Chapter 4
Environment—Climate Change

1.0 Main Points

In March 2016, governments across Canada, including the Government of Saskatchewan, agreed to take steps to reduce greenhouse gas (GHG) emissions to mitigate their effect on climate (mitigation), and to reduce the vulnerability and increase the resilience of nature and people to the effects of climate change (adaptation). These governments agreed to implement GHG reduction policies to reduce Canada's emissions by 30% from 2005 levels by 2030. This agreement does not hold the Saskatchewan Government to a specific provincial target.

At January 2017, Saskatchewan did not have a provincial mitigation plan with provincial targets for GHG reduction. In addition, it did not have a co-ordinated provincial adaptation plan. Rather, it was at the policy development stage.

In October 2016, Saskatchewan issued its *Climate Change White Paper*. The purpose of the White Paper was, in part, to outline future potential direction or actions to combat climate change both provincially and nationally. The White Paper highlighted different strategies that Saskatchewan intends to use (e.g., carbon capture and storage technology for coal-fired electricity generation, increasing renewable power generation).

Using direction set in the White Paper, the Ministry of Environment, at January 2017, was developing policies related to reducing GHG emissions and was leading the development of a co-ordinated provincial adaptation plan.

Without plans, policies and targets, Saskatchewan may not be able to fulfill its commitment to Canada to contribute to the reduction of GHG emissions.

2.0 Introduction

This chapter provides the results of our audit work on the Ministry of Environment's activities to mitigate greenhouse gas emissions and to adapt to climate change in Saskatchewan, as of January 31, 2017.

2.1 What is Climate Change?

Climate change is a statistically significant change in the distribution of global weather patterns when that change lasts for an extended period.[1]

Climate change poses significant threats to environmental sustainability, economic growth, biodiversity, human health, infrastructure, and water resource management. For example, increasing climate variability increases risks of floods, droughts, and forest fires.

[1] INTOSAI Working Group on Environmental Auditing, *Coordinated International Audit on Climate Change,* (2010). www.environmental-auditing.org/Portals/0/AuditFiles/Canada_f_eng_International%20Audit%20on%20Climate%20Change.pdf (1 April 2016).

It also increases challenges to water supply management due to longer periods with warmer temperatures.[2]

Increased concentrations of GHG, mainly carbon dioxide and methane, are the major contributing factors to increasing global temperatures and climate change.

2.2 Climate Change in Canada and Saskatchewan

Canada produces approximately 2% of global GHG emissions, of which 10% come from Saskatchewan. As shown in **Figure 1**, in 2014, Saskatchewan and Alberta had the highest GHG emissions per capita in Canada at 67.3 tonnes and 66.7 tonnes respectively.

Research indicates the average global temperature has increased about 0.8 degrees Celsius since 1880. Two-thirds of this warming has occurred since 1975.[3]

The Federal Government's Department of Environment and Climate Change Canada (Environment Canada) indicated that Canada is warming twice as fast as the global rate. Canada's average temperature increased 1.6 degrees Celsius from 1948 to 2014.[4] It expects a global increase of 2 degrees Celsius would result in Canada increasing 3 to 4 degrees Celsius.[5]

Temperature increases vary across Canada—Saskatchewan's average temperature has increased about two degrees Celsius from 1948 to 2014. See **Section 4.0** for average temperature changes by region from 1948 to 2014 and **Section 5.0** for projected increase in annual average temperature from 2041 to 2070. The effects from temperature increases caused by GHG emissions that have already occurred may continue into the future because, once emitted, GHGs remain in the atmosphere for a long time.

Figure 1—2014 Greenhouse Gas Emissions in Canada by Province and Territory

	Total emissions (megatonnes of carbon dioxide equivalent)[A]		Emissions per Capita (tonnes)
Province/Territory	Total	%	
Alberta	274.0	37.4	66.7
Ontario	170.0	23.2	12.4
Quebec	83.0	11.3	10.1
Saskatchewan	**76.0**	**10.4**	**67.3**
British Columbia	63.0	8.6	13.5
Manitoba	21.0	2.9	16.8
Nova Scotia	17.0	2.3	17.6
New Brunswick	15.0	2.0	19.7
Newfoundland & Labrador	10.6	1.4	20.1

[2] Ibid.
[3] https://earthobservatory.nasa.gov/Features/WorldOfChange/decadaltemp.php (28 March 2017).
[4] www.ec.gc.ca/indicateurs-indicators/default.asp?lang=en&n=64C9E931-1 (27 March 2017).
[5] Environment and Climate Change Canada, *The Science of Climate Change,* (2015). http://ec.gc.ca/sc-cs/Default.asp?lang=En&n=A5F83C26-1 (27 March 2017).

Province/Territory	Total emissions (megatonnes of carbon dioxide equivalent)[A] Total	%	Emissions per Capita (tonnes)
Prince Edward Island	1.8	0.3	12.3
Northwest Territories	1.5	0.2	34.9
Yukon	0.3	-	7.3
Nunavut	0.3	-	7.5
Canada	733.5	100	20.6

Source: Environment and Climate Change Canada, *National Inventory Report,* (2016).
[A] Greenhouse gases (e.g., methane and carbon dioxide) are expressed as megatonnes of carbon dioxide equivalent. One megatonne is equal to 1,000 kilotonnes and one million tonnes.
Note: 2014 is the most recent information available in the *2016 National Inventory Report*.

The prairies have one of the most variable climates in Canada. Summers are typically hot and dry, and winters are bitterly cold. Climate change may bring more extreme weather including heat waves, intense storms, torrential rains, and droughts.[6]

2.3 Climate Change Agreements

In December 2015, the Government of Canada, along with approximately 190 other countries, committed to reducing global GHG emissions (the Paris Agreement). The key objective of this agreement was to limit global warming to less than 2 degrees Celsius, and to try to limit it to 1.5 degrees Celsius above preindustrial levels (i.e., levels prior to the industrial revolution).[7] Environmental scientists predict that if the increase in average global temperature is kept below 2 degrees Celsius from preindustrial levels, the most serious effects of climate change can be avoided.[8]

In March 2016, Canadian First Ministers (Prime Minister and provincial and territorial Premiers) committed to meet Canada's commitment for the Paris Agreement. They agreed to implement GHG reduction policies to reduce Canada's emissions by 30% from 2005 levels by 2030 (i.e., the Vancouver Declaration).[9]

In addition, the Canadian First Ministers developed a Pan-Canadian framework. This Framework, in part, outlined actions Canada could take to grow the economy while reducing harmful GHG emissions. During its development, the Government of Canada required all provinces and territories to implement carbon-pricing mechanisms (e.g., carbon tax, cap and trade systems) by 2018.[10]

While the Government of Saskatchewan agreed to the Vancouver Declaration, it did not agree to the Pan-Canadian framework. It does not support mandating the use of carbon pricing mechanisms in all provinces and territories.

[6] Ministry of Environment, *2015 State of the Environment Report*, p. 25.
[7] www.scics.ca/en/product-produit/vancouver-declaration-on-clean-growth-and-climate-change/ (4 April 2017).
[8] The United Nations Framework Convention on Climate Change held in Cancun in 2010 set a target of limiting average global surface temperatures to increase by two degrees Celsius. www.ipcc.ch/pdf/assessment-report/ar5/syr/SYR_AR5_FINAL_full_wcover.pdf (10 April 2017).
[9] www.scics.ca/en/product-produit/vancouver-declaration-on-clean-growth-and-climate-change/ (4 April 2017).
[10] www.scics.ca/en/product-produit/communique-of-canadas-first-ministers/ (6 February 2017).

Canada and each of the provinces and territories together developed this Framework. They established four working groups to present options to achieve Canada's emission reduction target.

These working groups included Adaptation and Climate Resilience, Specific Mitigation Opportunities, Carbon Pricing Mechanisms, and Clean Technology, Innovation, and Jobs. Saskatchewan participated in all four working groups. The Carbon Pricing Mechanisms working group had provided three options[11] for consideration. Reports from each of these working groups are published on the Government of Canada's climate change website.[12]

On November 28, 2016, the Governments of Saskatchewan and Canada reached an agreement in principle to finalize the equivalency agreement for Canada's existing coal-fired electricity generation power plant regulation.[13] Once finalized, the federal/provincial equivalency agreement on coal-fired electricity generation regulation (coal equivalency agreement) is expected to provide Saskatchewan more flexibility in transitioning to additional renewable energy, including evaluating future opportunities for carbon capture and storage to trap carbon dioxide and store it.[14]

2.4 Actions to Address Climate Change

Efforts to address climate change fall into two categories:

- Mitigation: these are efforts to decrease GHG emissions or enhance carbon sinks.[15] For example, technologies that reduce emissions or consume less energy, or use of more energy efficient machinery, vehicles, or appliances.

- Adaptation: these are efforts to reduce the vulnerability and increase the resilience of nature and people to climate change.[16] For example, building of flood defenses (e.g., berms) and changing agriculture practices or crops.

Governments can use policies to foster mitigation and/or adaptation behavior and actions of consumers, governments, and companies.

2.5 Saskatchewan Ministry of Environment's Role

The Ministry of Environment, although currently not required by law, has assumed responsibility as the lead agency for climate change for the Provincial Government.

[11] The three options the working group put forward were: single type of broad-based carbon pricing mechanism in all jurisdictions, broad-based carbon pricing in all jurisdictions with flexibility on instrument choice, broad-based carbon pricing or reduction targets. The Federal Government chose the first option for inclusion in the Pan-Canadian Framework.
[12] http://climatechange.gc.ca/default.asp?lang=En&n=64778DD5-1 (5 April 2017).
[13] Under the *Canadian Environmental Protection Act, 1999* the Federal Government may enter into an equivalency agreement with provinces and territories provided that the provincial approach delivers equivalent or better outcomes than the federal *Reduction of Carbon Dioxide Emissions from Coal-fired Generation of Electricity Regulations.*
[14] www.saskatchewan.ca/government/news-and-media/2016/november/28/equivalency-agreement (16 December 2016).
[15] Carbon sink is defined as any process, activity, or mechanism, which removes a greenhouse gas, an aerosol or a precursor of a greenhouse gas from the atmosphere. Examples include forests and other vegetation because they remove carbon dioxide from the air through photosynthesis.
[16] INTOSAI Working Group on Environmental Auditing, *Coordinated International Audit on Climate Change,* (2010). www.environmental-auditing.org/Portals/0/AuditFiles/Canada_f_eng_International%20Audit%20on%20Climate%20Change.pdf (1 April 2016).

The Ministry predicts significant overall increases in precipitation and annual temperatures to occur during 2015 to 2100 for Saskatchewan. It notes the following as possible impacts on Saskatchewan and its economy:[17]

- Flooding – an increase in high-intensity rainfall or rapid spring snowmelts can cause flooding. Standing water in fields delays planting crops, which affects production and quality of crops. Flooding damages personal property, resulting in increased insurance rates and potential reduction of insurance coverage. Also, flooding increases costs to government (e.g., Provincial Disaster Assistance Program payments and repairs to infrastructure such as highways).

- Water shortages – reduced availability of water (e.g., rainfall, irrigation) could constrain both the agriculture and the forestry sectors. Reduced availability of water decreases the quantity and quality of crops produced. Higher temperatures and decreased precipitation would decrease the amount of timber available for harvest and the size of the forests, and reduce boreal forests in the north causing reduced carbon sink.

- Warmer temperatures – increased winter temperatures impact the mineral, mining, and forestry industries. Resource exploration and forestry operations located in northern Saskatchewan rely on frozen ground to explore resources and transport goods. Also, warmer winters increase the risk of the spread of pests (e.g. mountain pine beetle) and diseases that prolonged cold temperatures normally eradicate. Warmer temperatures could mean a longer growing season and increased productivity (e.g., agriculture and forestry).

At January 31, 2017, Saskatchewan did not have legislation in effect that directly related to mitigating GHG emissions or adapting to climate change. At January 31, 2017, *The Management and Reduction of Greenhouse Gases Act* (Act), passed in 2010 and amended in 2013, was not in effect (not proclaimed as law).

In December 2016, the Ministry indicated the Provincial Government intends to put into force the parts of the Act needed to finalize the coal equivalency agreement. Once in force, the Act would assign all matters relating to climate change, not assigned by law to another agency, to the Minister of Environment. In the interim, the Ministry assumed this responsibility.

As reflected in the Ministry's *2015-16 Annual Report*, the Ministry's responsibilities include co-ordinating climate change planning and activities with other provincial agencies (e.g., Innovation Saskatchewan, Ministry of the Economy, SaskPower). Also, this included co-ordinating Saskatchewan's participation on four federal/provincial/territorial working groups (e.g., Adaptation and Climate Resilience).[18]

The Ministry actively participated in several climate change committees to co-ordinate climate change activities within the Provincial Government. It indicated the majority of these committees' discussions related to policy and potential program development.

[17] Ministry of Environment, *State of the Environment Report,* p. 23.
[18] Ministry of Environment, *2015-16 Annual Report*, p. 4.

3.0 Collaborative Audit Work on Climate Change

In April 2016, the federal, provincial, and territorial auditor generals agreed to participate in a collaborative engagement on climate change with each conducting its own audit work. Most auditor generals planned to complete audits relating to climate change during 2016-17. The focus of these audits vary.

In addition, all parties agreed, where feasible, to complete the work necessary to answer the specific mitigation and adaptation questions in **Figure 2**. Each audit office was responsible for determining the work it would do to respond to each question and how best to report the results to their Assembly.[19]

The auditor generals expect to publish the results of these audits to their Assembly at different times throughout 2016 and 2017. The Office of the Auditor General of Canada (i.e., the Commissioner of the Environment and Sustainable Development) will compile the findings to the questions in **Figure 2** from each audit office to produce a Summary Report. The Summary Report is expected to be completed late 2017 or early 2018.

Figure 2—Collaborative Mitigation and Adaptation Questions

Mitigation

1. What targets related to mitigation of GHG emissions has the government adopted?
2. Do documented strategies or plans exist to meet these commitments?
3. Is the government on track in meeting intended targets? Which ones have been met and which ones have not been met? Does the government have an adequate process to monitor progress?
4. Are there regular reports to the public or to other stakeholders? What elements are being reported on? Is the reporting regular and timely?
5. What policy instruments, actions or initiatives are expected to result in significant GHG emissions reductions?

Adaptation

1. Has the government developed a policy/plan/strategy on adaptation?
2. Has the government produced a comprehensive national/provincial/territorial specific risk assessment?
3. Has the government implemented their actions as outlined in their policy/plan/strategy? Does the government know whether they are on track to implement their policy/plan/strategy?

Source: Project Charter – Collaborative Audit on Climate Change 2015 to 2017.

3.1 Objective and Scope

The objective of this engagement was to complete specified procedures over the Ministry of Environment's activities to mitigate greenhouse gas emissions and to adapt to climate change in Saskatchewan, as of January 31, 2017.

To conduct this engagement, we followed the standards for engagements published in the *CPA Canada Handbook – Assurance*. This includes obtaining an understanding of the Ministry for matters relevant to the engagement and obtaining sufficient appropriate evidence to support our findings relating to the questions.

We conducted specified procedures to answer the questions listed in **Figure 2**. The specified procedures performed included discussions with management, examination of source documents, and reviewing the Ministry's process to assess data included in

[19] In some cases, the results may be incorporated into their audit on climate change.

Environment Canada's GHG emissions reporting to the public. This engagement was not an audit engagement, and accordingly, we did not conclude on the effectiveness of the Ministry's climate change activities.

As the findings below indicate, the Ministry was in the policy development stage of its work to consider new initiatives to respond to climate change. Also, it was compiling information on existing activities completed by other government organizations.

3.2 Key Findings—Mitigation

In this section, we describe our key findings related to each of the questions in **Figure 2** related to mitigation.

3.2.1 Provincial Targets Not Set to Reduce GHG Emissions

What targets related to mitigation of GHG emissions has the government adopted?

As of January 2017, the Ministry had not established provincial GHG reduction targets.

In March 2016, Canadian First Ministers, including Saskatchewan, agreed to the Vancouver Declaration. They agreed to implement GHG reduction policies to reduce Canada's emissions by 30% from 2005 levels by 2030. This agreement does not hold Saskatchewan to a specific provincial target. For example, the agreement does not require Saskatchewan to reduce its GHG emissions by 30% from 2005 levels by 2030.

While the Government had not legislated or set targets for GHG emissions reduction, one government agency set a target. In November 2015, SaskPower, a provincial Crown corporation that is Saskatchewan's main electricity provider, announced its commitment to doubling its percentage of electricity generation from renewable sources (e.g., solar, wind, etc.) by 2030. SaskPower expects this to reduce its GHG emissions by 40% from 2005 levels by 2030.[20] The Ministry communicated this target to others during its involvement in national climate change working groups.

3.2.2 Provincial Mitigation Plan Under Development

Do documented strategies or plans exist to meet mitigation targets?

What policy instruments, actions, or initiatives are expected to result in significant GHG emissions reductions?

As of January 2017, the Ministry had not implemented a provincial mitigation plan.

The Ministry indicated it was developing policies related to reducing GHG emissions. In the development of policies, it was using direction set in the Provincial Government's October 2016 *Climate Change White Paper*.

The Ministry noted that each sector of the Saskatchewan economy has unique characteristics that may require different approaches to emission reductions.

[20] SaskPower, *2015-16 Annual Report*, p. 10.

Provincial Direction of Climate Change Policies

In October 2016, the Government of Saskatchewan issued its *Climate Change White Paper*. The Ministry indicated the Government considered its input while preparing this document.

The purpose of the White Paper was, in part, to outline future potential direction or actions to combat climate change both provincially and nationally.[21] Examples of climate change policy direction in the White Paper included:

- Increased focus on reducing global GHG emissions instead of focusing on Canada's emissions. As previously noted, Canada produces approximately 2% of global GHG emissions. The White Paper argues technological innovation that reduces GHG emissions would have a greater global impact if applied to nations with greater GHG emissions than Canada.

- The Government of Saskatchewan's position that carbon pricing mechanisms (e.g., a tax on GHG emissions) may not be effective in reducing GHG emissions in Canada.

- The Government of Saskatchewan plans to place specific emphasis on adaptation, resilience, and new technologies that reduce GHG emissions.

- Introducing any mitigation initiatives in a way that minimizes impact to the economy.

The White Paper included 13 recommendations on redirecting the national conversation on climate change. Many of these recommendations focus on developing new or expanding existing technology as the primary means to address climate change. For example, one recommendation focused on increased federal promotion of SaskPower's carbon capture and storage technology for coal-fired electricity generation to other nations.[22]

Current and Expected Mitigation Activities in Saskatchewan

The Government's White Paper and other sources describe some of Saskatchewan's current and expected mitigation strategies to reduce GHG emissions.

The White Paper outlined several different strategies that Saskatchewan intends to use, which include:

- Developing and applying technological solutions such as the carbon capture and storage technology for coal-fired electricity generation

- Requesting increased federal funding to support clean technology

- Increasing renewable power generation to meet the growing power needs of Saskatchewan

[21] Government of Saskatchewan, *Climate Change White Paper,* (2016), p. 6.
[22] Carbon capture and store technology captures carbon dioxide emissions from large sources (e.g., coal-fired electricity production) and stores the carbon dioxide underground so it is not released into the atmosphere. Captured carbon dioxide may also be used in industrial processes such as enhanced oil recovery. www.nrcan.gc.ca/energy/coal/carbon-capture-storage/4295 (5 April 2017).

- Recognizing the carbon sink potential in Saskatchewan's farming, afforestation,[23] and other natural sinks[24]

In addition, the reports of the Pan-Canadian Framework working groups identify mitigation actions Saskatchewan is taking or considering.

For example, the Specific Mitigation Opportunities working group report included some current and potential initiatives to reduce GHG emissions in Saskatchewan. For example, it discussed SaskPower's target to increase electricity generated from renewable sources, existing regulations for the oil and gas industry that set when waste gas must be conserved, and a SaskPower program to encourage the oil and gas industry to capture waste gases to be used to generate electricity.[25]

3.2.3 Processes to Monitor Progress of GHG Reduction Targets to be Established when Provincial Mitigation Plan and Targets Finalized

Is the government on track in meeting intended targets? Which ones have been met and which ones have not been met? Does the government have an adequate process to monitor progress?

As noted in **Section 3.2.1**, in November 2015, SaskPower set a target to reduce GHG emissions. It was the only Saskatchewan government agency to do so. Since the target was recently established, at January 2017, the Ministry had not received reporting on whether SaskPower was on track to meet its established target.

Also as previously noted, Saskatchewan has not formally (i.e., through legislation) made the Ministry responsible for overseeing the implementation of provincial climate change plans. At January 2017, although not legally required, SaskPower provides the Ministry with information on its GHG emissions.

3.2.4 Ministry Relies on Federal Report to Communicate GHG Emission Information for Saskatchewan

Are there regular reports to the public or other stakeholders? What elements are being reported on? Is the reporting regular and timely?

The Ministry did not publish reports on Saskatchewan's GHG emissions. Instead, the Ministry was actively involved in the Federal Government's processes to issue reports on Canada's GHG emissions. It recognizes Canada's public reports include specific information on Saskatchewan's GHG emissions.

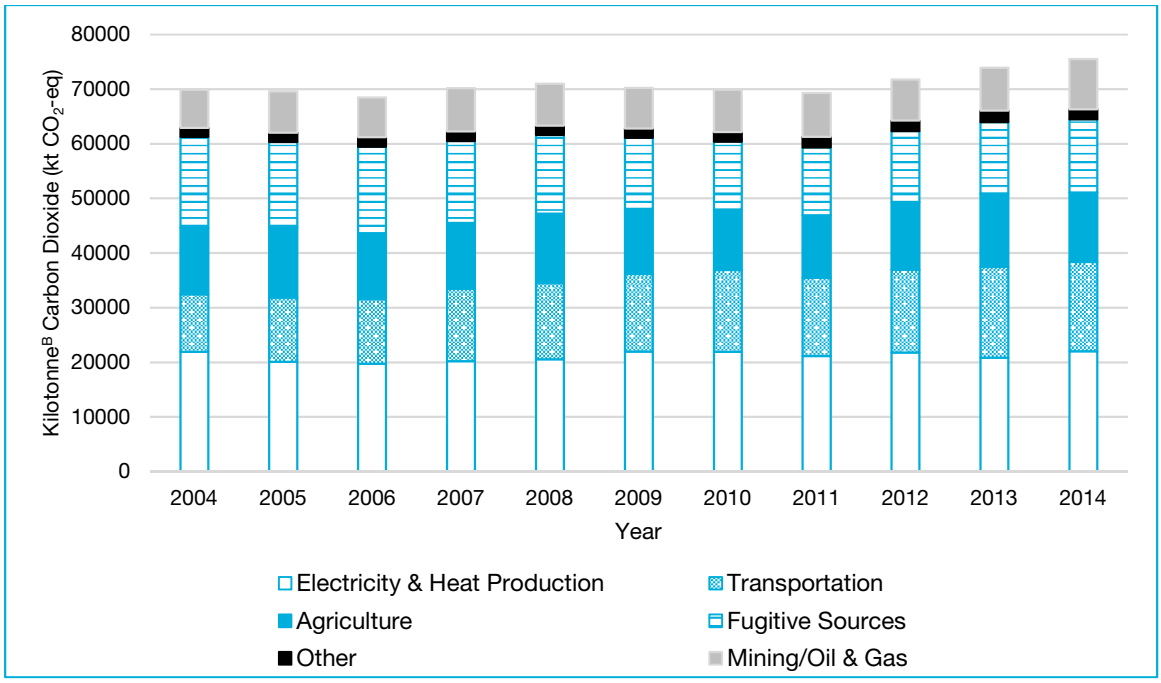
Each year, Environment Canada publishes a report on GHG emissions in Canada consistent with United Nations Framework Convention on Climate Change reporting

[23] Afforestation is the act of re-planting trees.
[24] Government of Saskatchewan, *Climate Change White Paper,* (2016).
[25] http://climatechange.gc.ca/Content/6/4/7/64778DD5-E2D9-4930-BE59-D6DB7DB5CBC0/WG_Report_SPECIFIC_MITIGATION_OPPORTUNITIES_EN_V04.pdf (21 February 2017).

guidelines.[26] The most recent report it published was the *2016 National Inventory Report*.[27] The National Inventory Report breaks down emissions by source by province and territories.

Figure 3 is an example of the information contained in the *2016 National Inventory Report*. This information shows that Saskatchewan's major industries produce a high amount of emissions. It shows Saskatchewan's GHG emissions increased by 5.6 megatonnes, or 8%, from 2004 to 2014. Saskatchewan's GHG emissions by sector remained consistent from 2004 to 2014.

Figure 3—Saskatchewan's GHG Emissions by Sector



Source: Environment and Climate Change Canada, *National Inventory Report*, (2016).
[A] Fugitive sources include leakage of gases from pressurized equipment, primarily in the oil and gas sector.
[B] One megatonne is equal to 1,000 kilotonnes and one million tonnes.

Environment Canada annually estimates the GHG emissions for Canada, the provinces, and territories. We observed that the Ministry reviewed and provided feedback to Environment Canada on the information and assumptions Environment Canada used to prepare the National Inventory Report.

3.3 Key Findings—Adaptation

In this section, we describe our key findings related to each of the questions in **Figure 2** related to adaptation.

[26] The United Nations Framework Convention on Climate Change sets an overall direction for government efforts to address issues posed by climate change. Under the convention, governments gather and share information on GHG emissions, policies, and best practices. Also, governments launch national strategies for adapting to climate change. http://unfccc.int/essential_background/convention/items/2627.php (4 April 2017).
[27] www.publications.gc./ca/site/eng/9.816345/publication.html# (28 February 2017).

3.3.1 Ministry Compiling Information on Climate Change Risks

Has the government produced a comprehensive provincial specific risk assessment?

At January 2017, the Ministry was actively collecting risk assessment information related to adaptation from other government agencies. It had not completed an assessment of the risks that exist due to climate change. As such, it has not developed a provincial risk assessment.

The Ministry is a member of the Prairie Regional Adaptation Collaborative. The purpose of this group is to assist the prairie provinces to identify similar climate change impacts and vulnerabilities these provinces face in relation to adaptation policy decision-making.[28]

The group's March 2012 report *Advancing Climate Change Adaptation in Saskatchewan*[29] recommended the Ministry prepare a risk assessment related to climate change. The report provided sources the Ministry could use to complete a risk assessment. As of January 2017, the Ministry had not adopted the recommendation.

Completing an assessment of these risks is a first step before developing an adaptation plan. Risk assessments help governments to support decision-making and identify areas of key vulnerabilities. Knowing areas where the province is vulnerable will help the Ministry to create an adaptation plan that addresses these areas.

3.3.2 Provincial Adaptation Plan Under Development

Has the government developed a policy/plan/strategy on adaptation?

Has the government implemented their actions as outlined in their policy/plan/strategy?

Does the government know whether they are on track to implement their policy/plan/strategy?

As of January 2017, the Ministry was leading the development of a co-ordinated provincial adaptation plan. As discussed in **Section 3.2.2**, the Ministry was using the direction in the Government's October 2016 *Climate Change White Paper* to guide this development.

As evident in the White Paper and the Pan-Canadian Working Groups reports, various agencies in Saskatchewan have been undertaking adaptation activities for several years (e.g., planting tree species more resistant to disease). As of January 2017, the Ministry was compiling a listing of information on the adaptation plans and activities established by these agencies. It expects to use this information as an input into the development of provincial adaptation policies and related strategies.

Current and Expected Adaptation Activities in Saskatchewan

The Government's White Paper and other sources describe some of Saskatchewan's current and expected adaptation initiatives.

[28] www.parc.ca/rac/index.php?page=home (27 March 2017).
[29] www.parc.ca/rac/fileManagement/upload/Advancing%20Adaptation%20in%20Saskatchewan_Final.pdf (3 March 2017).

The White Paper indicated Saskatchewan was working with the Federal Government on adaptation initiatives such as:

- Researching how climate change is impacting water in Canada's north
- Developing a natural hazards risk assessment, focusing on how climate change will impact the risk of specific hazards occurring
- Developing new business risk management programs for the agricultural sector (e.g., AgriStability)

In addition, the reports of the Pan-Canadian Framework working groups identify adaptation actions Saskatchewan is taking or considering. For example, the Adaptation and Climate Resilience working group's report acknowledged the following adaptation efforts in Saskatchewan:

- The Ministry of Highways and Infrastructure altered culvert design to allow for a 1-in-50 year weather event
- The Government of Saskatchewan was developing a drought strategy, a new water allocation policy, and new legislation to allow more flexibility to manage water shortages
- The Ministry of Environment's continued monitoring of its capacity to deal with wildfires, including wildfire response times
- The Ministry of Agriculture's partnering with crop research organizations (such as the University of Saskatchewan) to develop more drought-resistant crop varieties[30]

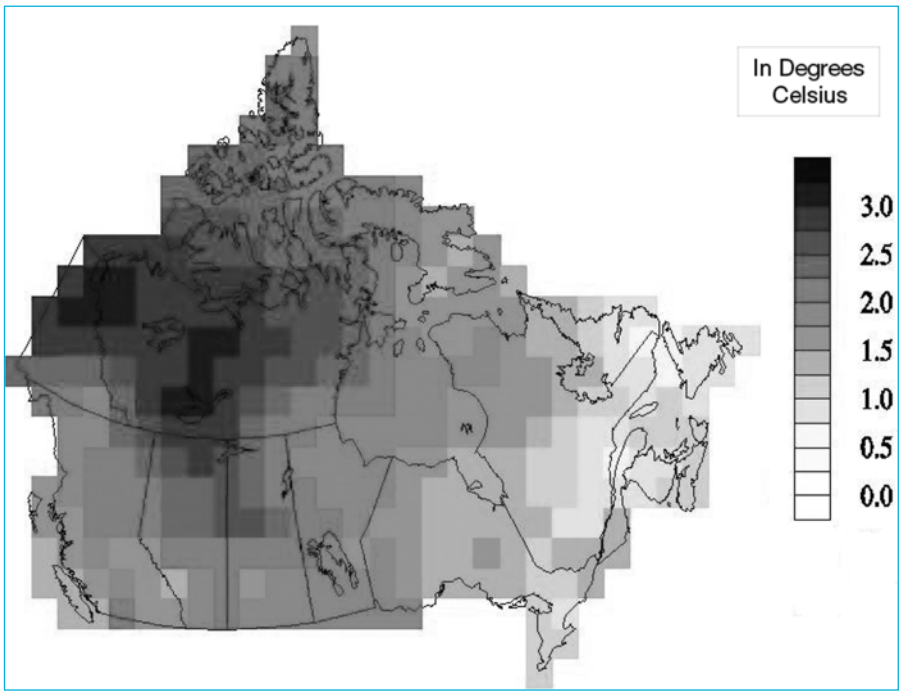
In addition, the Ministry engaged in partnerships with non-government agencies to research potential plans and strategies to adapt to a changing climate. The reports the Ministry received from these partnerships provided potential adaptation efforts based on the research. These reports did not provide information on provincial adaptation efforts taken or underway.

For example, the Ministry partnered with the Prairie Adaptation Research Collaborative (PARC). PARC was a partnership between the Government of Canada and the prairie provinces. In 2009, PARC funded University of Regina research on climate change impacts. It made recommendations on how the provinces could work to adapt to the changing climate.[31]

PARC published various reports on its website in 2009. Its reports included analysis on how climate change can impact temperature, precipitation levels, impact on environment (i.e., forestry, ecosystems, water and agriculture), and provided suggestions for adaptation efforts to undertake in each prairie region.[32]

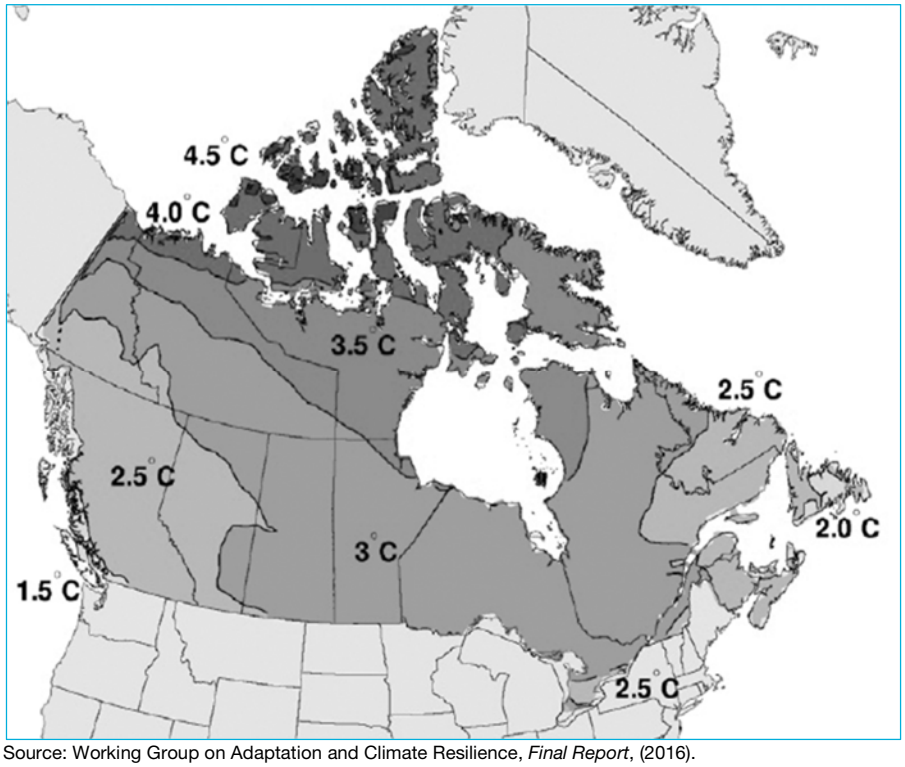
[30] Working Group on Adaptation and Climate Resilience, *Final Report*, (2016), p. 42.
[31] www.parc.ca/ (15 March 2017).
[32] Ibid.

4.0 Canadian Temperature Trends, 1948 - 2012



Source: Environment and Climate Change Canada, http://ec.gc.ca/sc-cs/Default.asp?lang=En&n=A5F83C26-1 (27 March 2017).

5.0 Projected Increase in Annual Average Temperature, 2041 - 2070 (relative to 1976 – 2005)



Source: Working Group on Adaptation and Climate Resilience, *Final Report*, (2016).

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