - Agriculture, given the vulnerability of this sector, potentially furthering research initiated during the first phase of the PRAC focused on grasslands.
        - Forestry, given its understood vulnerability, potential for building upon past outcomes and complementarity with the work of the Adaptation Platform.
        - Health, an area identified as being of interest for future collaboration at the conclusion of the PRAC's previous work plan.
        - Transportation, a cross-cutting need for many sectors. Climate impacts on transportation systems could have broadly-felt adverse effects.
        - Infrastructure, given the need to ensure that current investments will remain robust in the face of increasing climate risks.
    - Focus on groups that are particularly vulnerable to climate change, such as:
        - Aboriginal peoples, as identified in the synthesis reports of the first PRAC. Particular attention could be given to those living in remote communities whose level of adaptive capacity might be significantly lower than other Prairie residents
        - Residents of poor communities, either rural or urban, who have more limited capacity to effectively respond to climatic shocks and stresses.
    - Focus on particular regions, such as:
        - The northern regions of each province, given the relatively limited attention given to understanding vulnerabilities and adaptation needs of the people and businesses located in these regions
        - Shared watersheds, such as the Souris River Watershed or the South Saskatchewan River Watershed, to explore mechanisms for strengthening interprovincial collaboration and adaptation action
    - Focus on particular climatic risks, such as:
        - Drought, reflecting the continuing need to strengthen interprovincial knowledge sharing and planning around this extreme climatic event
        - Flooding, such as deepening understanding of current flood management capacity and preparedness, if these systems are sufficient to meet anticipated future risks, and what actions might be taken to plan for adaptation needs.

- **What are the key actions needed to build awareness, understanding and capacity for action among decision makers?** Consideration could be given to determining:
    - Priority audiences, such as private sector leaders, senior levels of government, industry associations or other stakeholder groups.
    - Knowledge communication vehicles, such as cost-benefit assessments to support desired adaptation efforts in key sectors or case studies of vulnerability and adaptation measures within particular industries.
    - Creative dissemination approaches, such as videos or other multimedia projects, to raise general awareness within government and the general public.

- **How can we work together?** Options that may be considered include:
    - Establishment of a formal interprovincial adaptation community of practice.
    - Development of project charters or terms of reference to support this community.
    - Evaluation of synergies between existing and planned adaptation-related policies and programs across jurisdictions.

- **What decision support tools are required?** Options that may be considered include:
    - Guidance documents for assessing and integrating adaptation options within existing work plans.
    - Compendiums of case studies that synthesize the broader implications of climate change for particular regions, groups or sectors.
    - Tools for accessing climate data with a focus on providing value-added information for priority sectors.

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Appendix 1: Description of activities completed as part of the PRAC between 2009 and 2012

Table A.1. PRAC activities (2009-2012) by jurisdiction and theme

	Alberta	***Saskatchewan***	***Manitoba***	***Interprovincial***
Drought and Excessive Moisture	1. Performance Evaluation of the (VSMB) Model for growing seasons 2. Development and Implementation of an improved Snow and Frozen Soil Algorithms for VSMB Model.	1. Evaluation of Monitoring 2. ADAPT Tool 3. Evaluation of Farm Stewardship Program, Farm and Ranch Water Infrastructure Program, Environmental Farm Planning and Agri-Environment Group Planning Programming 4. Watershed Drought and Excessive Moisture Preparedness Plans 5. Drought and Excessive Moisture Characterization	1. Municipal Adaptation Planning 2. Land and Infrastructure Resilience Assessment Tool 3. Provincial Drought Plan 4. Provincial Planning on Adaptation to Excessive Moisture in the Interlake Region 5. Evaluation of Existing Drought and Excessive Moisture Programs	1. Drought Communication Framework 2. ADAPT Tool application to agri-environmental programs
Water	1. Hydro-climatic Variability: South Saskatchewan River Basin 2. Hydro-climate Modelling – South Saskatchewan Regional Planning	1. Hydroclimatic Variability Analysis and Projections 2. In-stream Flow Needs and Climate Change Adaptation Gap Analysis 3. Community-Based Socioeconomic Vulnerability Assessment 4. Analysis and Projections of Water Demands in Selected Watersheds	1. Assiniboine River Basin Hydrologic Supply Study 2. Assiniboine River Basin Water Demand Study 3. Water Soft Paths 4. Workshop on Climate Data, Modelling and Applications for Planning 5. Water Policy Guidance	1. Hydro-climatic Variability: South Saskatchewan River Basin

Table A.1. PRAC activities (2009-2012) by jurisdiction and theme (cont'd)

	Alberta	***Saskatchewan***	***Manitoba***	***Interprovincial***
Terrestrial	1. Impacts of Climate Change on the Western Canadian Southern Boreal Forest Fringe 2. Vulnerability of Prairie Grasslands to Climate Change 3. Climate Change Adaptation Framework – Manual	1. Vulnerability of Prairie Grasslands 2. Vulnerability of Forest Ecosystems	1. Vulnerability Assessment of the Sandilands Provincial Forest 2. Vulnerability and Adaptation Options for Grasslands Management 3. Integration of adaptation into MAFRI's planning processes	1. Vulnerability of Prairie Grasslands 2. Vulnerability of Forest Ecosystems

Sources: Archibald 2011; Parry et al. 2012; Rescan 2012a; Rescan 2012b

Appendix 2: Description of opportunities, barriers and paths forward post-PRAC 1

Table A.2. Advancing adaptation post-PRAC 1

	Alberta	***Saskatchewan***	***Manitoba***	***Interprovincial***
Opportunities	• Mainstream adaptation within enterprise risk management for provincial departments • Increase the priority for adaptation by leveraging recent observations and experiences with climate change	• Undertake interdepartmental risk assessments • Mainstream adaptation within ongoing reviews of water allocation and water security planning • Examine adaptation options within management processes for provincial forests • Build off existing agri-environmental programs to promote preparedness for climate extremes	• Create opportunities for knowledge sharing, collaboration, and voicing different perspectives • Establishing greater linkages with boundary organizations and academia • Improve monitoring and dissemination of biophysical conditions	• Build from existing collaboration established under PRAC • Explore opportunities for mainstreaming
Barriers	• Limited support from high-level decision makers • Limited resources • Limited perception of climate change risks • Mismatch between existing decision-making time-horizons and those required for adaptation	• Limited support from high-level decision makers • Mismatch between existing decision-making time-horizons and those required for adaptation • Differing public opinions towards climate change • Low general priority of adaptation activities relative to day-to-day operations • Limited resources	• Limited support from high-level decision makers • Limited precedent for proactive management of climate risks • Limited resources • Low relative priority of adaptation • Limited coordination	• Limited support from high-level decision makers • Limited precedent for interprovincial coordination and collaboration

Table A.2. Advancing adaptation post-PRAC 1 (cont'd)

	Alberta	***Saskatchewan***	***Manitoba***	***Interprovincial***
Path forward	• Complete Climate Change Adaptation Strategy • Improve intra-provincial coordination Improve stakeholder engagement	• Improve coordination • Undertake multi-sector risk assessments • Mainstream where possible Develop a provincial adaptation strategy	• Integrate adaptation into next climate change plan • Raise awareness • Improve provincial coordination • Establish a climate data centre • Improve stakeholder engagement Establish procedures for monitoring and evaluating adaptation programs	• Establish an interprovincial adaptation working group • Broaden engagement across levels • Streamline collaboration Develop shared approaches for monitoring and evaluating adaptation

Sources: Archibald 2011; Parry et al. 2012; Rescan 2012a; Rescan 2012b