

A Made-in-Manitoba
**Climate and
Green Plan**
Annual Report

Manitoba
Environment
and Climate

2020-2021

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Message from the Minister

It is my privilege to present the second annual report on the Made-in-Manitoba Climate and Green Plan. This report is a requirement of the Climate and Green Plan Act and underpins government's dedication to accountability and transparency in climate change action. This annual report highlights the actions undertaken to reduce emissions and to adapt to the changing climate.

I am pleased to share a few highlights of the progress made to date and the effective cross-departmental collaboration and the external partnerships we have established:

- Efficiency Manitoba (EM) was established in January 2018 to develop and support energy efficiency initiatives that will reduce provincial consumption of electricity by 1.5 per cent and natural gas by 0.75 per cent annually. On March 31, 2020, the Efficiency Manitoba Act was passed. Its first three-year plan was approved, enabling EM to officially commence operations.
- The Conservation and Climate Fund was launched in 2020, resulting in \$600,000 in grants for post eight funded projects. Successive rounds of intakes have occurred and this program continues to have lasting impacts.
- The Manitoba Climate Resilience Training Project (MCRT) was launched in 2020 to train and educate professionals to help communities better prepare for the effects of climate change.
- The Efficient Trucking Program, which provides rebates for fuel-saving devices and technologies for heavy duty trucks, continued with a second intake of applicants, estimating emission savings of five kilotonnes CO₂e in this reporting year.
- Manitoba continues to support water treatment plant upgrades for 12 communities to support climate readiness and improved resiliency to deal with extreme climate events.
- Provincial Ethanol Mandate for gasoline increased from 8.5 per cent to 9.25 per cent on January 1, 2021, and increased to 10 per cent on January 1, 2022. Likewise, the biodiesel mandate increased from two per cent to 3.5 per cent on January 1, 2021 and increased to five per cent on January 1, 2022. Estimated emission reductions for this reporting year are 800-1,000 kt of CO₂e.
- Manitoba announced an investment of \$42 million, with an additional \$18.7 million from the federal government, to help Manitoba Hydro construct a 230-kilovolt transmission line from Birtle South Station to the Manitoba-Saskatchewan border, 46 km northwest, to expand Manitoba's capacity to export power and support Saskatchewan in reducing emissions.

The highlights in this report represents the hard work and accomplishments made this year. While there is still much work ahead, Manitoba is making great strides advancing our Climate and Green Plan goals.

Warm regards,

Honourable Kevin Klein

Message from the Expert Advisory Council

The Expert Advisory Council on the Climate and Green Plan (“the Council”), is pleased to offer some remarks regarding this annual report.

Reflecting on 2020 and early 2021, we can all agree that it has been a time unlike any other experienced in our lifetimes. Instead of one big problem to solve, we are facing a multitude of challenges as we move toward better times. However, we should not be fooled into thinking that our response to climate change can be thought of as a secondary issue for us. That is why the Council continued supporting Manitoba’s Climate and Green Plan by developing our second guidance report providing advice and recommendations on a Provincial Water Management Strategy for Manitoba (January 2021). We have also begun work on our third guidance report which provides advice and recommendations on a future Transportation Strategy for Manitoba.

The Council continues to play an important advisory role to the Carbon Savings Account (CSA). The Council also continues to support various components of the Climate and Green Plan, including providing guidance on Manitoba’s Watershed Management Plans, and supporting our subcommittee, the Youth Advisory Council, in its sharing of the important perspective of Manitoba youth.

This is the second annual report on the Climate and Green Plan. It includes information on the Carbon Savings Account (CSA), which the Council addressed in June 2019. The greenhouse gas (GHG) emission reduction goal that we recommended for the period of 2018 to 2022 (1 Megatonne of carbon dioxide equivalent) was accepted by the Minister.

As a province, this provides a great opportunity to prove to the world that we are taking our obligations seriously. These meaningful and immediate actions toward meeting the CSA goals will prove to our fellow provinces, territories and even to our national and international partners that our support for the climate is steadfast.

We are pleased to see the numerous actions laid out in this report that advance the objectives of the Climate and Green Plan. As we grapple with the difficulties in front of us, we are hopeful that the path to recovery will lead us to a unified vision of a cleaner, greener, resilient future for us all.

Sincerely,

Expert Advisory Council

Executive Summary

Since the release of the Climate and Green Plan ("the Plan") in 2017, Manitoba has advanced climate action programs, training and partnerships, producing tangible results and setting the stage for future initiatives. The 2020-2021 Climate and Green Plan Annual Report outlines over 115 government-wide initiatives to reduce emissions and address climate resiliency and adaptation.

Manitoba's emissions levels remained consistent, and currently account for only 3.1 per cent of Canada's total emissions. Nevertheless, Manitoba set its first greenhouse gas emissions reduction goal for 2018-2022, at 1 Megatonne (Mt) carbon dioxide equivalent (CO₂e). Manitoba's 5-year emission reduction targets are based on the independent, scientific recommendations made by the Expert Advisory Council, an independent group of experts with a mandate to provide advice and recommendations on the Climate and Green Plan.

The four pillars of the Climate and Green Plan provide a strategic approach for climate action. This annual report highlights climate action based on the Climate, Jobs, Water, and Nature pillars. It also includes two additional sub-reports: A progress report on Low Carbon Government initiatives to reduce emissions and advance the sustainable operations of government, and a progress report on Climate Adaptation and Resiliency.

During this year, Manitoba has taken decisive action, achieving tangible results in emissions reductions. Highlights include the new Biofuels Mandate, which will require the use of renewable contents in gasoline and diesel fuel. The Efficient Trucking Program, which provides rebates for fuel-saving devices and technologies for heavy duty trucks was successfully launched in 2020. The closure of the Selkirk thermal electric generating station also decreases emissions, favouring cleaner sources.

Manitoba also worked to increase capacity and resources for climate action. The province launched the Manitoba Climate Resilience Training Project (MCRT) to help officials and professionals develop the skills and knowledge to design strategies and programs to support communities prepare for the effects of climate change. The Conservation and Climate Fund was launched and implemented, with results expected to be reported in 2022.

Despite the disruptions caused by the COVID-19 pandemic, the province made progress across the four pillars of the Plan. The implementation of these initiatives is a product of a clear vision and extensive partnerships with non-governmental organizations, levels of government, and communities across Manitoba.



Introduction

The Made-in-Manitoba Climate and Green Plan was released in October 2017. It is built on four pillars: Climate, Jobs, Water and Nature.

Together, these four pillars provide direction for Manitoba to reduce greenhouse gas (GHG) emissions and address the effects of climate change, build a green economy by promoting sustainable development, protect valuable water resources, and conserve the natural environment. Manitoba’s unique emission profile, extensive investment in clean hydroelectricity and targeted emissions reductions have framed the approach to tackling climate change outlined in the Plan. Manitoba’s profile provides strengths and opportunities to advance emission reductions in our province and other jurisdictions.

The Climate and Green Plan (CGP) Act, which came into force on November 8, 2018, requires the Minister to prepare an annual report on the programs, policies and measures employed in that year to implement the Climate and Green Plan. This document fulfills these requirements for the April 1, 2020 to March 31, 2021 reporting period. This is the second annual report on the Plan, following the passage and enactment of The Act in 2018.

This annual report provides the current emission reductions achieved, the current status of the Carbon Savings Account (CSA), the programs, policies and measures underway by government departments and other reporting entities to support the Plan, the activities of the Expert Advisory Council, the activities of the Climate and Green Fund including a list of organizations that received money from the fund, and finally, a summary of the activities of the Low Carbon Government office and the emissions of all government departments and other reporting entities.

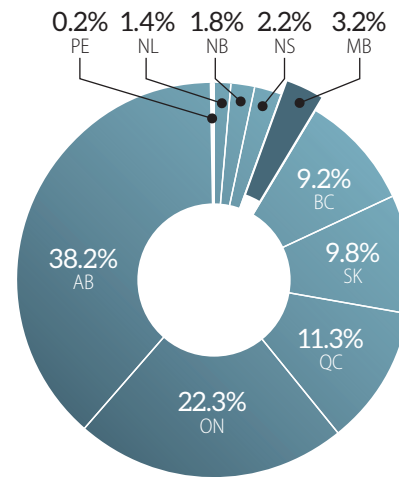
Manitoba's Greenhouse Gas Emissions

5.1 Manitoba's Emissions Profile

Manitoba accounts for 3.2% of Canada's total emissions (Figure 1) which is representative of our population, geography and economic activity as well as our renewable energy resources.

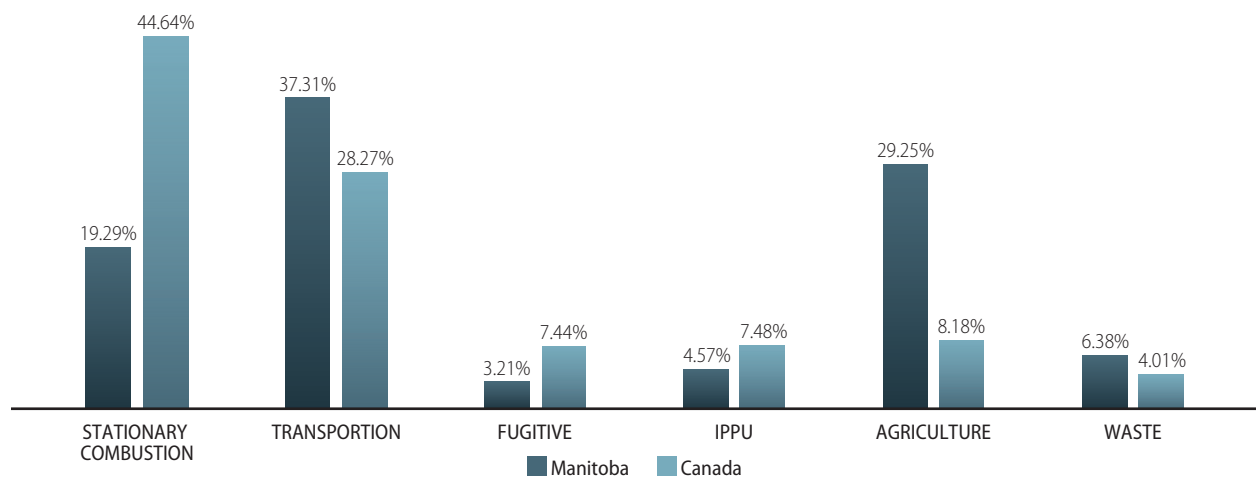
Transportation (37%) and agricultural (29%) sectors are the two largest sources of emissions in Manitoba, with the third being emissions from fossil fuels to heat buildings (19%) (Figure 2). While Manitoba has a strong manufacturing sector, the emissions industrial applications (fugitive and IPPU per Figure 2), are significantly lower than the rest of Canada. The higher percentage of transportation and agricultural emissions in Manitoba as compared to the rest of Canada represents, in part, the strength of these two sectors in the Manitoba economy. However, another key reason for these sectors dominating the province's emissions profile is because the Manitoba electrical grid is essentially emissions free, unlike most other provinces and territories. This serves to lower the emissions in those sectors that rely on a high proportion of electricity for their energy use - in Manitoba's case buildings and industry.

FIGURE 1. Manitoba's Emission as Share of Total Canadian Emissions (2020)



Source: 2022 National Inventory Report, Environment and Climate Change Canada

FIGURE 2. 2020 GHG Emissions Profile (9%) Manitoba versus Canada



*IPPU: Industrial Processes and Product Use

*Fugitive: Unintended leaks from pipelines (natural gas) and from industrial operations

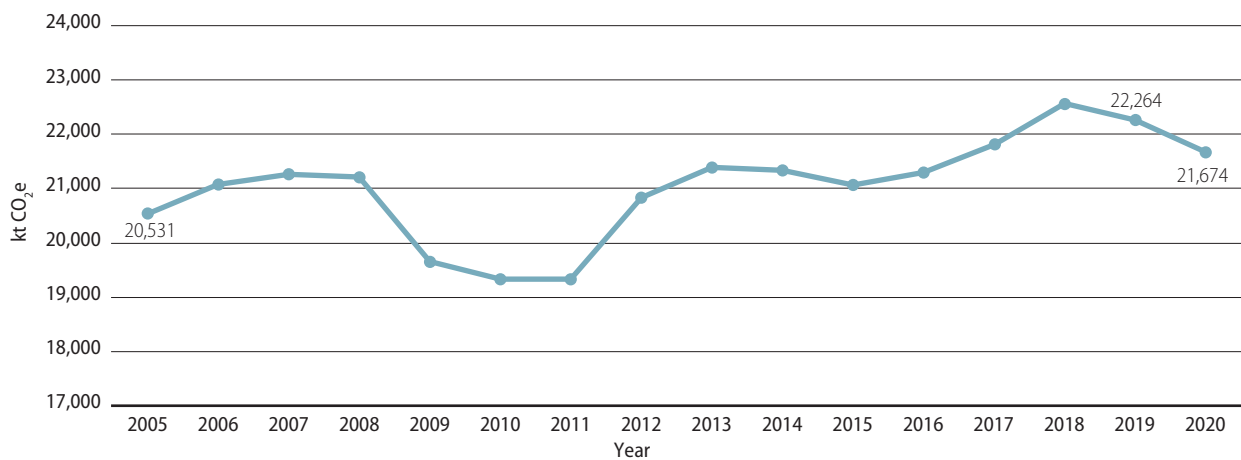
5.1.1 Details of Manitoba's Emissions

Manitoba's emissions increased by approximately 2100 Kilotonnes (kt) of CO₂e over the 2005 to 2018, representing a 10.2% increase (Figure 3). However, Manitoba's emission decreased by approximately 300 kt between 2018 and 2019 and further decreased by 600 kt in 2020 from 2019 levels. The data also shows emissions declined during two economic downturns in 2009 and 2010, followed by emission increases associated with economic recovery. For the 2018-2020 period, total emissions reductions were 900kt. (Figure 3).

Where does Manitoba's emissions data come from?

Manitoba reviews Environment and Climate Change Canada (ECCC) data and collaborates with third-party modelling experts to track and forecast Manitoba's GHG emissions. Canada prepares and submits a National Inventory Report (NIR) to the United Nations Framework Convention on Climate Change (UNFCCC). The 2020 emissions compiled in Canada's 2022 NIR that was released in 2022, were used to provide the status of Manitoba's emissions.

FIGURE 3. Manitoba's Emissions 2005-2020 (kt)



Source: 2022 National Inventory Report, Environment and Climate Change Canada

The drop in emissions between 2018-2020 is attributed to a combination of factors. These include targeted emissions reduction initiatives undertaken by the province, changes in behaviour attributed to the Covid-19 pandemic (reduced economic activity and work from home mandates), and behaviour change influenced by carbon tax signals and increased environmental awareness. As economic activity recovers, it is anticipated that emissions are also expected to partially rebound, although this may be dampened by investments in emissions reductions initiatives that governments, the private sector and households have taken.

Key Features of the CSA Approach

- Five-year targets which focus on continually monitored progress rather than lengthy periods i.e. setting a target further in the future (2030).
- Cumulative GHG emission reductions are measured over five years and not just a single-year snapshot providing a better picture of 'stockpiling' of CO₂ emissions.
- If the five-year target is not met, the difference between actual reductions and target are added to the next five-year period.

5.2 Provincial Greenhouse Gas Emissions Reduction Goal for 2018 to 2022

Manitoba's Carbon Savings Account (CSA) was developed as a way to ensure ongoing emission reductions in the province. The CSA represents the sum total of all emissions reductions that accrue over a five-year period on a cumulative basis. This is tracked against a set of cumulative emission reduction goals for each five-year CSA period. The cumulative emission reductions represent the "carbon savings", while tracking against the goal represents the "account".

How the CSA is Calculated

GHG emissions reduction during a CSA period is calculated using the following equation:
$$(\text{Cumulative Business-as-usual emissions* for the five-year CSA period}) - (\text{Cumulative Actual emissions for the five-year CSA period}) = \text{GHG emission reductions for the CSA period}$$

* Refer to Appendix 1 for details about *business-as-usual (BAU) emissions*.

The provincial greenhouse gas emission reduction goal for the January 1, 2018 to December 31, 2022 period is 1 megatonne of carbon dioxide equivalent relative to a forecast of the total greenhouse gas emissions that would have occurred in that period (i.e., BAU emissions). The 1 megatonne reduction goal is a cumulative reduction target amount over the five-year period. While this report provides a synopsis of progress to date, the emissions data required to report on Manitoba's first CSA ending December 31, 2022 becomes available in April 2024; after which Manitoba will be able to issue its final report on its first five-year CSA.

5.2.1 Progress on Emissions Reductions

Manitoba's emission reduction goal over the 5-year Carbon Savings Account (CSA) period 2018-22, is 1 Megatonne (Mt). In the first three years of the CSA, Manitoba has supported key actions (Table 1) such as decarbonizing transportation fuel and expedited decommissioning of fossil fuel generating stations as well as setting the stage for future emissions reductions.

Manitoba has invested in critical bridging actions that will provide emission reductions in the immediate and near term, until next generation technologies become market ready or are more widely accessible. One of those key bridging actions has been to increase mandates for biofuel content for fuels used by vehicles to immediately reduce emissions from transportation.

During this initial five-year CSA, Manitoba invested in systemic changes that will yield long-term results. To continue to expand on previous demand side management measures, Manitoba launched Efficiency Manitoba in 2020 with a mandate that includes natural gas reductions from building and processing operations. Together, Manitoba and Canada jointly agreed to cost-share Efficiency Manitoba's natural gas energy efficiency programs through the \$66.8 million Canada-Manitoba Low-Carbon Economy Fund (LCEF) Agreement. Efficiency Manitoba's \$32.3 million of LCEF for natural gas efficiency programs was announced on January 29, 2021. The duration of this funding agreement coincides with Efficiency Manitoba's current three-year Plan for fiscal years 2020/21 through 2022/23. Efficiency Manitoba offers over 35 programs for Manitobans to improve energy efficiency, save money and reduce greenhouse emissions. Efficiency Manitoba's programs support actions in the residential, Indigenous and Métis, lower-income, commercial, industrial and agricultural customer segments. It is estimated that the natural gas savings from Efficiency Manitoba's three-year Plan are expected to result in a cumulative GHG emissions reduction of over 100,000 tonnes of CO₂e over the three year period up to 2022/23, and lifetime cumulative GHG emission reductions of over 866,000 tonnes of CO₂e, over 15 years (Table 2).

Are we making progress?

Some big moves undertaken in the first half of the 2018-2022 CSA have helped to drive down GHG emissions by 200 kt CO₂e. An early phase out of Manitoba Hydro's coal and natural gas-powered generating facilities, improved agricultural practices in fertilizer, manure management and tillage,

Programs launched during this period such as Efficiency Manitoba and the Efficient Trucking Program will set us up for even more savings in the future.

TABLE 1. Actions the Manitoba Government has supported to Reduce GHG Emissions in the Province

Targeted Initiatives	GHG Reduction in 2018 (kt)	GHG Reduction in 2019 (kt)	GHG Reduction in 2020 (kt)	Total GHG Reduction (kt)
Early phase out of Manitoba Hydro's Brandon Coal-fired Generating Facility ¹	23.5	30	-	53.5
Early phase out of Manitoba Hydro Selkirk Natural Gas Generating Facility ²	-	-	2.5	2.5
Demand-side Energy Management	18	37	59*	114
Supporting low emission soils, crops and livestock practices			10**	10
Restoration of wetlands and riparian areas to sequester carbon			18**	18
Efficient Trucking Program			1.7	1.7
Total Reductions (kt) from these initiatives	41.5	67	91.2	199.7

¹ Originally scheduled for 2020

² Originally scheduled for 2030

*estimated

**cumulative reduction since 2018

Cumulative Emissions

It is common to measure and report GHG emissions on an annual basis. However, GHG's persist in our atmosphere for decades. It is important to understand that GHG emissions have a cumulative impact on the climate. Globally, we are releasing more GHGs in the atmosphere than can be absorbed by natural systems such as burying them in the form of carbon sequestration. Thus, when developing policies to address GHG emissions, it is important to consider the impact of cumulative emissions, not just annual emissions.

Between 2018 and 2020, Manitoba's cumulative emissions are calculated to be 1.0 Mt less than the forecasted BAU emissions (Table 2). This reduction is a result of the combination of specific projects and initiatives undertaken by the province, carbon tax price signals and changes in behaviour attributed to the Covid-19 pandemic and other factors.

TABLE 2. Comparison between forecasted BAU emissions and actual emissions

Cumulative actual emissions (2018-2020) (Mt)	Cumulative forecasted BAU emissions (2018-2020) (Mt)	Difference between cumulative actual and BAU emissions (2018-2020) (Mt)
66.5	67.5	-1.0

note: 1,000kt = 1Mt

Data source 2022 NIR

The NIR is developed using methodologies outlined by the Intergovernmental Panel on Climate Change (IPCC) guidelines. IPCC guidelines are revised regularly as methodologies improve and emissions data are recalibrated back to the 1990 base year in each annual NIR. The projected BAU emissions scenario has considered and calibrated to reflect the methodological changes implemented up to 2022 NIR.

Manitoba's actual emissions at the beginning of the CSA period (2018) were higher than the BAU scenario forecasted by Environment and Climate Change Canada for Manitoba. However, with implementation of emission reduction initiatives, Manitoba has been able to bend the emissions curve down in 2019 and 2020.

5.2.2 Emissions Reductions Outside of the Carbon Savings Account

Manitoba exports clean electricity to nearby jurisdictions (Saskatchewan, Ontario, and the US), which contributes significantly to global emission reductions. These reductions are approximately 7,000 kt CO₂e annually. In 2020, Manitoba had a strong performance, displacing emissions by approximately 8,200 kt CO₂e. Manitoba's net electricity exports within Canada accounted for 10 per cent (1,164 gigawatt-hour) of the total electricity exports and displaced approximately 520 kt CO₂e in Canada. The other 90 per cent (10,200 gigawatt-hour) of total electricity exports went to the US.

5.2.3 Looking Forward

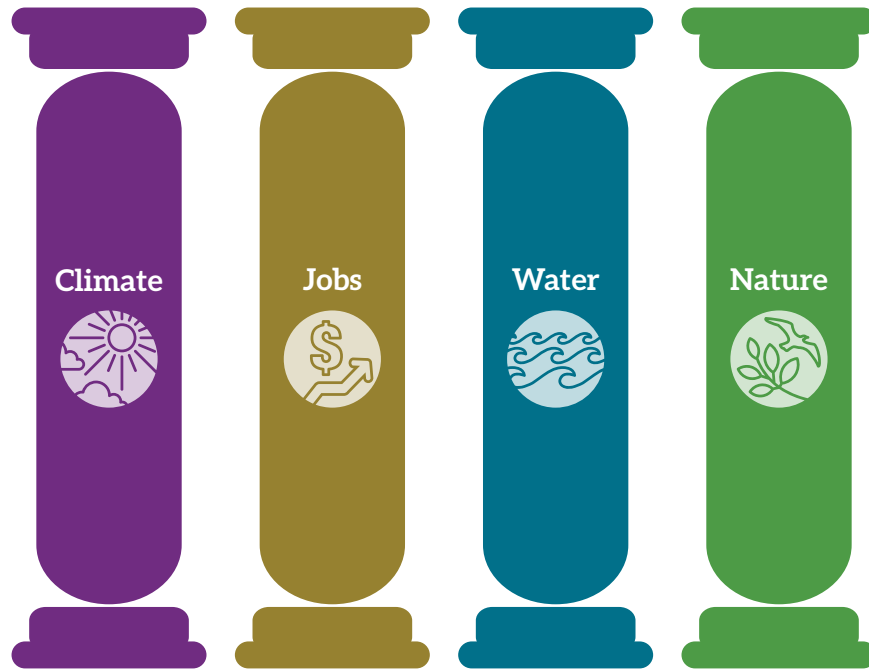
Ongoing measures will have positive emissions reduction implications for this CSA period and continue to deliver into future years. With Efficiency Manitoba in place, building energy programs launching in 2021 and 2022 will result in an estimated additional 50,000kt of emissions reductions by the end of this CSA period. Emissions from transportation fuels are the largest source of greenhouse gas emissions in Manitoba, accounting for around 40 per cent of provincial emissions. Looking forward, the increase in percentage of plant-based fuels associated with the updated biofuels mandate is expected to reduce an additional 100 kt CO₂e annually starting in 2021.

In 2020, the Expert Advisory Council was requested by the minister to provide recommendations on a Green Transportation Strategy. It is expected that future actions under a green transportation policy will further lead to emissions reductions for the province. In 2020, Manitoba also identified the need to update its energy policy framework in response to evolving low carbon energy options and anticipate that in the long-term emissions reductions will also result from action under this policy.



The Climate and Green Plan

The Climate and Green Plan (CGP) has four pillars - climate, jobs, water and nature that form its strategic approach. Each of the pillars is supported by keystones that guide the strategy. The following sections provide an overview of the progress and initiatives implemented during this reporting year. Many of the initiatives address more than one pillar, and reflects the cross-cutting nature of climate action.



115 major
climate and green plan
initiatives in 2020-2021

In 2020-2021, the Manitoba government undertook over 115 climate-related initiatives under the CGP. These initiatives vary in size, scope and timelines for implementation and completion. (See Appendix 2 for a full list).

Climate Pillar

7.1 Clean Energy

Manitoba's electricity grid is the cleanest in Canada and is the key driver of the province's carbon emission profile. The province also pursued additional opportunities to reduce emissions and further transition Manitoba to a low-carbon economic future and supporting GHG reductions in other jurisdictions through green power exports. During 2020-2021, Manitoba's clean energy initiatives included:

- An investment of \$42 million, with an additional \$18.7 million from the federal government, to support construction of a 230-kilovolt transmission line from Birtle (MB) to the Manitoba–Saskatchewan border. This will increase export capacity to Saskatchewan, which will displace electricity produced by coal, a high emitting GHG fuel.
- In February 2021, the first generating unit of the Keeyask generating station came into operation. The Keeyask project is a 695-megawatt (mw) hydroelectric generating station owned by a partnership between Manitoba Hydro and four Manitoba First Nations: Tataskweyak Cree Nation, War Lake First Nation, York Factory First Nation, and Fox Lake Cree.
- Increasing Manitoba's ethanol mandate from 8.5 per cent to 9.25 per cent and its biodiesel mandate from two per cent to 3.5 per cent. These increased blending requirements reduce Manitoba's emissions by an additional 150 kt CO₂e annually, bringing the total annual GHG reductions attributed to biofuels to approximately 550 kt CO₂e for 2022.



Keeyask generating station

7.2 Carbon Pricing

Carbon pricing is one of many tools to reduce GHG's and transition to a lower-carbon economy. Carbon pricing is a cost applied to carbon pollution to encourage polluters to reduce the amount of GHG's they emit. It should be designed in a way that encourages households and businesses to select greener investment choices, while simultaneously protecting Manitoba's competitiveness and growing the economy.

Manitoba's proposal for a carbon pricing system was put to the federal court in 2020 for review. In the interim, the federal carbon tax structure applies in the province. CGPIO continues to review the efficacy of different approaches to carbon pricing that reflect Manitoba's unique emissions profile and investments in clean energy.

Manitoba Biofuels Mandate

The Expert Advisory Council advised the implementation of a biofuel mandate as an important first step to achieving our 2018 to 2022 and future carbon savings account targets.

Greater emissions reductions in the future are possible if the use of renewable fuels is maximized in the province or if petroleum fuels are displaced by other types of low, or zero emissions transportation energy.

Manitoba was the first province in Canada to require renewable fuels in diesel in 2009, and had the highest ethanol blend requirement for gasoline from April 1, 2008 until January 1, 2020, acting ahead of the federal government. Manitoba will have the highest biofuels blending requirements in Canada, with 10 per cent ethanol and 5 per cent biodiesel on January 1, 2022.

7.3 Sector Emission Reduction

Transportation, agriculture and stationary combustion (primarily from buildings), are the main sources of emissions in the province and the main areas of focus for the development of emission reductions. Key emission reduction projects of various size and scope underway in this reporting year included:

- Launching the Efficient Trucking Program, to assist with the reduction of GHG emissions associated with the heavy-duty trucking sector. The three-year program supports the installation of cost-effective fuel saving retrofitted devices on vehicles and trailers, such as tire pressure monitoring systems, side skirts, boat tails for improved aerodynamics and anti-idling technology through the provision of rebates. Funding of \$11.8 million has been allocated to this program, with \$5.9 million obtained from the Federal Low Carbon Economy Fund (LCEF) and \$5.9 million matched by Manitoba.
- Ag Action Manitoba is a five-year, \$176 million fund which facilitates the offering of the Ag Action Assurance program. – Environment fund for farmers and farm service providers; one of the key benefits of this program is reduced GHG emissions associated with better agricultural practices.

Manitoba and Canada signed an agreement worth \$64.6 million over three years to fund initiatives through the Low Carbon Economy Leadership Fund.

The first program approved under this fund is the Efficient Trucking program that supports retrofits of heavy transport vehicles to save fuel in order to reduce emissions from fossil fuels.

Efficiency Manitoba's natural gas demand-side management (DSM) program is a result of Manitoba-Canada cooperation, with a joint \$64.6 million investment.

DSM programs provide a consistent, systemized, cyclic approach for planning and conducting evaluations of building-related energy efficiency programs. They are intended to nudge consumer demand down for natural gas through various methods, such as financial incentives and education.

By accessing these DSM programs, Manitobans reduce residential, commercial, institutional, industrial and agricultural building-related natural gas consumption and associated GHG emissions.

Efficiency Manitoba programs will reduce emissions by an estimated 488 kt CO₂e by 2030.

7.4 Adaptation

Adaptation is defined as taking preventative steps today to remove, reduce, or recover more quickly from the consequences of climate impacts. Over the decades, Manitobans have built significant capacity and resiliency to a wide variety of climatic and seasonal variations and extreme weather events. The province knows the importance of being well-prepared for flooding, not only in the spring, but also in the summer and fall. The growing risk of drought and wildfires in recent decades has pushed efforts to improve monitoring capacity, as well as adaptive and quick response initiatives. In this reporting year, there were over 40 major adaptation initiatives identified, of various size and scope, such as:

- Projects to support water treatment plant upgrades for 12 communities that support climate readiness and improved resiliency to deal with extreme climate events. The upgrades allow for remote oversight, reducing travel and installing backup generator systems to improve resiliency, in three communities.
- Manitoba provided \$15 million for disaster prevention and climate-resilient projects in the Winnipeg Metropolitan Region (WMR). Under the program, the Manitoba government funded 12 local infrastructure projects that will better prepare municipalities to withstand the impacts of natural disasters and extreme weather events. These projects enhanced resiliency through critical infrastructure power back-up system improvements to reduce flood risk and improve water retention during droughts, and expanded emergency response capacity of municipalities.
- Building a Resilient Manitoba Annual Report on Climate Adaptation in the Manitoba Government (Appendix 3) expands on these and other adaptation initiatives for 2020-2021.
- Manitoba launched a Vulnerability, Risk and Opportunity Assessment (VRA) of core government operations. The assessment provided scientific, technical and practical knowledge to identify climate change-related risks and opportunities to form adaptation strategies. The VRA is designed to: 1) increase capacity to understand, adapt, and ultimately manage climate impacts and risks; 2) expand government-wide climate knowledge by providing the necessary tools to conduct detailed analysis on risk and vulnerability and to implement timely and cost-effective solutions; 3) establish a baseline for longitudinal and well-coordinated action on adaptation.
- The Climate and Green Plan Implementation Office (CGPIO) participates on the Natural Resources Canada-sponsored National Adaptation Plenary and Platform. This body represents provinces, territories, federal government departments, national Indigenous groups, academia, and sectoral leads. It provides a forum to share expertise and identify emerging climate adaptation issues across Canada.

Jobs Pillar

The Jobs pillar includes four keystones – innovation and clean tech, financing and investment, skills and training, and green infrastructure. Initiatives described below capitalize on opportunities to align with a low-carbon future, ensuring that economic growth continues in Manitoba while protecting the environment (See Appendix 2 for a full list of initiatives).

8.1 Innovation and Clean Tech

In June 2019, the Innovation Growth Program was launched as a key element of Manitoba's Economic Growth Action Plan and, in 2020, the Manitoba government selected five leading-edge businesses to receive more than \$350,000 through the program to commercialize new and innovative green products and services. The recipient projects of Evolution Wheel, Aquatic Life, TRAINFO Corporation, Creative Applications for Sustainable Technologies Inc., and SolarSkyrise, have helped create new clean tech jobs supporting the plan.

Harmonizing energy efficiency standards of household appliances across Canada, will not only prevent interprovincial trade barriers, but will advance improvements in energy efficiency of household appliances. In October 2020, Manitoba signed the Energy Efficiency Requirements for Household Appliances Reconciliation Agreement, endorsed by Canada, Ontario, British Columbia, Quebec, Nova Scotia, and New Brunswick. This Regulatory Reconciliation and Cooperation Table Agreement will provide greater certainty to industry and the alignment of energy efficiency requirements will also make it easier for jurisdictions to offer incentives on even more efficient products to continue the market transformation of the household appliance sector.

The Manufacturing Investment Tax Credit provides an eight per cent tax credit (seven per cent refundable and one per cent non-refundable) to businesses that acquire qualified plant, machinery and equipment for first-time use in manufacturing or processing in Manitoba, including clean technologies.

Indigenous Reconciliation and Northern Relations is working with northern communities to build capacity to create sustainable and Climate Ready Communities. This initiative, called the Northern Healthy Foods Initiative (NHFI) aims to reduce long-haul transportation by supporting greenhouse and gardening projects localizing food production.

8.2 Financing and Investment

Accessing financing for small and medium-sized enterprises (SME's) is a key to developing clean growth and innovation. Manitoba has used financing and tax credits to assist SME to achieve their goals and the goals of the Climate and Green Plan.

- In February 2021, Manitoba launched a \$1 million Green Impact Bond, a finance tool to help the government rapidly innovate and implement new solutions for organic waste and GHG emission reductions, while sharing risks with the private sector. This tool brings the public, private, non-profit and charitable sectors together to develop innovative solutions to complex problems that have not been solved by one sector alone. Through the Green Impact Bond, a service provider meets agreed-upon outcomes for organic waste diversion, job creation, and GHG reduction. Investors will provide up-front funding to the service provider. A third-party evaluator will determine whether the outcomes have been met and the return on investment to be paid by the province.
- The Green Energy Equipment Tax Credit is a refundable tax credit to reduce costs incurred by Manitoba's manufacturers and purchasers of property used to produce energy in Manitoba from a renewable source. The credit ranges from 7.5 per cent to 15 per cent, depending on the type of equipment manufactured or purchased. Equipment includes geothermal heat pump systems, green energy transmission equipment, solar thermal heating equipment, gasification equipment and biomass fuel energy systems.

- Manitoba is advancing circular economy action, using recycled materials to offset non-renewable resources. Asphalt-paving mixtures containing recycled asphalt shingles are being tested as part of a pilot project. If effective and durable, this innovation could significantly reduce environmental impact, decrease landfill waste volumes and lower GHG emissions. Manitoba Infrastructure, in conjunction with the University of Manitoba, is testing the pavement conditions over the next five years to monitor its performance.

8.3 Skills and Training

Manitoba continues to identify and support activities to bridge gaps in skills and training in the green jobs sector. In this reporting year:

- Economic Development and Jobs provided the Manitoba Environmental Industries Association (MEIA) with funds to train its workforce to achieve sector goals for the Natural Resources, Energy & Environment sector. The training focused on growth, competitiveness and environmental sustainability performance of companies in:
 - Natural resources subsector, including: trapping, commercial fishing, mining, oil and gas, forestry, and processors of raw materials extracted from the environment.
 - Energy subsector involved in the production and sale of energy, refining, and distribution.
 - Renewable energy industries subsector, including: solar, geothermal, hydroelectricity, biomass, and wind to increase sales, exports, and the capacity to lead environmental sustainability performance technologies and practices.
 - Environment and Cleantech sector, to assist the province in meeting its overall environmental sustainability and climate change goals.
- The Brandon Energy Efficient Program provides skills and training to support climate and green related areas, such as geoscientists and conservation and fishery officers.
- The CGPIO commenced the implementation of the Manitoba Climate Resilience Training Project, in partnership with Natural Resources Canada in October 2020. This project seeks to build capacity and expertise of engineers, professional planners, water resource managers, the business community in Northern Manitoba, and within Indigenous organizations and communities, to address risks associated with climate change.

Economic Development and Jobs provided support to MEIA to deliver climate-related webinars. 182 people were trained in the following areas:

- Optimizing Geothermal Design
- Indigenous Clean Energy
- Heating Manitoba's Buildings Affordably Without Fossil Fuel
- Solar

8.4 Green Infrastructure

Green Infrastructure refers to a network that provides the “ingredients” for solving urban and climatic challenges by building with, and alongside, nature. The main components of this approach include stormwater management, climate adaptation, increasing biodiversity, food production, better air quality, sustainable energy production, clean water, and healthy soils. Green infrastructure also works to improve quality of life through recreation and the provision of shade and shelter in, and around, towns and cities.

Fundamental to Manitoba’s green infrastructure are the 14 watershed districts administered by the Watershed Planning and Programs Section. They are responsible to coordinate and support Integrated Watershed Management Planning as outlined in The Water Protection Act. Initiatives are funded and delivered by the GRowing Outcomes in Watersheds (GROW) program.

Manitoba has installed flood management infrastructure on the Lake Manitoba and Lake St. Martin outlet channels, as well as developed permanent roads in northern communities and funded flood preparedness projects with equipment in various municipalities.

Appendix 2 provides a comprehensive overview of green infrastructure projects currently underway in the province.

Riparian Area Management

Riparian areas are the vegetated (trees, shrubs and herbs) zones adjacent to rivers, streams, lakes and wetlands. A riparian area is considered a transition zone or interface between a waterbody or wetland, and the surrounding drier upland. Riparian areas need to be healthy to function at a high level. Healthy riparian areas can produce an abundance of forage, and provide shelter for livestock and maintain habitat for wildlife and fish. A producer can enhance economic and environmental productivity by improving both the condition and function of a riparian area.

Under GROW:

- 1,295 ha of wetlands were conserved
- 448 acres of existing wetlands were enhanced
- 140 ha of drained wetlands were restored
- Over 1,695 ha of riparian areas and 2,266 ha of upland areas were conserved or enhanced

Water Pillar

The water pillar addresses water quality as well as both flood and drought. Good water management recognizes the important relationship between land use and water, and that planning must take a comprehensive watershed approach.

In January 2021, the Expert Advisory Council provided its recommendations for a Provincial Water Management Strategy to the Minister of Conservation and Climate. The recommendations will help to guide future policies and initiatives on Manitoba's vast water resources.

In 2020-2021, there were over 31 diverse water-related initiatives underway across government (see Appendix 2 for a full list), including projects to:

- integrate watershed management planning
- advance water retention and runoff management on agricultural lands
- identify potential vulnerabilities to community drinking water sources
- improve wastewater treatment
- protect groundwater and recharge areas

9.1 Agriculture and Land Use

The relationship between water and land is closely intertwined. Agricultural or municipal land use decisions impact not only their local watershed, but also downstream. This is why maintenance and enhancement of the land, water and riparian areas is vital for a healthy ecosystem and sustainable agriculture. The Ag Action fund described above provides funding to Watershed Districts for environmental sustainability initiatives.

The Ag Action Manitoba program is an all-encompassing five-year investment of \$176 million to Manitoba's agriculture and agri-food sector. The fund helps farmers and industry service providers implement and adopt beneficial management practices (BMPs) as identified in Environmental Farm Plans, such as soil improvement, greenhouse gas reduction, manure and livestock management, direct manure injection, in-season manure application, improved pasture and forage quality. Ag Action funding for BMP's in 2020 was \$366,539 for a total of 38 projects.

Ag Action funding for Ecological Goods and Services in 2020-2021 was \$1,056,631 for 20 projects. Program initiatives include:

- Farmland Beaver Damage Control provides financial assistance to rural municipalities, the Association of Manitoba Community Pastures, Northern Association of Community Councils and First Nation Community Bands to implement appropriate methods to control beavers that cause problems, such as excess moisture or flooding on agricultural land.
- Managing livestock access to riparian areas requires effective management of both surface and ground water sources used for livestock production. The Association of Manitoba Community Pastures (AMCP) assists producers in restricting direct access to surface water to help minimize the impact livestock have on surface water quality and the riparian zone.

9.2 Wetlands and Watersheds



Wetlands can provide benefits through improved ecosystem health and resilience, such as absorbing excess nutrients, mitigate flood peaks, provide surface water storage to reduce risks of drought, enhance groundwater and aquifer recharge, and enhance carbon storage for greenhouse gas emissions.

In 2018 and 2019, Manitoba created the Conservation Trust and GROW Trust, administered by Manitoba Habitat Heritage Corporation, which provides funding to create, conserve and restore ecosystems and natural infrastructure. In 2020-2021, Manitoba's Watershed Districts were approved for over \$5.3 million in funding through the GROW and Conservation Trusts. Project funding was awarded for the conservation of over 1,295 ha (hectares) of existing wetlands, enhancement of 197 ha of existing wetlands of all classes, and restoration of 140 ha of former wetlands. Additionally, over 1,619 ha of riparian area (lands around water, such as river banks) for conservation, restoration, and enhancement projects, and approximately 2,266 ha of upland areas, including grasslands, were approved. GROW Trust and Conservation Trust-funded projects for 2020 is available at <https://mhhc.mb.ca/funded-projects/>

9.3 Flood and Drought

Significant work was completed to support effective forecasting, mitigation and response to flooding and drought in the province. Below are four examples of the many initiatives underway to combat flood and drought scenarios (see Appendix 2 for a full list of initiatives):

- A project is underway to ensure water-related assets are maintained, preserved and operated in a manner to provide flood protection and manage water supply during flood and drought conditions. This program provides accurate data so that flood mitigation and water management programs and decisions are made in an efficient, economical and sustainable manner, including flood risk maps, hydraulic and hydrological data.
- Flood Risk Mapping under Canada's National Disaster Mitigation Program was undertaken to map vulnerable rivers and waterways. The completed mapping was delivered to the federal government to assist with developing more resilient communities, and to provide flood protection and manage water supply during flood and drought conditions.
- The Water Infrastructure Resiliency program was launched and is implementing improved design standards for increased resiliency and adaptation during flood events, and includes dam inspections, channel development, flood protection infrastructure, drains and ditches.
- A program was launched to increase the flood protection levels and resiliency of flood protection structures, repair domestic irrigation water supply and dams to provide better drought resiliency, and increase the capacity of the agricultural drains to improve drainage times post-flooding in various areas of the province.

9.4 Water Quality

Good quality water is essential to aquatic ecosystems and to the health of all Manitobans. The changing climate has the potential to affect both water quantity and quality. Highlights from this year include Manitoba's \$375,000 commitment to the Lake Winnipeg Research Consortium to upgrade research equipment and \$175,000 to Fish Futures Inc. for Lake Whitefish research. The Lake Winnipeg Research Consortium Inc. monitors conditions and conducts research on Lake Winnipeg. Additionally, Manitoba Agriculture and Resource Development is currently assessing the potential for water quality trading. Work is underway to set nutrient targets for Lake Winnipeg and its tributaries, a critical first step in developing a water quality trading program.

Nature Pillar

Protecting the health of Manitoba's diverse ecosystems is critical to the well-being of people and communities and therefore, a critical component of the Climate and Green Plan and the heart of the nature pillar. Manitoba enjoys over four million hectares of land and water inside 90 provincial parks. In 2020, Manitoba significantly invested in parks infrastructure (See Appendix 2 for a full list of initiatives).

10.1 Parks and Protected Areas

Parks are places where people work, live and play, as well as places of cultural significance for Indigenous people. They play a critical role in protecting nature, conserving biodiversity and are home to thousands of birds, animals and plant species. The government has invested in parks to encourage Manitoba families to enjoy a greater connection with nature, including:

- \$16.6 million invested in parks' infrastructure in 2020. Projects undertaken included the completion of Phase 1 of the Duff Roblin Provincial Park, a new water treatment plant at Big Whiteshell Lake, Falcon Lake road improvements, upgraded water treatment plants at Grand Beach and Birds Hill Parks and new playgrounds at six parks.
- The province also invested \$7 million for the creation, maintenance and enhancement of Manitoba trails through three new funds.
- The \$1 million Trails Manitoba Operating Endowment Fund will serve as ongoing operating funding for Trails Manitoba.
- The \$4 million Manitoba Trails Improvement Endowment Fund will support annual application based grants to create new trails or improve existing ones.
- The third fund, a \$2-million Manitoba Trails Strategic Fund, is designed to support capital projects that advance recreational trail development in Winnipeg and will be distributed as matching grants.

10.2 Wild Species and Habitat

Manitoba works to support healthy wildlife populations and to conserve biodiverse ecosystems. The following initiatives were launched this year to conserve wild species and habitats:

- The Manitoba government provided a matching contribution of up to \$1.5 million to support wetland education and conservation at the award-winning Oak Hammock Marsh Interpretive Centre.
- Manitoba conducted a species-at-risk (SAR) survey of over 49,000 ha in southern Manitoba to monitor and map populations, assess habitat conditions; provided SAR occurrence data to stakeholders to facilitate stewardship and mitigation of SAR populations and habitat; and worked with stakeholders to conserve and manage species-at-risk and their habitat.
- The Conservation Trust and GROW funds supported habitat management projects, such as building capacity for farmers to implement regenerative agricultural practice that improve ecosystem function, and the Fisher River Cree Nation (FRCN) Conservation Areas Initiative to protect the health of a thriving natural landscape on the southwest side of Lake Winnipeg (which includes forests, wetlands, beaches, and habitats of species-at-risk).

\$1,500,000 → to support wetland education and conservation to update the award-winning Oak Hammock Marsh Interpretive Centre

10.3 Forests and Natural Areas

Approximately half of Manitoba's land base is forested. The boreal region is the province's largest ecozone and is a highly diverse landscape of trees and peatlands. These sensitive areas play an important role in managing climate change. Among the efforts in place during 2020-2021, the Manitoba government released the Boreal Wetlands Conservation Codes of Practice in 2020. It is a series of best management practices co-developed with industry and stakeholders that provides guidance on how to avoid, minimize, and offset impacts to boreal wetlands that result from resource access roads and crossings. The code of practice helps to protect the boreal wetlands, which are some of the most carbon-rich ecosystems in the world, and provide critical habitat for a variety of wildlife and species at risk.

10.4 Conservation

Manitoba continues to balance natural resources and economic development. For example, in 2020-2021, Manitoba provided grant funding of up to \$875,000 to advance Commercial Fishery Certification and increase market competitiveness for Manitoba's commercial fisheries.

In 2020, the governments of Canada and Manitoba invested more than \$210,000 to monitor and improve the health of the province's bee colonies, and support the long-term sustainability of beekeepers. Manitoba's beekeeping industry is crucially important, because of the economic contributions to Canada's honey industry, and also because of the vital role bees play in pollinating crops. With these investments, Manitoba is helping to keep beekeeping sustainable for future generations.

Collaborations and Programs

Manitoba engages with a wide variety of stakeholders when making climate decisions. This collaborative approach ensures there are diverse groups informing the government. Manitoba relies on partnerships with municipalities, other provinces, territories, the federal government, non-government organizations, indigenous communities and industries to implement climate change initiatives. Manitoba continued building partnerships and fostering dialogue with provincial partners, businesses and the non-profit sector:

- Eco-West Canada, a bilingual organization promoting the growth of small to medium-sized municipalities and seeks to establish partnerships with various stakeholders, all three levels of government and private enterprise to create initiatives in the areas of energy, economy and the environment.
- Manitoba supports the University of Winnipeg's unique Prairie Climate Centre, which provides an evidence-based perspective to communicating the science, impacts, and risks of climate change through maps, documentary video, research reports, and plain-language training, writing, and outreach.
- International Institute for Sustainable Development (IISD) -- Manitoba entered into a five-year funding agreement, which continued over 2020/21, and included the delivery of research to support the implementation of Manitoba's Climate and Green Plan. During 2020-2021, IISD developed indicators to track progress on climate goals; a Circular Economy (CE) Sector Assessment, as well as research on natural infrastructure implementation, micro-plastics management in Manitoba, Lake Winnipeg Aqua Hacking, Agriculture and Climate Change, support for a Provincial Water Strategy, exploring vertical integration for climate adaptation planning and net-Zero 2050.
- The province partnered with the other prairie provinces and Canada in the establishment of ClimateWest, launched in January 2021. ClimateWest is a new central hub for climate services in Manitoba, Saskatchewan, and Alberta with a mandate to support people, communities, businesses, and governments to address climate change risks and vulnerabilities through planning and action. ClimateWest delivers access to credible, useful and timely climate information and data tailored to the region, investing in tools and training that build local capacity for the application of climate information in planning and action.
- Manitoba worked in partnership through the Prairies Regional Adaptation Collaborative (PRAC) to complete its two-year survey of adaptation planning by municipalities and Indigenous communities. This was a tripartite effort between Alberta, Saskatchewan and Manitoba. After 10 years in existence, PRAC will cease operations in 2021. The legacy of information and partnerships built by PRAC will continue through the newly-created ClimateWest.
- The CGPIO contributes to work undertaken by the Canadian Council of Ministers of the Environment and provided input on publications related to climate risk management, and natural infrastructure. Additionally, the CGPIO contributed to ongoing committee work for adaptation, climate indicators, flood, drought, and government leadership in reducing its carbon footprint.
- The CGPIO participates on the Natural Resources Canada-sponsored National Adaptation Plenary and Platform. This body is a representation of provinces, territories, federal government departments, national Indigenous groups, academia and sectorial leads. It provides a forum to share expertise and identify emerging climate adaptation issues across Canada.
- Energy and Mines Ministers Conference (EMMC) is an annual event that gives federal, provincial, and territorial Energy and Mines Ministers an opportunity to discuss current opportunities and challenges facing Canada's energy and mining sectors. Manitoba is an active participant in this annual event.

Climate and Green Fund

The Manitoba Climate and Green Fund was established in 2018 with an annual allocation of up to \$40 million across departments to support the implementation of the plan. The distribution of funds in 2020 is provided in Table 3.

TABLE 3. Allocations made under the Climate and Green Fund

Manitoba Climate and Green Fund	2020/21 Actuals (\$,000)
Agriculture and Resource Development	
Manitoba Habitat Heritage Corporation - NAWMP	518
Manitoba Infrastructure	
Maintenance and Preservation of water-related assets	11,206
Amortization related to the existing network of water-related assets owned by the province	7,867
Conservation and Climate	
Conservation and Climate Fund	599
International Institute for Sustainable Development	1,156
Building Resiliency Adaptation Capacity and Expertise (BRACE)	379
Vulnerability and Risk Assessment Study (VRA)	50
Low Carbon Economy Fund - Efficient Trucking Program	5,485
Prairie Climate Services Network (PCSN)	170
Unallocated	-
Total: Climate and Green Fund	\$27,430

12.1 Conservation and Climate Fund

The Conservation and Climate Fund (CCF) provides support for projects occurring in Manitoba that incorporate actions to combat and adapt to climate change, protect the environment and are in alignment with the priorities and implementation of the plan (Table 4). The grant application process is available to incorporated non-profit organizations, academic and educational institutions, Manitoba municipalities, Northern Affairs and Indigenous Communities in Manitoba, and businesses.

The CCF highlights and funds pilot projects which can serve as a way to demonstrate to others how to approach a project with a climate lens. For example, the conversion of a tundra buggy used for tourism in Churchill, MB, from diesel to electric, by tour operator Frontiers North Adventures, is an effort to reduce carbon emissions and demonstrate use of electric vehicle technology in the North.

Investments in green initiatives through the fund nearly doubled to a total of \$600,000 from the \$355,000 that was previously granted to various groups. In 2020-2021, the province awarded \$600,000 to eight organizations for local green initiatives that supported priorities of the CGP. These projects addressed sustainable food production, community composting, clean energy, active transportation, climate adaptation of wetlands, and nutrient reduction in the Lake Winnipeg Basin.

TABLE 4. Allocations made under The Conservation and Climate Fund 2020-21

Organization	Dollar Amount (Approx.)	Description
Bike Winnipeg	\$ 37,000	Bikeshare Social Enterprise Project
Centre for Indigenous Environnemental Ressources	\$ 100,000	Nutrient reduction in the Lake Winnipeg Basin through nature-based solutions
Crescent Fort Rouge United Church	\$ 1,200	Community organic composting project
Ducks Unlimited	\$ 65,000	Climate adaptation contributions of wetlands in livestock production grasslands
Frontiers North Adventures	\$ 149,000	Conversion of a Tundra Buggy in Churchill to electric power from diesel
Manitoba Building Trades Institute	\$ 78,000	Aquaponics greenhouse training facility to teach sustainable food production
Winnipeg Repair Education and Cycling Hub (W.R.E.N.C.H)	\$ 29,000	Reclaim bicycle parts from the waste stream while providing education to youth and affordable active transportation options
Winnipeg Trails Association Inc.	\$ 138,000	Project Bicycle Power for Every Ability, which will match bicycles to the specific needs of newcomer/refugee communities, Indigenous communities, differently abled people and those with a need to transport young children.

Low Carbon Government

The Manitoba government seeks continuous improvement in greening its operations with the intention to lead by example. As one of the largest employers in Manitoba, with offices and operations throughout the province, the government is committed to taking action to reduce its carbon footprint and achieve the goals of the plan.

13.1 GRE Reported Emissions by Source (2017-2020)

The Government Reporting Entities (GRE) GHG emissions for 2020 are notably lower than in previous periods. The reductions are due in part to the impact of COVID-19. During the pandemic, service levels were maintained, while work from home directives resulted in reduced energy, water and fuel use for government-owned buildings, vehicles and equipment. The government has taken note of these reductions in energy and fuel use, and the resulting emission reductions as it plans for the post pandemic economic recovery and opportunities to further reduce GHG emissions.

Table 5 provides the total emissions of the GRE for the period 2017-2020. There was a 10 per cent reduction in GRE total reported emissions from 2017 to 2020. Since 2017, building-related emissions are consistently 86-87 per cent of the GRE's total emissions, and vehicle and equipment emissions are between 13 and 14 per cent of the GRE reported total emissions. The full Low Carbon Government annual report is found in Appendix 4.

TABLE 5: GRE Emission Summary 2017-2020

GRE Emissions	2017	2018	2019	2020
GRE Buildings (tCO ₂ e)*	630,115	649,843	633,836	574,122
Vehicles & Equipment (tCO ₂ e)*	101,254	107,223	98,134	82,598
Total Emissions GRE (tCO ₂ e)*	731,369	757,067	731,970	656,720
% of Building Emissions in Total GRE Emissions	86%	86%	87%	87%
% of Vehicle & Equipment Emissions to Total GRE Emissions	14%	14%	13%	13%

*GRE reporting is in tCO₂e as opposed to kt in rest of report.

Activities of the Expert Advisory Council (EAC)

The EAC is an independent group of experts with a mandate to provide advice and recommendations to the Minister on the Manitoba government's Climate and Green Plan. In January 2020, the Minister of Conservation and Climate delivered a second [mandate letter](#) to the EAC, outlining four initiatives for the EAC to pursue in 2020. As of March 31, 2021, the EAC has delivered on the following:

- Provided advice and recommendations regarding the scope and elements of a modernized, coordinated provincial water management strategy for Manitoba. The advice provided included short and long-term measures, regulatory and governance changes to support watershed-based management and investments like the Conservation Trust and GROW programs. The EAC's full report is available at [Water Management Strategy](#).
- Provided advice and recommendations on a Green Transportation and Infrastructure Strategy. The stakeholder engagement work was conducted in the summer of 2020. The report will support the work by the EAC in 2021-2022 (see [EAC Consultation Paper for a Green Transportation Strategy for Manitoba](#)).
- Established a [Youth Advisory Council](#) on January 2020, to engage the next generation in the collective climate change efforts. Nine young Manitobans are members of the new council.
- Continued to provide input on performance indicators framework, in collaboration with the CGPIO and IISD.

Next Steps

Manitoba continues its efforts to advance the Climate and Green Plan across all sectors.

- The CGPIO continues to coordinate efforts across government to implement measures to achieve the CSA emission reduction target for 2018 to 2022, and has begun evaluating emission reductions pathways to inform a CSA target for the 2023-2027 period.
- The Manitoba government will continue to explore opportunities to further reduce emissions under the Low Carbon Economy Fund.
- Manitoba will continue its work on adaptation and inter-jurisdictional cooperation to expand resiliency actions.
- The province continues to foster low carbon economic prosperity and green jobs.
- The government continues to review the efficacy of different approaches to carbon pricing that reflect Manitoba's unique emissions profile and investments in clean energy, while achieving equivalent or better environmental outcomes than the federal carbon price, and at a lower cost to Manitobans. The province will continue to build partnerships and foster dialogue with provincial partners, businesses and the non-profit sector.
- The government will continue to provide support to Efficiency Manitoba to advance energy efficiency programs.
- The recommendations from the Expert Advisory Council on water and green transportation will be considered for the development of the Water Strategy and energy policy.

Appendix

Appendix 1

Overview of the Carbon Savings Account

Appendix 2

Building a Resilient Manitoba -
Annual Report on Climate Adaptation
in the Manitoba Government 2020-2021

Appendix 3

Low Carbon Government Annual Report

Appendix 4

Manitoba Government Initiatives under
the Climate and Green Plan



Overview of the Carbon Savings Account

Manitoba
Conservation
and Climate

2020-2021

Overview of the Carbon Savings Account

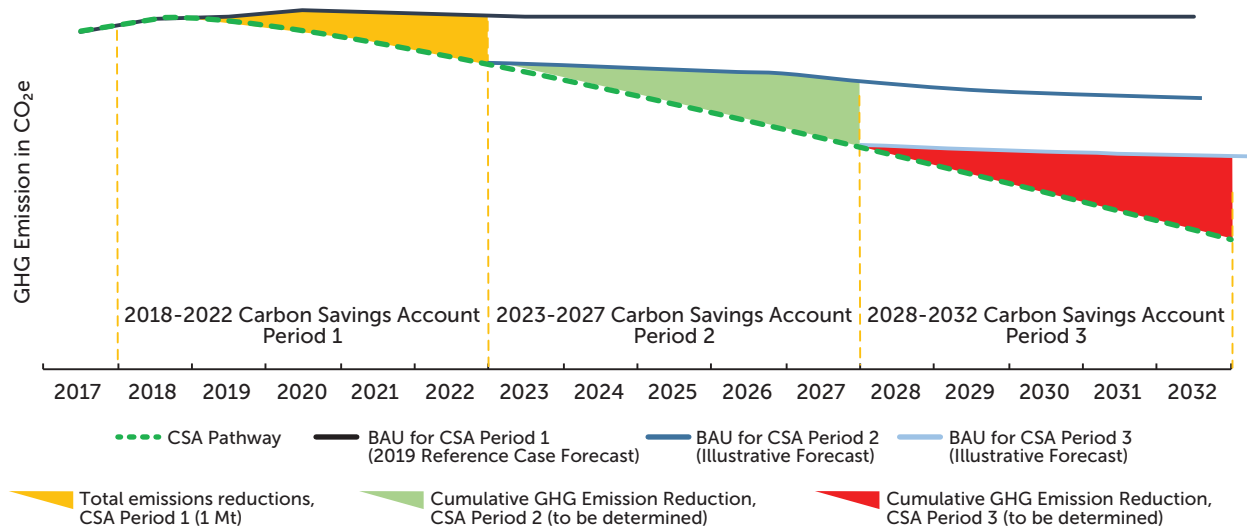
The Carbon Savings Account (CSA) is Manitoba's approach to setting, tracking, and reporting GHG emission reductions. Under the Climate and Green Plan Act, the Minister of Conservation and Climate is required to establish an emissions reduction goal for each five-year period and establish, maintain and annually report on the CSA. The CSA is the cumulative sum of all emission reductions over a five-year period that is tracked against a set goal for that period. The emissions reductions are the 'carbon savings;' the tracking against that goal is the 'account'. The provincial reduction goal established for the January 1, 2018 to December 31, 2022 period is 1 Mt CO₂e, tracked against "business-as-usual" (BAU). The BAU represents the scenario where no action is taken to reduce emissions. The overall objective of each carbon savings account is to decrease the total amount of carbon emissions that would otherwise be generated in Manitoba without emissions reduction measures.

How are the business-as-usual (BAU) emissions determined?

To calculate the benefits of emission reduction measures within a CSA period, actual annual emissions are measured against business-as-usual (BAU) emissions over the five-year period. The running balance between Manitoba's BAU and actual emissions throughout the five-year period is equivalent to the cumulative GHG reductions in the carbon savings account (Table 1. GHG emission reduction formula).

The forecast is an emission projection of the total amount of greenhouse gas emissions that would have occurred in Manitoba in that five-year period. To calculate the benefits of emission reduction measures within a CSA period, actual emissions are measured against the forecasted business-as-usual (BAU) emissions over the five-year period. As recommended by the Expert Advisory Council, the BAU forecast was selected as the best representative for Manitoba. Environment and Climate Change Canada' (ECCC) publishes a Reference Case Forecast based on historical data every year. For the first CSA period (2018-2022), Manitoba used the ECCC's 2019 Reference Case Forecast as the BAU scenario to compare against actual emissions. The 2019 Reference Case forecast projected Manitoba's emissions considering no emission reduction measures in place and it was chosen as the BAU since it considered Manitoba's historical emissions from 1990 to 2017 (Figure 4).

FIGURE 4. Illustrative BAU scenarios and CSA Goals for each CSA period



Source: ECCC's 2019 Reference Case Forecast



Building a Resilient Manitoba

*Annual Report on Advancing
Climate Adaptation in the
Manitoba Government*

Manitoba
Conservation
and Climate

2020-2021

Executive Summary

The increasing incidence and cost of natural disasters and weather events puts pressure on the social, economic and environmental health of Manitoba. With climate change as a leading driver of weather-related disasters, climate adaptation plays a defining role in economic growth, environmental sustainability and well-being of the province.

Responding to the challenges brought by our weather extremes and associated events, such as seasonal floods, droughts, and storms have helped build resilience in the province, putting Manitoba in a more advantageous position to respond to climate change impacts. Yet, adaptation is an ongoing process, and a resilient province requires all of us to be prepared to face present and future impacts, and understand the benefits of being proactive.

The Made-in-Manitoba Climate and Green Plan (released in 2017) indicated that, along with the efforts to mitigate greenhouse gas emissions, the province must continue addressing present and future climate impacts. This report provides an overview of the government-led initiatives and actions regarding climate adaptation during the fiscal year 2020-2021. Climate adaptation is an all-encompassing challenge, and the Manitoba government has been making continuous progress, with actions taking place across all departments. This report provides an overview, proposes a framework to understand the different components in government's action on adaptation, and summarizes the initiatives currently in place.

This report identified a total of 40 major initiatives that the Manitoba government took to address climate adaptation in 2020-2021. These initiatives spread across the six components of climate adaptation: 1. Information and knowledge, 2. Capacity building, 3. Assessment, 4. Planning, 5. Implementation, and 6. Monitoring. To assess the government-wide action on adaptation, all core departments were engaged, which uncovered further insights and learnings. Given that an important portion of climate adaptation occurs at the local level, fostering partnerships and dialogue across the province and regions proved to be an important path in strengthening climate resiliency and knowledge-sharing.

With an increasing frequency of weather events projected for the future, integrating an adaptation lens in government decisions and strategies will be vital to ensure that the province is well prepared to face a more unstable climate. This adaptation report complements the Climate and Green Plan Annual Report, focusing on the Manitoba government's work on climate resiliency, showing cross-departmental impacts and issues. Present and future climate-related impacts are difficult to assess and quantify, and forthcoming efforts will focus on consolidating a broad adaptation strategy, developing tools to measure success, and continue building partnerships. As Manitobans learned through the construction of the Winnipeg floodway, the investments in preparedness bring major returns in avoided costs and damages.

Introduction

Manitoba is adapting to a changing climate. In 2017, the provincial government released the Made-in-Manitoba Climate and Green Plan to take action on climate change and move Manitoba toward a prosperous and sustainable future. The plan envisions Manitoba to become the “cleanest, greenest and most climate resilient province in Canada”, and outlines a roadmap that organizes the approach across four pillars: Climate, Jobs, Water and Nature. As one of the keystones supporting the climate pillar, adaptation contributes to this vision through:

- Expanding education, knowledge and data that allows the province to assess its climate-risk and opportunities.
- Growing partnerships, leading and supporting efforts toward climate-resilient communities.
- Fostering an adaptable economy and a province equipped to address a changing climate.

“The cost of weather-related disasters in Canada rose from \$8.3 million per event in the 1970s, to an average of \$112 million between 2010 and 2019”¹

Climate change poses present and future challenges to ecosystems and habitats, local wildlife, as well as human infrastructure, agricultural production, health, and livelihoods. In recent years, floods, drought, wildfires and other climate extremes have caused significant physical and socioeconomic damage to infrastructure and communities. Many of these weather disasters are driven by climate change, and they are costly: according to the Canadian Institute for Climate Choices, the cost of weather-related disasters in Canada rose from \$8.3 million per event in the 1970s, to an average of \$112 million in the period from 2010 to 2019¹. Preparing for present and future climate change is one of our best strategies for protecting the well-being, sustainability and prosperity of Manitobans, and province’s environment and economy.

This adaptation report expands upon the updates summarized in the Climate and Green Plan Annual Report, outlining the Manitoba government’s work on climate resiliency from April 2020 to March 2021². This report is pursuant to legislated requirements under The Climate and Green Plan Act, and it also responds to The Office of the Auditor General recommendations for reporting on progress on climate risk, resiliency and adaptation.³

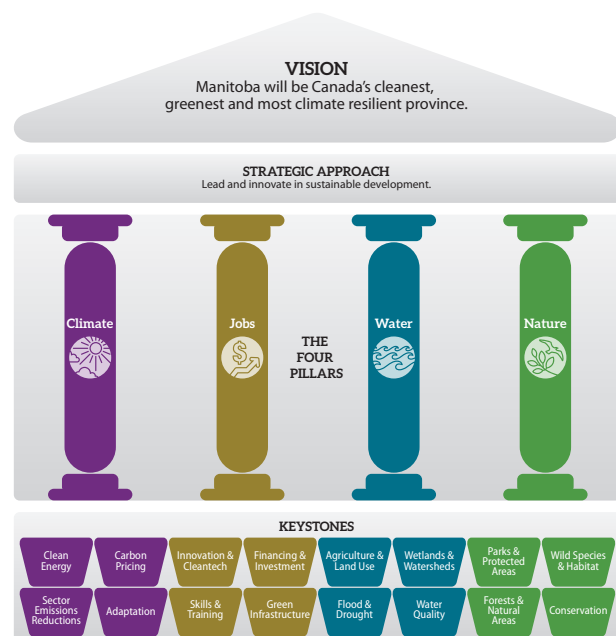


Figure 1. Adaptation is one of the keystones supporting the Climate pillar of the Made-in-Manitoba Climate and Green Plan.

¹ Canadian Institute for Climate Choices (2020). Tip of the Iceberg. Navigating the known and unknown costs of climate change. <https://climatechoices.ca/wp-content/uploads/2020/12/Tip-of-the-iceberg--CoCC--Institute--Full.pdf>

² This document covers the work on government-led climate adaptation work. Climate adaptation initiatives by Government Reporting Entities and Municipalities is beyond the scope of this report.

³ The Office of the Auditor General (OAG) report with their recommendations can be found at: <https://digitalcollection.gov.mb.ca/awweb/pdfopener?smd=1&did=25775&md=1>.

Climate change and climate adaptation are reshaping the way communities and governments operate. The progress made so far builds on historical investments in infrastructure and preparedness, which has helped Manitoba mitigate the escalating costs of disasters such as spring flooding. As Manitoba moves toward integrating a climate adaptation framework into existing and new initiatives, this report offers an overview of the progress made thus far, recognizing the important work ahead.

Climate Change and its Impacts on Manitoba

Trends from the past 20 years show that Manitoba is projected to see significant impacts from climate change. While the world average temperature rose 0.8 degrees Celsius from 1946 to 2016, Canada's average temperature increased by 1.7 degrees Celsius, and the prairie provinces experienced an average warming of 1.9 degrees Celsius, far beyond the world average⁴. Future climate projections from the Prairie Climate Centre's Climate Atlas indicate that more changes are coming. The National Issues report released in June 2021⁵ indicates that communities of all sizes across Canada are currently experiencing the effects of a changing climate on their infrastructure, health and well-being, and economies. The prairie provinces are expected to be more exposed to extreme storms, droughts and wildfires, as well as increasing instability of weather events.

Recent changes in the climate pattern in the province have already caused a wide range of environmental and socioeconomic impacts on Manitobans. Manitoba will have to adapt to increased temperatures, shorter winter seasons and changing precipitation patterns leading to more frequent and severe extreme events like storms, floods, and heatwaves, increasing other risks factors for droughts and wildfire. Ecosystems are likely to change, creating associated disturbances. Importantly, water management will require continuing and collaborative efforts across jurisdictions, paired with regional land-use policy and planning to mitigate the adverse effects in the region.

Manitobans have a long history in disaster preparedness that was framed by its flood experience in the 1950's. Since then, Manitobans have built significant resiliency to a wide variety of climatic and seasonal variations and extreme weather events. In response to the growing risk of drought and wildfires in recent years, the province has improved monitoring capacity and its adaptive and emergency response preparedness. The province implemented several initiatives promoting water management: the implementation of integrated watershed management plans, enhancements to drought planning and fire management, and community based programs. This lived experience with changing conditions and the adaptations made to date have placed Manitoba in a good position to further actions that enhance our collective resiliency.

There are two pathways to respond to climate change.

Mitigation strategies look for ways to reduce greenhouse gas emissions.

Adaptation deals with the consequences of a changing climate and methods to build climate resiliency.

Climate Adaptation is the planning process needed to proactively prepare and respond to current and future climate risks and opportunities. Effective adaptation planning leads to greater **Resiliency** within communities, economic sectors and regions.

⁴ Bush, E., & Lemmen, D. S. Eds. (2019). Canada's Changing Climate Report. <http://www.changingclimate.ca/CCCR2019>

⁵ This report is part of the National Knowledge Assessment process. See <https://changingclimate.ca/national-issues/>

Adaptation Planning Process

The adaptation planning process can be divided into six interrelated components, supported by expertise, ongoing communications and engagement with affected decision-makers and stakeholders. The six adaptation components are:

1. **Accessing Data and Building Foundational Climate Knowledge** is an initial step for decision-makers and stakeholders to understand and communicate scientific climate trends, future scenarios, and the impacts to other audiences.
2. **Building Capacity and Skills** requires ongoing engagement and two-way communications, enhanced measures to build knowledge and understanding, and a suite of broad-based as well as targeted training sessions. Building capacity and skills for decision makers, stakeholders, sector groups like engineers, planners, business representatives, and Indigenous groups, can greatly enhance their fitness to assess, plan and implement appropriate measures in their community, sector or organization.
3. **Assessing Climate Vulnerabilities and Risks** looks at the relationship between the likelihood and severity of a weather event, and then contrasts this information with the existing preparedness and response capacity in a community. This assessment is key to understand and prioritize risks and opportunities (i.e., current socioeconomic and environmental adaptive capacities, sensitivities).
4. **Planning and Developing Adaptation Initiatives** are based on the results of the vulnerability and risk assessment. Given that human and financial resources are often limited, adaptation actions need to support the most cost-effective results to enhance climate resiliency. Developing initiatives to reduce climate risks and take advantage of potential opportunities requires expert analysis as well as engagement with decision-makers, stakeholders and right-holders.
5. **Implementing Adaptation Initiatives** can be targeted or broad based. Their scope could focus on a community, watershed, ecosystem, sector or even a region. A well-designed implementation plan seeks to streamline action and integrate into existing plans, policies, programs and decision-making processes.
6. **Monitoring, Measuring and Updating Adaptation Initiatives** to track progress and promote the best adaptive management on existing and new initiatives. While there is need for monitoring and measuring adaptation actions or plans, in some cases enhancing monitoring and measuring is in itself the adaptation action (e.g., monitoring hot weather and longer summers to estimate the incidence risk of West Nile Virus in Manitoba).

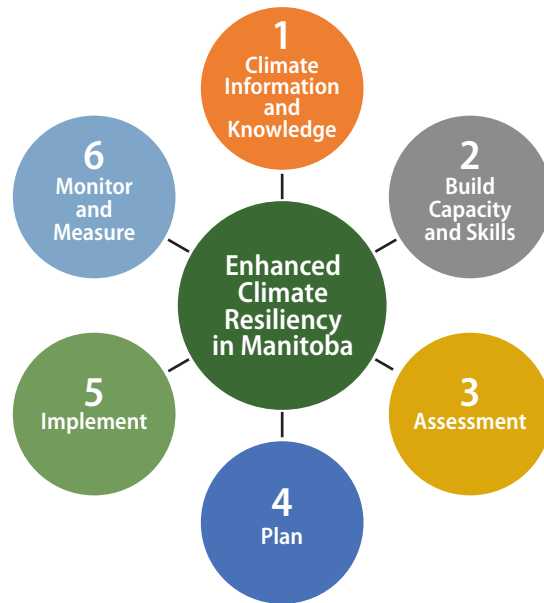


Figure 2. Components of the Climate Adaptation process

Summary of Initiatives and Measuring Progress

During 2020-2021, the Manitoba government led over 40 major initiatives addressing climate resiliency and adaptation, covering all six components across the climate adaptation planning process. Manitoba's vast experience in disaster preparedness has been a key advantage in responding to climate change impacts, and serves as a strong foundation to continue building adaptability in Manitoba's economy and infrastructure. In 2020, the Intact Center of Climate Adaptation⁶ noted the province's efforts in flood resiliency, highlighting the progress in waterway management, sustainable flood management, emergency management, and public health and safety. Since then, the province has continued improving flood preparedness and completed flood mapping in critical areas. The continuous acquisition of data is fundamental to informing good decision making and building resiliency. Over the years, Manitoba has also been instrumental in helping make climate information publicly available, and financially supporting organizations, such as the Prairie Climate Centre and their development of the Climate Atlas of Canada, and ClimateWest.



Figure 3. Major climate adaptation initiatives summary

The changing climate will test Manitoba's preparedness for the future. Even with Manitoba's experience in climate resiliency so far, the systems and programs in place will face rising challenges ahead. The iterative nature of the planning process emphasizes the need for continuous monitoring and review.

⁶ Feltmate, B. Moudrak, M. and K. Bakos (2020) *Climate Change and the Preparedness of Canadian Provinces and Territories to Limit Flood Risk*. Intact Centre on Climate Adaptation, University of Waterloo. <https://www.intactcentreclimateadaptation.ca/wp-content/uploads/2020/11/Provincial-Territory-Flood-Report.pdf>

Climate Adaptation across Manitoba: Highlights

Despite the COVID-19 pandemic, Manitoba continued advancing climate adaptation initiatives during 2020-2021. Climate adaptation is a complex, multifaceted endeavour. Many of the major initiatives simultaneously involved actions that advanced more than one pillar⁷. Municipalities, businesses and organizations also made important progress on climate adaptation and, as the province moves toward the creation of a climate adaptation framework, future reports will apply an all-encompassing scope of the efforts across the province. The activities below are highlights of the Manitoba government's climate adaptation progress.



Figure 4. Initiatives associated to the pillars of the Climate and Green plan



Progress under the Climate Pillar

Building Climate Knowledge and Capacity: Establishment of ClimateWest

Manitoba partnered with other prairie provinces and Canada in the establishment of ClimateWest, a new central hub for climate services in Manitoba, Saskatchewan, and Alberta. Its mandate is to support people, communities, businesses, and governments to address climate change risks and vulnerabilities through planning and action. ClimateWest delivers access to trusted, useful and timely climate information and data tailored to the region, investing in tools and training that builds local capacity for the application of climate information to aid planning and action. For more information, visit www.climatewest.ca



Figure 5. Jane Hilderman, Executive Director, ClimateWest

⁷ See Appendix 1 for a full list of initiatives.

The Disaster Prevention and Climate Resiliency Program

In the summer of 2020, the Manitoba government announced \$32 million in funding for 18 projects across Manitoba under the Disaster Prevention and Climate Resiliency Program. Twelve projects in the Winnipeg Metropolitan Region, and six projects in other municipalities were selected, to receive provincial financial support through a \$48-million fund. These projects will build local infrastructure to better prepare municipalities to withstand the impacts of natural disasters and extreme weather events. The province also announced \$16 million to convert Provincial Road (PR) 246 from gravel to asphalt from Provincial Trunk Highway (PTH) 23 near Morris to PR 205 near Aubigny, which will allow traffic to be rerouted around sections of PTH 75 that are most prone to closure during flood events.



Figure 6. Street flooding in the City of Altona (Photo credit: City of Altona)

Manitoba Fire Protection Grant

The Manitoba Fire Protection Grant provided \$9.14 million for 296 projects in municipalities and northern communities in 2020 to support projects or activities that would improve fire protection and emergency response. Projects are ongoing until Fall 2021 and include initiatives to broadly enhance climate preparedness planning through a variety of training on safety and equipment. Municipalities utilized the grant funding to improve their fire protection capabilities in many different ways, including bolstering their ability to rapidly respond to hazards such as grass fires and wildfires through the use of equipment, like ATVs and Utility Terrain Vehicles (UTVs).



Figure 7. All-terrain units increase the hazard response capacity.

Northern Healthy Foods Initiative

The Northern Healthy Foods Initiative's (NHFI) vision is for people to define their own food systems and to improve access to healthy foods in northern Manitoba. In 2020-2021, \$1.3 million of provincial funding supported local and regional projects that contribute to the development of culturally relevant, healthy food systems, while improving the health and well-being of Indigenous and northern peoples. The initiative provides grant funding to five key strategic partners that work to localize northern food systems. NHFI's role is to increase access to food by working with communities and coordinating efforts aligned with the program's goals and objectives. Activities supported by NHFI include gardening, greenhouse gardening, beekeeping, poultry production, hunting, gathering, and composting. The NHFI initiatives supports local food security taking advantage of warmer and longer growing conditions through community gardens and greenhouses, and reduced dependency on the transport of food along less reliable winter roads or other routes that may be affected by wash outs from more heavy rain events. For more information on the NHFI see www.manitoba.ca/inr/major-initiatives/nhfi.



Figure 8. Greenhouse. Pine Dock, Manitoba (Photo credit: NHFI)



Progress under the Jobs Pillar

Manitoba Climate Resiliency Training Program

The Manitoba Climate Resilience Training Project (MCRT) builds the capacity and expertise of engineers, other infrastructure decision-makers, professional planners, the business community in northern Manitoba and Indigenous organizations and communities to address risks associated with a changing climate in areas such as land use, water management and infrastructure. The project designs and delivers comprehensive training and capacity building programs to enhance knowledge and collaboration among targeted sectors. Manitoba has partnered with Natural Resources Canada through its Building Regional Adaptation Capacity and Expertise (BRACE). The program will run until March 31, 2022. For more information see www.mcrtproject.ca/.

Indigenous Engagement Component of MCRT

The MCRT project engaged with organizations and communities, such as the Assembly of First Nations Advisory Committee on Climate Action, Regional Climate Change Coordinators, and Misipawistik Cree Nation. These organizations are actively seeking to apply climate data in a way that respects First Nations traditional knowledge. They expressed significant interest in the project and its ability to support adaptation-related initiatives their regions, and indicated that training programs on tools like the Climate Atlas of Canada would provide an excellent opportunity to increase capacity within First Nation communities.



MANITOBA CLIMATE
RESILIENCE TRAINING

Winter Road Network Enhancements

Manitoba has approximately 2,381 kilometers of winter roads. Each year, more than 2,500 shipments are delivered to a large number of isolated northern communities from mid-January to mid-March.

There are two types of winter ice roads – over land and over water. Over the last few years, work was completed to maximize the short winter road season, including an engineering study that allowed for increased weight load levels for transport trucks on most winter roads.

The effects of climate change is already making winter roads progressively harder to construct and maintain for sufficient periods of time. However, improvements such as relocating the roads from water to land or building new culverts and bridges for passage of water helps to maintain a 6-week winter road season to support the transportation of key goods and supplies to Manitoba’s northern and remote communities.



Figure 9. Winter road to Tadoule Lake Manitoba

Progress under the Water Pillar

Supporting Integrated Watershed Planning

Led by Manitoba's Watershed Districts, integrated watershed management planning is a cooperative effort by government and other stakeholders to create long-term plans to manage land and water resources on a watershed basis in Manitoba. It is an ongoing process across the province that helps support enhanced resiliency in a changing climate by reducing a wide range of environmental and socioeconomic impacts associated with droughts and floods.

In 2020-2021, the development of watershed management plans continued in the Boyne-Morris, Roseau, Northwest Interlake and Souris River Watersheds. In November 2020, the East Interlake Watershed District began the renewal of the Netley-Grassmere and Willow Creek Integrated Watershed Management Plans, the Pembina Valley Watershed District started a first watershed planning process in the Plum-Marais Watershed and the Inter-Mountain Watershed District initiated a pilot project to enhance surface water management planning. Completed Manitoba plans and the Manitoba Watershed Districts Annual Reports are available online at: www.manitoba.ca/water/watershed/wd

Implementing the GROWing Outcomes in Watersheds (GROW) and Supporting Climate Resiliency

A made-in-Manitoba approach to deliver ecological goods and services, GROW is a framework delivered by Watershed Districts and supported through funding from the GROW and Conservation Trusts established by the province, as well as municipalities, and other funding sources. The priority outcomes for GROW are improving watershed resiliency to the effects from a changing climate, and improving water quality. These outcomes are supported by activities, including water retention, wetland and riparian area conservation and restoration, buffer establishment, and upland area enhancement throughout Manitoba's 14 Watershed Districts.

Watershed Districts were approved for over \$5.3 million in funding through the GROW and Conservation Trusts for 2020-21. Watershed Districts plans proposed to conserve over 1,295 hectares of existing natural and temporary wetlands (which improve water retention capacity and biodiversity); enhance 198 hectares of wetlands to improve existing degraded habitat, and restore 140 hectares of previously drained wetlands. Additionally, over 1,619 hectares of riparian area and 2,226 hectares of upland area (including grasslands) were proposed for conservation, restoration and enhancement projects.



Figure 10. Small class 2 wetland in a canola field near Treherne, Manitoba

Microcystin Standard for Drinking Water and Drinking Water: System Operational Guideline on Planning for Climate Change

Microcystins are a toxin produced by some freshwater blue-green algae (also known as cyanobacteria) present in Manitoba's surface water. This toxin can be produced in large quantities during algal blooms and can pose a threat to the environment at large and freshwater supplies used for drinking water. As temperatures rise and water levels drop, the frequency and severity of algal blooms and the production of microcystins are expected to increase and affect the province's freshwater supply. Completed in March 2021, this initiative implemented the adoption of the microcystin standard and the development of operational guidelines and a monitoring program. This standard is a health-based limit established to ensure that the levels of microcystin do not exceed levels deemed unsafe for drinking water. The Operational Guideline on Planning Climate Change provides further assurance by assisting drinking water system operators in preparing them for the impacts of a changing climate, including the possibility of warmer temperatures, drought, extreme precipitation events, and flooding.

Collectively, the standard, monitoring program, and operational guideline will help ensure resilient and high water quality systems in Manitoba in the face of a changing climate. More information can be found at: www.gov.mb.ca/drinkingwater.



Progress under the Nature Pillar

Enhancing Manitoba's Wildfire Program

Wildfires are expected to occur with greater frequency and severity and, as a result, Manitoba continues to invest and promote prevention and mitigation as an effective means of addressing climate change. Manitoba Conservation and Climate, Manitoba Municipal Relations and partner agencies supported wildfire prevention and mitigation programming. A Wildfire Management Strategy was undertaken in 2020-2021 for the Whiteshell Provincial Park to identify wildfire concerns and make recommendations for managing the associated hazards and risks. The province continues to promote and support Community Wildfire Protection Plan (CWPP) development, a two-part document comprised of a Wildfire Preparedness Guide and a FireSmart Mitigation Strategy, to ensure effective and efficient response to wildfire and improved community resiliency. A CWPP ensures communities in Manitoba's boreal are taking appropriate and community specific measures to improve wildfire resilience as wildland urban interface communities are increasingly subjected to wildfire's impacts.

For the second consecutive year, Manitoba partnered with the Canadian Forest Service to conduct post-season fire mapping based on satellite imagery resulting in more accurate information on area burned. The new Operations Fire Management System (OPS/FMS) became fully operational, helping increase capacity for province-wide weather monitoring, data collection and management to ensure business continuity. Manitoba also provided support to FireSmart Canada to develop and make available a new publication entitled "Blazing the Trail – Celebrating Indigenous Fire Stewardship", which was distributed to indigenous communities and organizations. Manitoba also provided support for the Boreal Discovery Centre in Thompson to develop a wildfire education exhibit.



Figure 11. A photo of a wildfire in Manitoba

Looking Forward

As the frequency and intensity of weather events continue to escalate, planning for climate adaptation will become more common across the province. Global analysis show that every dollar invested in resiliency returns several dollars in avoided costs, damages, and socioeconomic disturbances⁸. The way Manitoba responds to emerging climate challenges will affect the magnitude of the impacts and costs to the province, its businesses and its residents.

The Manitoba government will continue to implement climate adaptation measures in the Climate and Green Plan. As the work on adaptation continues, Manitoba will focus on building capacity to take advantage of innovative approaches to climate adaptation updating and developing new indicators to assess programs cost effectiveness, monitor progress in climate adaptation, and extending partnerships across the province.

The province will continue working in partnership, building relationships through national platforms such as the National Adaptation Plenary and regional initiatives such as ClimateWest. Given that municipalities, Indigenous communities, and regional organizations are often direct witnesses of the impacts of climate change and the benefits of adaptation, fostering partnerships and providing support will help build a stronger Manitoba.

The province will finalize the vulnerability, risk and opportunity assessment for core government operations, which will inform the creation of a climate resiliency strategy, as well as the development of indicators and monitoring protocols for changing and emerging climate impacts.

A future provincial Climate Resiliency Strategy will build on the progress made to date to incorporate climate change into policy formulation and economic decisions. Staying current on adaptation innovation and investing in climate resiliency will save on avoided costs and disruptions, while creating prosperity around an adaptable, climate-ready economy. Given Manitoba's experience in disaster preparedness, the province is in a good position to use this opportunity to show exceptional provincial leadership in climate resilience while stimulating green economic growth in the province.

⁸ Global Commission on Adaptation (2019). *Adapt Now: A Global Call for Leadership on Climate Resilience*. https://gca.org/wp-content/uploads/2019/09/GlobalCommission_Report_FINAL.pdf

Annex

Table 1. Climate Impacts affecting Manitoba

Impacts	Description
Flooding	Seasonal flooding events from rivers and lakes and other temporary overflows
Excess moisture	Long term chronic high moisture conditions
Drought	Long duration dry conditions affecting ecosystems and human activities such as agriculture
Extreme precipitation event in a 24-hour period	Heavy rain event within a 24-hour period
Duration of snow cover & ice cover on rivers & lakes	The period of time appreciable snow covers the ground and ice covers lakes and rivers in a region
Wildfires (<i>grass, peatlands, forest</i>)	Fires caused by human or natural causes; includes forest and grass fires in remote and non-remote developed regions of Manitoba
Heat waves	Several hot days in a row usually above 30 degrees Celsius
Extreme wind events (<i>all seasons</i>)	High wind events including tornadoes and winds from summer and winter storms
Severe storms	Thunderstorms with hail, heavy rain; winter storms or blizzards
Invasive species	Species not native to the ecosystem that cause detrimental impacts to infrastructure
Vector and water borne diseases, zoonotic	Diseases that adversely impact ecosystems, wildlife or human health that are spread from animals to humans (zoonotic) or vector borne
Ecological	Secondary impacts to ecosystems and eco-zones including forests, rivers, lakes and the plants and animals within those systems
Socioeconomic	Secondary financial or economic impacts to communities, families and economic sectors
Human Health and Well-being	Secondary impacts to human health from vector borne, zoonotic and other environmental diseases impacted by a changing climate. Mental health impacts induced by extreme weather events.

Table 2. Summary of 2020-2021 Major Government Initiatives addressing Climate Resiliency

The table below lists government-led initiatives that address climate adaptation, identifying which initiatives contribute towards the pillars of Manitoba's Climate and Green plan. The table also indicates how the initiatives contribute in the climate adaptation planning process. While initiatives do not contribute to all steps of the process, the table displays how individual initiatives support the whole.

Key Initiatives	Climate Pillars				Summary of Initiative/Program	Adaptation planning process steps					
	Climate	Jobs	Water	Nature		Climate information and knowledge	Capacity and skills	Climate vulnerability and risk assessment	Prioritize risks, develop action plan	Implement adaptation initiatives or plan	Monitor, measure, update, improve
1 2020 Flood Preparedness Program			x		Under the 2020 Flood Protection Program, the province offered one-time \$8 million funding support to municipalities in enhancing capacity for flood preparedness, equipment costs and build resiliency for future floods. This funding helped bring added resources for projects and equipment for the crews who work on flood protection in areas all across Manitoba, while boosting economic activity. Funding was announced in March 2020 and spent during the first half of the 2020-21 fiscal year.	-	-	-	-	C	-
2 511 Road conditions service					The 511 service provides real time, up to date information on the conditions of Manitoba roads including road closures due to weather events and high water events.	C	-	C	C	P	-
3 Ag Action Manitoba Program - Assurance: Watershed EGS Develop farm-based, community planning and water retention structure approaches	x		x	x	Ag Action Manitoba is a five-year, \$176 million, all-encompassing program offered to farmers, agri-processors, industry organizations, researchers and industry service providers. Watershed Ecological Goods and Services (EGS) grant helps watershed districts to work with farmers to implement sustainable environmental practices. Completed activities include water retention and runoff management, wetland restoration and enhancement, soil health improvement, riparian area enhancement, natural upland area rejuvenation and enhancement, land rehabilitation, tree plantings and woodlot management.	-	-	-	-	C	-
4 Ag Action Manitoba Program for Farmers - Assurance Beneficial Management Practices	x		x		Ag Action Manitoba helps farmers implement beneficial management practices on their farms identified in their Environmental Farm Plans, including practices with climate change adaptation benefits. The initiative funded 94 projects, many of which had adaptation co-benefits.	-	-	-	-	C	-
Climate adaptation planning components: C = complete P = in process or ongoing - = initiative does not support that component											

Key Initiatives	Climate Pillars				Summary of Initiative/Program	Adaptation planning process steps					
	Climate	Jobs	Water	Nature		Climate information and knowledge	Capacity and skills	Climate vulnerability and risk assessment	Prioritize risks, develop action plan	Implement adaptation initiatives or plan	Monitor, measure, update, improve
5 Amortization and interest related to the existing network of water-related assets owned by the province	x	x			The program includes projects to increase the flood protection levels and resiliency of flood protection structures, repair dams used for water supply (domestic and irrigation) to improve drought resilience, and increase the capacity of the agricultural drains to improve drainage times post-flooding.	-	-	-	-	P	-
6 Aquarius	x				Real time water level and flow information on rivers and streams throughout MB that is accessible to the public.	C	-	C	C	C	-
7 Beneficial Management Practices for Manitoba's boreal zone and assisted tree migration study	x			x	Tree species migration research trials have been established in spring of 2015. Tree seed lots from warmer areas (Minnesota, Wisconsin, and Ontario) are being tested to explore their potential to grow and survive north of their current location in Manitoba. Results from five years of growth and survival data have been collected and have been analyzed in 2020; a climate-based seed transfer application tool has been developed to assist with the identification of suitable seed transfer zones under climate change.	-	-	P	P	P	P
8 Boreal Wetland Conservation Codes of Practice				x	Published final version of the Boreal Wetlands Conservation Codes of Practice. These are being applied to resource and access roads and crossings in the boreal region of Manitoba, and follows the mitigation sequence of avoid, minimize, and offset for impacts to boreal wetlands.	-	-	-	-	C	-
9 Climate Adaptation Research support for the International Institute for Sustainable Development (IISD)	x	x			IISD research focused on climate change and adaptation in the agriculture sector; circular economy; green economy indicators; natural infrastructure; net-zero emissions; and plastic waste management and vertical integration of Adaptation Planning.	C	-	-	C	-	-
Climate adaptation planning components: C = complete P = in process or ongoing - = initiative does not support that component											

Key Initiatives	Climate Pillars				Summary of Initiative/Program	Adaptation planning process steps					
	Climate	Jobs	Water	Nature		Climate information and knowledge	Capacity and skills	Climate vulnerability and risk assessment	Prioritize risks, develop action plan	Implement adaptation initiatives or plan	Monitor, measure, update, improve
10 Climate Change Vulnerability Assessment framework			x		The objectives of the project were to: 1) Assist partner organizations in understanding their vulnerability to climate change and variability; 2) Assist partners in identifying adaptation options that can be mainstreamed into planning and decision-making systems; 3) Integrate the results across companies, governments and a large multi-use landscape into a regional assessment of climate change vulnerability with real-world implementable adaptation options for the partner organizations; 4) Provide partners with tools for vulnerability assessment and adaptation planning that can be incorporated into their planning systems after project completion. Results include using CCFM adaptation guidebook approach for forest vulnerability assessment; use of LANDIS II model for to integrate the effects of a changing climate and changing disturbance regimes on forest productivity and species composition; the release of two reports presenting the project results.	-	C	C	C	-	-
11 Climate Ready and Fire Resilient Communities from Enhancing Manitoba's Wildfire Program	x			x	A FireSmart Wildfire Management Strategy was completed for the Whiteshell Provincial Park to identify concerns and make recommendations for managing hazard and risk in fire and fuel management decision making. Manitoba also supported wildfire prevention and mitigation programming with FireSmart Canada to develop and distribute a new publication entitled "Blazing the Trail – Celebrating Indigenous Fire Stewardship" to Indigenous communities and organizations across Canada.	P	-	-	C	C	P
12 ClimateWest	x				Partnered to create ClimateWest, a new central hub for climate services in Manitoba, Saskatchewan, and Alberta with a mandate to support action on climate adaptation.	C	-	-	C	-	-
13 Community Water Source Vulnerability Study	x		x		The study identifies potential vulnerabilities to community drinking water sources from changing climate and aquatic invasive species. Study is ongoing.	-	-	-	-	-	P
14 Conservation and Climate Fund	x		x		The Conservation and Climate Fund provides support to projects occurring in Manitoba that incorporate actions to combat and adapt to climate change and protect the environment in alignment with the Manitoba Climate and Green Plan. In 2020-21 fiscal year \$600,000 was provided in support of 8 Manitoba based projects.	P	P	-	-	-	-
Climate adaptation planning components: C = complete P = in process or ongoing - = initiative does not support that component											

Key Initiatives	Climate Pillars				Summary of Initiative/Program	Adaptation planning process steps								
	Climate	Jobs	Water	Nature		Climate information and knowledge	Capacity and skills	Climate vulnerability and risk assessment	Prioritize risks, develop action plan	Implement adaptation initiatives or plan	Monitor, measure, update, improve			
15 Conserve species at-risk, assess, monitor, protect and recover vulnerable species	x			x	Completed 20 species at-risk surveys throughout southern Manitoba to monitor and map populations and assess habitat conditions. Worked with stakeholders to conserve and manage species-at-risk and their habitat, surveying approximately 49,000 ha.	-	-	-	-	-	-	-	C	
16 Develop and implement watershed-based targets for nutrient reduction: Nutrient Concentration and Loading Targets for Lake Winnipeg and its Tributaries			x		Manitoba is proposing a Nutrient Targets Regulation under The Water Protection Act that would establish nutrient loading targets for the four major tributaries (Red, Winnipeg, Saskatchewan, and Dauphin Rivers) flowing into Lake Winnipeg and nutrient concentration targets for total phosphorus and total nitrogen in Lake Winnipeg. To date the province prepared and posted key information to support the proposed Nutrient Target Regulation, including a plain language summary, Report on Setting Phosphorus and Nitrogen Targets to Improve Water Quality, Report on Application of a Water Quality Model to Draft Nutrient Targets for Lake Winnipeg. Public consultation on the proposed Nutrient Targets Regulation was conducted through the Manitoba Regulatory Consultation Portal.	-	P	-	-	P	-	P		
17 Disaster Financial Assistance (DFA) Mitigation and Preparedness Program	x				To assist municipalities to mitigate against future disasters, when Manitoba establishes a DFA program that is eligible for cost-sharing with Canada under the Disaster Financial Assistance Arrangements, municipalities would have the option to invest an amount equal to the Provincial/Municipal DFA deductible into a disaster mitigation and preparedness project. Manitoba would then reimburse municipalities for 100% of their eligible DFA claim. Projects must be approved by the Manitoba government.	-	-	C	C	C	-	C	-	
18 Disaster Mitigation Adaptation Fund: The Lake Manitoba-Lake St. Martin Outlet Channel project			x		The Lake Manitoba-Lake St. Martin Outlet Channel project consists of an outlet channel to divert water from Lake Manitoba into Lake St. Martin, as well as a permanent Lake St. Martin outlet channel to divert water into Lake Winnipeg. During times of flooding and high water levels, the channels will carry water from Lake Manitoba into Lake Winnipeg in a controlled manner, mitigating the disastrous effects of flooding experienced by the communities and environment adjacent to the lakes. For more information see https://www.gov.mb.ca/mit/wms/lmbismoutlets	-	-	-	-	-	P	-	-	-
19 Drought Management Strategy	x			x	Ongoing activities to monitor and manage drought. For more information see www.manitoba.ca/drought	-	-	-	P	-	-	P	P	
Climate adaptation planning components: C = complete P = in process or ongoing - = initiative does not support that component														

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	Climate	Jobs	Water	Nature		Climate information and knowledge	Capacity and skills	Climate vulnerability and risk assessment	Prioritize risks, develop action plan	Implement adaptation initiatives or plan	Monitor, measure, update, improve	
20 Flood Risk Mapping			x		Flood risk mapping of vulnerable rivers and waterways, as well as developing internal analyses and policy implications (Assiniboine River, from Portage la Prairie to the west Perimeter Highway, the Whitemud River and the Souris River).	C	-	C	-	-	-	-
21 Highway Maintenance Program - Strategic Flood Routes - Damage Prevention & Climate Resiliency (DPCR)	x				The Damage Prevention and Climate Resiliency provided \$16 million to provide a hard surface to PR 246 (from PTH 23 to PR 205), thus providing an alternate route for PTH 75 to support movement of goods and people during flooding. The project's anticipated completion is October 2021.	-	-	P	P	P	P	P
22 Ice Jam Mitigation Program	x				Implemented a new delivery model through a private service provider.	-	-	C	C	C	C	C
23 Implementing the Growing Outcomes in Watersheds (GROW) and Supporting Climate Resiliency	x	x	x		A Made-in-Manitoba approach to deliver ecological goods and services, GROW is a framework delivered by watershed districts and supported by the GROW and Conservation Trusts and many other sources of funding. Priority outcomes for GROW are improved watershed resilience to the impacts of a changing climate, and improved water quality. These outcomes are supported by activities such as water retention, wetland and riparian area conservation and restoration, buffer establishment, and upland area enhancement. Watershed districts were approved for over \$5.3M in funding through the GROW and Conservation Trusts in 2020-21.	P	-	-	-	P	P	P
24 Investing in Canada Infrastructure Program (ICIP)	x	x	x		The Investing in Canada Infrastructure Program (ICIP) will support infrastructure investments over 10 years through combined federal, provincial, and other partnerships. The program includes a Green Infrastructure Stream (GIS) that includes projects that incorporate climate change mitigation, adaptation, resilience and disaster mitigation, and environmental quality.	-	-	-	-	-	P	P
25 Maintenance and Preservation of Water Related Assets (Part A)			x		Operation and maintenance of provincial drains, flood protection structures, and dams; hydrological forecasting; flood risk mapping.	-	-	P	P	P	P	P
26 Manitoba Climate Resiliency Training	x	x			18-month project to build the capacity and expertise of targeted decision makers to address risks associated with a changing climate.	P	P	-	-	-	-	-
Climate adaptation planning components: C = complete P = in process or ongoing - = initiative does not support that component												

Key Initiatives	Climate Pillars				Summary of Initiative/Program	Adaptation planning process steps							
	Climate	Jobs	Water	Nature		Climate information and knowledge	Capacity and skills	Climate vulnerability and risk assessment	Prioritize risks, develop action plan	Implement adaptation initiatives or plan	Monitor, measure, update, improve		
27 Microcystin standard for drinking water and Drinking Water System Operational Guideline on Planning for Climate Change	x	x	x		Completed in March 2021, this initiative implemented the adoption of the microcystin standard, along with the release of the operational guidelines and monitoring form. Microcystins are toxins produced by certain freshwater blue-green algae (also known as cyanobacteria). In large quantities, the toxins can pose a threat to the environment at large and freshwater supplies. The development of a drinking water system Operational Guideline on Planning for Climate Change was also completed by March 2021. The standard, monitoring program, and operational guideline will help ensure resilient and high water quality systems in Manitoba in the face of a changing climate.	C	-	P	-	P	-	P	C
28 Northern Prairie Forests Integrated Regional Climate Change Assessment	x			x	Ongoing project to that applies a vulnerability and risk assessment framework to monitor and ensure forests' resiliency to the changing climate.	-	-	P	P	P		P	P
29 Participation and contributions to CCME publications	x				In 2020/2021, the Canadian Council Ministers of the Environment completed publications on Climate Risk Management and Natural Infrastructure. Manitoba also contributed to ongoing committee work on adaptation, climate indicators, flood and drought.	C	C	-	C	-		-	-
30 Participation in the National Adaptation Plenary and Platform	x				This body is a representation of provinces, territories, federal government departments, national indigenous groups, academia and sectorial leads. It provided a forum to share expertise and identify emerging issues across Canada.	C	-	-	C	-		-	-
31 Pilot testing of recycled asphalt shingles on Ethan Boyer Way	x				Pilot testing of recycled asphalt shingles. The road will be completed in June 2021, and Manitoba infrastructure will be monitoring the performance of recycled materials ongoing for the next several years in the test site area.	-	-	-	-	P		P	P
32 Prairies Regional Adaptation Collaborative (PRAC)	x				Capacity building, knowledge building through engagement, adaptation planning surveys with Municipalities and Indigenous communities, 4 webinars on adaptation issues, and transition of its 10 year legacy over to ClimateWest.	-	-	C	C	-		C	C
Climate adaptation planning components: C = complete P = in process or ongoing - = initiative does not support that component													

Key Initiatives	Climate Pillars				Summary of Initiative/Program	Adaptation planning process steps					
	Climate	Jobs	Water	Nature		Climate information and knowledge	Capacity and skills	Climate vulnerability and risk assessment	Prioritize risks, develop action plan	Implement adaptation initiatives or plan	Monitor, measure, update, improve
33 Proposed amendments to The Water Resources Administration Amendment Act	x				The proposed amendments include protection of provincial water infrastructure from negligent damage, permit requirement for activities that interfere with water infrastructure, and will allow ministerial orders to impose temporary access restrictions of up to 90 days, for example to account for increased risk of drowning during spring flooding.	-	-	P	P	-	P
34 Protected Areas Initiative				x	The Protected Areas Initiative builds a network of protected and conserved areas that conserves ecosystems and maintain biodiversity in all 16 ecoregions across the province. Protected and conserved areas are natural solutions to climate change, and provide a range of ecological services with direct or indirect economic benefits to communities and businesses, including: natural regulation of water flow, water quality improvement, carbon storage, and biodiversity conservation. In 2020 protection was increased in Duck Mountain Provincial Park by expanding the Backcountry Land use Category area by 951 hectares, and also in Turtle Mountain Provincial Park by expanding the Backcountry Land use Category area by 5,065 hectares.	-	-	-	-	P	P
35 Supporting Climate-Ready and Sustainable Communities through the Disaster Prevention and Climate Resiliency Program	x	x			Manitoba provided \$32 million in funding for 18 projects across the province under the Manitoba Disaster Prevention and Climate Resiliency Program. Twelve projects were selected in the Winnipeg Metropolitan Region, and six projects were selected in other municipalities, to receive provincial financial support through a \$48-million fund. Additional funding included \$16 million to convert Provincial Road 246 from gravel to asphalt from Provincial Trunk Highway 23 near Morris to PR 205 near Aubigny. These projects will build up local infrastructure to better prepare municipalities to withstand the impacts of natural disasters and extreme weather events.	-	-	-	-	-	P
36 Supporting Community Food Security through the Northern Healthy Foods Initiative	x	x		x	The Northern Healthy Foods Initiative's (NHFI) vision is for people to define their own food systems to access healthy foods in northern Manitoba. NHFI goals are to increase food security efforts at the community level and strengthen community-led development. In 2020-21, \$1.3 million provincial funding supported local and regional projects that contribute to the development of culturally relevant, healthy food systems, while improving the health and well-being of Indigenous and northern peoples.	-	P	-	-	P	-
Climate adaptation planning components: C = complete P = in process or ongoing - = initiative does not support that component											

Key Initiatives	Climate Pillars				Summary of Initiative/Program	Adaptation planning process steps							
	Climate	Jobs	Water	Nature		Climate information and knowledge	Capacity and skills	Climate vulnerability and risk assessment	Prioritize risks, develop action plan	Implement adaptation initiatives or plan	Monitor, measure, update, improve		
37 Supporting Integrated Watershed planning			x		Led by Manitoba's Watershed Districts, Integrated watershed management Planning (IWMP) is a cooperative effort by watershed residents, government and other stakeholders to create a long term plan to manage land and water resources on a watershed basis in Manitoba. It's an ongoing process supporting enhanced resiliency to a changing climate including floods and drought. In 2020-2021, development of watershed management plans continued in the Boyne-Morris, Roseau, Northwest Interlake and Souris River Watersheds. In November 2020, the East Interlake Watershed District initiated the renewal of the Netley-Grassmere and Willow Creek Integrated Watershed Management Plans, the Pembina Valley Watershed District initiated a first watershed planning process in the Plum-Marais Watershed and Inter-Mountain Watershed District initiated a pilot project to enhance surface water management planning as an amendment to the Dauphin Lake IWMP. Completed Manitoba IWMPs and the Manitoba Watershed Districts Annual Reports are available online at: www.manitoba.ca/water/watershed/wd	P	P	P	P	P	P	P	P
38 Vulnerability and Risk Assessment for Manitoba core government departments	x				This assessment will provide scientific, technical and practical knowledge to identify climate change-related risks and opportunities that will serve to inform adaptation strategies.	P	-	P	P	-	-	-	
39 Water Infrastructure Resiliency			x		Implementation of improved design standards for increased infrastructure resiliency and adaptation during flood events.	P	-	P	P	P	P	P	
40 Water Treatment support for northern communities	x		x		The project supports Water Treatment Plant Upgrades for Indigenous and Northern Communities that include back up generators to support climate readiness allowing for remote oversight and reducing travel. Backup generators manage power outages from increased storms.	-	-	-	-	P	-	-	
Climate adaptation planning components: C = complete P = in process or ongoing - = initiative does not support that component													



Low Carbon Government *Annual Report*

Manitoba
Conservation
and Climate

2020

Introduction

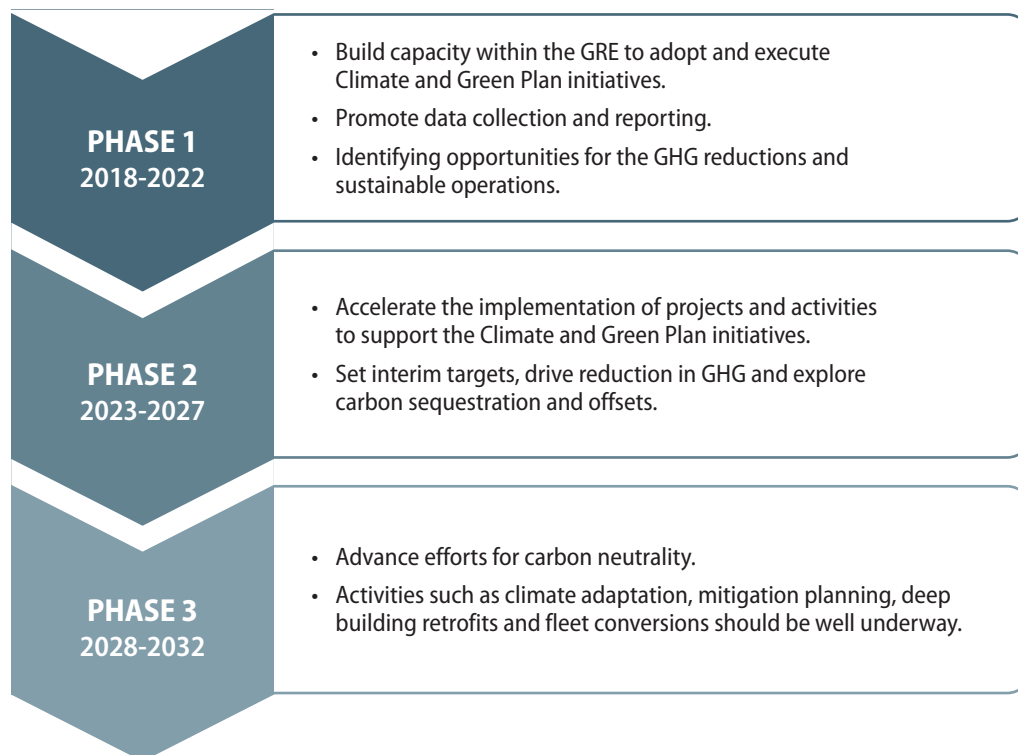
This report provides the emissions of the Government Reporting Entity (GRE) for calendar year 2020, the activities of the GRE and Low Carbon Government Office's plan to advance sustainable operations and emission reductions of the GRE.

Background

The Climate and Green Plan Act came into force in November 2018. The Act established the Low Carbon Government Office (LCGO). The LCGO provides support to government Departments and other government reporting entities such as universities, colleges, school divisions, Manitoba Housing, Crowns and, health authorities to reduce greenhouse gas (GHG) emissions and advance sustainable operations with a focus on:

- g. Sustainable procurement of goods and services;
- h. Improving building design, construction and management;
- i. Increasing use of zero emission vehicles and reducing fuel consumption by vehicle and equipment;
- j. Innovative use and management of information and communication technologies; and
- k. Improving waste reduction and waste management.

In 2019 LCGO developed an action plan to focus its efforts over three, five year phases.



Overview of the Government Reporting Entity (GRE)

The Government Reporting Entity (GRE) is comprised of six sectors: core departments, health authorities, school divisions, Crown corporations, Manitoba housing and universities & colleges. The Core Department Sector is comprised of provincial government departments that own and control the operation of assets.

The Health Authorities Sector is comprised of Addictions Foundation Manitoba, Cadham Provincial Lab, Cancer Care, Interlake Eastern Regional Health Authority, Northern Regional Health Authority, Prairie Mountain Health Authority, Southern Health Authority and Winnipeg Regional Health Authority.

The School Division Sector is comprised of 34 School Divisions⁹.

The Crown Sector includes Efficiency Manitoba, Liquor, Gaming and Cannabis Authority of Manitoba, Manitoba Hydro, Manitoba Liquor & Lotteries Corp. and Manitoba Public Insurance.

The Manitoba Housing Sector is comprised of the buildings, and equipment owned by Manitoba Housing Renewal Corporation/Manitoba Housing and includes direct and sponsor managed buildings.

The Universities and Colleges Sector is comprised of Assiniboine Community College, Brandon University, Manitoba Institute of Trades and Technology, Red River College, Université de Saint-Boniface, University College of the North, University of Manitoba and University of Winnipeg.

The number of buildings owned and the gross floor area of each GRE sector since 2017 is provided below.

Buildings Associated with the GRE

There are 5,741 owned buildings within the GRE with a total gross floor area of approximately 66 million square metres (Figure 1 and 2). This includes but is not limited to the Manitoba Legislative Building, provincial court houses, park structures, office buildings, jails, retail buildings, casinos, hospitals, clinics, personal care homes, residential housing, schools, colleges, universities, garages and warehouses. These facilities deliver a wide variety of services to Manitobans.

FIGURE 1: Number of Buildings owned within the GRE by Sectors 2017-2020

Number of Buildings by GRE Sector	2017	2018	2019	2020
Core Departments	2,567	2,570	2,608	2,604
Crowns	156	151	147	146
Health Authorities	425	428	428	428
MB Housing	1,458	1,441	1,459	1,469
School Divisions	840	838	843	849
Universities & Colleges	238	242	244	245
Total Buildings GRE	5,684	5,670	5,729	5,741

⁹ Beautiful Plains SD, Borderland SD, Brandon SD, DSFM SD, Evergreen SD, Flin Flon SD, Fort la Bosse SD, Frontier SD, Garden Valley SD, Hanover SD, Interlake SD, Kelsey SD, Lakeshore SD, Lord Selkirk SD, Louis Riel SD, Mountain View SD, Mystery Lake SD, Park West SD, Pembina Trails SD, Pine Creek SD, Portage La Prairie SD, Prairie Rose SD, Prairie Spirit SD, Red River Valley SD, River East Transcona SD, Rolling River SD, Seine River SD, Seven Oaks SD, Southwest Horizon SD, St. James Assiniboia SD, Sunrise SD, Swan Valley SD, Turtle Mountain SD and Turtle River SD

FIGURE 2: Gross Floor Area (GFA) of GRE Owned Buildings by Sector 2017-2020

Gross Floor Area (millions m ²) by GRE Sector	2017	2018	2019	2020
Core Departments	1.24	1.36	1.28	1.27
Crowns	0.36	0.36	0.36	0.45
Health Authorities	1.77	1.78	1.82	1.80
MB Housing	56.31	55.45	56.00	52.67
School Divisions	8.12	8.13	8.16	7.31
Universities & Colleges	2.70	2.82	2.83	2.86
Total GFA (millions m²)	70.51	69.91	70.44	66.35

The government leases several buildings in addition to primary office buildings. Leased space is not included in this report.

Vehicles Associated With the GRE

The GRE owns 9,705 vehicles including 2 electric vehicles, 70 hybrid vehicles, 1,625 school buses, 225 ambulances, 7 planes, 4 Zambonis, 3 amphibexs, 1 locomotive, 435 snowmobiles plus trucks, construction equipment and more. Vehicles are classified as light duty, medium duty, heavy duty or specialized units. In addition, the GRE owns 3,338 pieces of equipment that are classified as small engine or other. Figure 3 provides an inventory of GRE vehicles and equipment since 2017.

FIGURE 3: GRE Vehicle and Equipment Inventory 2017-2020

GRE owned Vehicles and Equipment	2017	2018	2019	2020
Charging Stations (# of units)			4	4
Light Duty Vehicles (# of units)	4,263	4,180	5,609	3,704
Medium Duty Vehicles (# of units)	1,233	1,244	1,247	2,667
Heavy Duty Vehicles (# of units)	722	716	1,512	2,083
Specialized Units (# of units)	341	340	1,833	1,251
Small Engines (# of units)	927	940	1,072	2,754
Other (# of units)	197	192	884	584

A description of vehicle and equipment classes is found in Appendix A of this report.

GRE Emissions Report 2020

As prescribed in the Climate and Green Plan Act, each entity within the GRE is required to track and report building, vehicle and equipment related energy and fuel use, and report consumption data to the LCGO on a calendar year basis. Based on the amounts and types of energy consumed, LCGO converts the usage data to GHG emissions using methodology consistent with the Greenhouse Gas Protocol developed by the World Resource Institute.

Since 2017, GRE organizations have been developing processes to capture and report data for reporting purposes.

Total Annual GRE Emissions

Figure 4 provides the total annual emissions for the GRE since reporting began in 2017. Based on the data provided by the GRE, an approximate 8 per cent reduction in GHG emissions was reported in 2020 (570,122 metric tons CO₂e) relative to 2017 (630,115 metric tons CO₂e). While energy-related improvements to buildings are occurring within the GRE, the improvements to date would not contribute to the significant decrease in GHG emissions observed in 2020. With operations curtailed in 2020 due to COVID-19, the reduction in emissions presented in Figure 4 is not attributable to an efficiency trend.

The data shows that since 2017, building related emissions are consistently about 85 per cent of the GREs emission profile and vehicles & equipment emissions are approximately 15 per cent.

FIGURE 4: GRE Emission Summary 2017-2020

GRE Emissions	2017	2018	2019	2020
GRE Buildings (tCO ₂ e)	630,115	649,843	633,836	574,122
Vehicles & Equipment (tCO ₂ e)	101,254	107,223	98,134	82,598
Total Emissions GRE (tCO₂e)	731,369	757,067	731,970	656,720
% of Building Emissions in Total GRE Emissions	86%	86%	87%	87%
% of Vehicle & Equipment Emissions to Total GRE Emissions	14%	14%	13%	13%

Annual Emissions by GRE Sector

The total emissions (absolute emissions) associated with building energy related heating, cooling and operations and fuel used for equipment and vehicle by GRE sector is provided in Figure 5.

FIGURE 5: Emissions by GRE Sector

Building Emissions by GRE Sector	2017	2018	2019	2020	% of GRE 2020 Building Emissions
Core Department Emissions (tCO ₂ e)	26,363	26,690	30,435	26,185	5%
Crowns (tCO ₂ e)	7,449	8,619	8,549	7,667	1%
Health Authorities (tCO ₂ e)	94,977	102,082	104,995	102,138	18%
MB Housing (tCO ₂ e)	14,039	17,961	22,228	19,827	3%
School Divisions (tCO ₂ e)	447,681	452,954	426,818	376,524	66%
Universities & Colleges (tCO ₂ e)	39,607	41,538	40,812	41,781	7%
Total Emissions from GRE Owned Buildings (tCO₂e)	630,115	649,853	633,836	574,122	100%

Vehicle & Equipment Emissions By GRE Sector	2017	2018	2019	2020	% of GRE 2020 Vehicle and Equipment Emissions
Core Department Emissions (tCO ₂ e)	39,823	46,062	37,987	35,122	43%
Crowns (tCO ₂ e)	28,196	27,178	26,323	24,774	30%
Health Authorities (tCO ₂ e)	2,828	2,460	2,479	2,303	3%
MB Housing (tCO ₂ e)	705	663	509	565	1%
School Divisions (tCO ₂ e)	28,811	29,943	29,919	19,141	23%
Universities & Colleges (tCO ₂ e)	890	908	917	693	1%
Total Emissions from GRE Owned Vehicles and Equipment (tCO₂e)	101,254	107,213	98,134	82,598	100%

Building Emissions by GRE Sector

Total building emissions by sector is influenced by a number of factors including the number and types of buildings as well as total floor area within in each sector (Figure 1 and 2), building use, the type of energy sources used to heat, cool and operate the building, and the efficiency of the buildings.

Based on information reported by the GRE, comparing Figures 1, 2 and 5 indicate there is no correlation between the number of buildings and/or total gross floor area and the resulting GHG emissions between sectors. For instance the Manitoba Housing Sector operates almost 80 per cent of the GREs total gross floor area but contributed less than 3 per cent to the total GRE's building related emissions in 2020. Further, the School Divisions have a much lower total gross floor area than Manitoba Housing, but represents 66 per cent of the GRE's building related emissions. The emission profile of the GRE sector is most dependent on the source of energy used for building heating. MB Housing relies heavily on electricity for heating while the School Divisions primarily use natural gas.

Work is underway to develop capacity within the GRE to track and report energy use and fuel use at the building level for the 2023 calendar year reporting. Tracking usage at the building level within the GRE, will be used to determine the poorest performing buildings within a GRE sector and to formulate plans to upgrade operating efficiency and reduce emissions in the most cost efficient manner.

Based on the data provided by the GRE, the emissions per square metre of floor space by GRE sector is provided in Figure 6, provides an average emission profile for each sector within the GRE. High emission intensities associated with the School Divisions and Health Authorities are largely associated with the use of natural gas to heat many of the buildings within their sector. Manitoba Housing, with a low emission intensity, relies heavily on electricity for building heating within their sector.

FIGURE 6: GRE Sector Building Related Emissions Per Square Metre

GRE by Sector	2017 kg CO ₂ e/m ²	2018 kg CO ₂ e/m ²	2019 kg CO ₂ e/m ²	2020 kg CO ₂ e/m ²
Core Departments	21.29	19.60	23.87	20.58
Crowns	20.69	24.02	23.84	17.06
Health Authorities	53.66	57.36	57.60	56.65
Manitoba Housing	0.25	0.32	0.40	0.38
School Divisions	55.13	55.71	52.34	51.53
Universities and Colleges	14.67	14.71	14.43	14.63

*Data does not include leased spaces.

The Gross Floor Area (GFA) is provided in Figure 2. The kg CO₂e/m² in Figure 6 is dependant on data collection and reporting variabilities of the GRE sectors and is presented to establish a baseline for future reporting.

Vehicle and Equipment Emissions by GRE Sector

Vehicle and equipment emissions associated with the GRE sectors are provided in Figure 5. The Core Departments sector and the Crown sector reported the highest vehicle and equipment related emissions in 2020. These sectors rely on vehicles and equipment to deliver year-round services to Manitobans and were least affected by COVID-19. Emissions from the School Divisions sector were less in 2020, in part because COVID-19 reduced the demand for transportation services. The type of vehicles and equipment operated by the GRE is listed in Figure 3.

GRE Emissions by Energy and Fuel Type

Based on the reported data ¹⁰, the GRE relies heavily on natural gas to heat building and domestic hot water (Figure 7). Natural gas accounts for 84 per cent of the GRE's total emissions.

Gasoline and diesel fuel accounts for 12 per cent of the GRE total emissions. This fuel is for vehicles and equipment for GRE transportation, enforcement, construction purposes and maintenance.

An effective way to reduce GRE emissions in new or existing buildings is to reduce the demand for natural gas. Demand reduction for natural gas can be achieved when new buildings are designed or existing buildings are retrofitted with energy efficiency in mind.

¹⁰ (references: Manitoba Hydro 2020 Annual Report, https://www.hydro.mb.ca/corporate/ar/pdf/annual_report_2019_20.pdf and June 2014 Report on the Needs for and Alternative To (NFAT) Review of Manitoba Hydro's Preferred Development Plan, http://www.pub.gov.mb.ca/nfat/pdf/finalreport_pdp.pdf).

FIGURE 7: GRE Emissions by Energy and Fuel Type

Annual GRE Emissions by Energy & Fuel Type (tCO₂e)	2017	2018	2019	2020	% of GRE 2020 Emissions
Building Related Emissions (tCO₂e)	630,115	649,843	633,836	574,122	
Electricity Use (tCO ₂ e)	1,721	599	1,242	536	0.1%
Natural Gas Use (tCO ₂ e)	604,716	625,834	610,845	552,677	84.2%
Propane Use (tCO ₂ e)	19,101	19,760	18,363	17,606	2.7%
Diesel Use (tCO ₂ e)	795	295	401	305	0.0%
Light Fuel Oil Use (tCO ₂ e)	104	94	165	37	0.0%
Heavy Fuel Oil Use (tCO ₂ e)	3,664	3,244	2,795	2,957	0.5%
Motor Oil Use (tCO ₂ e)	15	16	23	0	0.0%
Wood Fuel/Wood Waste (tCO ₂ e)		0	2	4	0.0%
Transportation Related Emissions (tCO₂e)	101,254	107,223	98,134	82,598	
Diesel Use (tCO ₂ e)	41,741	51,729	49,731	37,840	5.8%
Gasoline Use (tCO ₂ e)	50,302	47,404	44,626	40,992	6.2%
Propane Use (tCO ₂ e)	315	503	626	1,277	0.2%
Jet Fuel Use (tCO ₂ e)	4,132	3,709	3,132	1,019	0.2%
Aviation Gasoline Use (tCO ₂ e)	4,764	3,878	18	1,470	0.2%
Total Emissions (tCO₂e)	731,369	757,067	731,969	656,720	100%

GRE Water Consumption

Although the GRE does not report emissions from water use, every litre of water has an energy footprint associated with pumping, moving, treating and heating the water. Managing water efficiently is also a priority within the Made-in-Manitoba Climate and Green Plan. Each entity within the GRE tracks and reports potable water consumption to the LCGO on a calendar year basis.

Figure 8 provides a profile of potable water consumption across the GRE. Universities and colleges use more water than all other GRE sectors combined. Water usage under this sector is required for a number of university and college related activities including: sport facilities such as indoor swimming pools and ice hockey rinks, cafeterias and eateries, student residents, science and research laboratories and staff and student washroom facilities.

With slight fluctuations from year to year, the volume of water used by the GRE is fairly consistent. The reduction in water use between 2019 and 2020 seen in Figure 8 is in part attributable to reduced GRE operations associated with COVID-19.

FIGURE 8: Water Use by Sector 2017-2020

Water Use by GRE Sector	2017	2018	2019	2020
Core Departments (m ³)	741,091	794,027	717,039	586,005
Crowns (m ³)	98,981	108,161	100,909	108,590
Health Authorities (m ³)	5,339,278	4,914,695	4,750,134	4,364,507
MB Housing (m ³)	2,114,713	2,235,898	2,256,338	1,584,347
School Divisions (m ³)	1,052,348	1,294,090	1,388,776	631,330
Universities & Colleges (m ³)	59,835,417	55,472,251	54,159,248	27,751,952
Total Water Use by GRE (m³)	69,181,827	64,819,122	63,372,445	35,026,731

Summary - Energy, Fuel, Water Use, Cost and Emissions in 2020 by GRE Sector

The GRE spent an estimated \$329 million in 2020 to operate owned buildings, vehicles and equipment. Generally speaking, year over year changes in fuel and water consumption are due to changes in operational need as well as some efficiency improvements. For example, in colder winters there is increased use of natural gas associated with building heating and, for example, on drier years there is an increased purchase and use of aviation fuel for fire fighting.

The estimated total cost of utilities associated with GRE activities was less than previous years. This is attributed, in part, to the change in operations due to COVID-19 restrictions and work from home directives.

In 2020, the GRE spent approximately \$73 million for natural gas. Improving the energy efficiency of owned buildings is the path to reduce cost and emissions associated with natural gas, this means increasing participation in Efficiency Manitoba programs that target natural gas reduction.

Use of fuels with lower emissions, implementing an anti-idling policy and employing new technologies are options considered by the GRE to reduce vehicle and equipment related emissions and reduce operating costs. The 2020 spend on gasoline and diesel was \$32 million.

Water has the highest cost per unit compared to energy or fuel used in GRE operations. It was estimated the GRE spent \$125 million on water in 2020. Implementing work and learn from home directives during COVID-19 significantly reduced the consumption and cost of this utility within the GRE.

FIGURE 9: Energy, Fuel, Water Use, Cost and Emissions in 2020 by Sector

2020 GRE Reported Data & Estimated Cost	Core Departments	Crowns	Health Authorities	MB Housing	School Divisions	Universities & Colleges	Total	Estimated 2020 Cost (\$ million) note 6
Building								
# of Buildings	2,604	146	428	1,469	849	245	5,741	
Gross Floor Area (m ²)	1,272,176	449,328	1,802,968	52,666,319	7,306,636	2,856,022	66,353,448	
Electricity Use (kWh) (\$0.0741/kWh) note 1	119,904,065	88,587,809	343,820,141	200,989,440	298,563,563	156,812,481	1,208,677,498	\$89.56
Natural Gas Use (m ³) (\$2.504/m ³) note 1	12,742,655	4,009,678	50,257,568	8,988,244	193,421,423	21,960,262	291,379,831	\$72.96
Propane Use (Litres) (\$0.5622/Litre) note 1	1,220,577	11,450	2,239,886	1,731,063	6,135,662	35,619	11,374,256	\$6.39
Diesel Use (Litres) (\$2.59/Litre) note 1	15,116	1,713	81,430	3,534	6,909		108,702	\$0.28
Light Fuel Oil Use (Litres) note 2	10,947		2,443		-		13,390	
Heavy Fuel Oil Use (Litres) (\$0.8587/Litre) note 3			930,417		-		930,417	\$0.80
Motor Oil Use (Litres) note 2				60	-		60	
Wood Fuel/Wood Waste (kg) (\$0.21/kg) note 4					42,690	149,550	192,240	\$0.04
Total GHG Emissions Buildings (tCO₂e)	26,185	7,667	102,138	19,827	376,524	41,781	574,122	
Water (m ³) (\$3.59/m ³) note 1	586,005	108,590	4,364,507	1,584,347	631,330	27,751,952	35,026,731	\$125.75
Vehicle & Equipment								
Diesel Use (Litres) (\$1.041/Litre) note 5	5,077,911	3,415,567	218,936	1,185	5,328,828	102,669.77	14,145,096	\$14.73
Gasoline Use (Litres) (\$0.957) note 5	8,665,858	7,367,488	809,695	264,763	2,030,005	189,137.45	19,326,946	\$18.50
Propane Use (Litres) note 1	445,812	6,846	30		376,693	359.34	829,740	
Jet Fuel (Litres) note 2	388,809					5748.1	394,557	
Aviation Fuel (Litres) note 2	589,962					849.9	590,812	
Engine Oil (Litres) note 2					3,198		3,198	
Total GHG Emissions Vehicles & Equipment (tCO₂e)	35,122	24,774	2,303	565	19,141	693	82,598	
Total GHG Emissions (tCO₂e)	61,307	32,441	104,441	20,392	395,664	42,474	656,720	
Total Estimated Annual Cost (\$) note 6								\$329.01

The table provides energy, fuel and water related consumption data for buildings, vehicles and equipment under the operational control of a GRE organization. Operational control means having the authority to implement operating policies to establish how the assets are used and maintained.

Notes:

1. Cost information provided by Core Departments Sector
2. Cost information unavailable
3. Cost information provided by Health Authorities Sector
4. Cost information provided by Universities & Colleges Sector
5. Cost information provided by Stats Canada
6. Cost excludes taxes, demand surcharges and meter rental (where applicable). The information was provided to demonstrate the minimum cost of energy, fuel and water paid by the GRE for operational purposes. Information does not account for locations with subsidized rates, nor does it account for locations that do not pay for water.

Activities of the Low Carbon Government Office to Support the GRE

The LCGO has been working cooperatively with core government departments and members of the GRE to reduce GHG emission and support the Climate and Green Plan Act. Below outlines some of the activities underway within the GRE.

Sustainable Procurement of Goods and Services

Procurement and Supply Chain Management (PSCM) in Central Services is considering the affects of indirect emissions and other environmental and social impacts associated with the manufacture of the goods and services used by the GRE. As a result PSCM is currently:

- Updating procurement policies and procedures to address “upstream” GHG emissions (upstream emissions are associated with the production of goods and services), low carbon procurement and environmentally preferred goods and services.
- Endorsing GRE use of Sustainable Procurement Manitoba (SPM) Website as a resource for low carbon procurement information and specifications on environmentally preferable goods and services. The information on the SPM website is developed by procurement professionals and sustainability practitioners from the GRE and the City of Winnipeg.

SHOWCASE - Sustainable Procurement in Manitoba (SPM)

The SPM Working Group is an example of how organizations within the public sector work together to advance sustainable procurement activities in Manitoba. The website is a resource for organizations interested in purchasing sustainable goods or services. SPM shares the goal of protecting the environment while promoting sustainable economic development.

Check out <https://manitobasustainableprocurement.com/>

Improving Building Design, Construction and Management

The Manitoba Green Building Program has been in place since 2007 and last revised in 2013. The program requires GRE organizations initiating a building project to apply defined Green Building Criteria and report building project results where applicable. The Green Building Criteria includes requirements to meet specific performance and energy efficiency and commissioning requirements as well as to achieve Leadership in Energy and Environmental Design (LEED®) certification. The Canadian Green Building Council (CaGBC) compiles an on-line database of Canadian registered and certified building projects. For a listing of all buildings in Manitoba (Private and Government) that are LEED® certified, go to the CaGBC website. https://leed.cagbc.org/LEED/projectprofile_EN.aspx

In 2020, one GRE owned project, École South Pointe School obtained LEED® - Gold Certification. In 2019, three GRE owned projects obtained LEED® certification: Laura Secord School Gymnasium - LEED® Gold, École Rivière-Rouge – LEED® Gold and Green Acres Gymnasium – LEED® Silver.

Efforts are currently underway to modernize the provincial Green Building Program. The Interdepartmental Working Group for Green Building Program Implementation (IWGGBPI) is currently assessing the existing plan. Modernization is expected to take into consideration: The Climate and Green Plan; Efficiency Manitoba Programs; and, Building Code updates.

Information and Communication Technology

At the onset of the COVID-19 pandemic, many organizations within the GRE moved quickly to modernize communication technology and equipment so employees could work remotely to prevent the spread of the virus. These technologies included virtual private networks (VPNs), virtual meetings, cloud technology and work collaboration tools, etc.

Many within the GRE are currently evaluating the continuation of remote work for a segment of their work force looking, in-part, at the environmental pros and cons.

Environmental benefits of remote work include:

- A reduction in commuting related emissions. Transportation, which includes vehicles used commuting to and from work, is the largest source of greenhouse gas emissions in Manitoba.
- Less energy consumption associated with the heating, cooling and lighting of commercial spaces.
- The digitizing of documents and processes resulting in less paper is being used.

Environmental impacts of remote work include:

- The energy use and the greenhouse gas emissions associated with the manufacture of the technologies purchased.
- Increased demand for data centre outsourcing (cloud services) purchases - the outsourced data centres may use coal and/or natural gas as their energy source and require significant quantity of water, mostly for cooling.

The SPM (Section 6.1) is working with the GRE to ensure procurers of ICT equipment and Cloud Services are aware of the environmental impacts and consider requesting environmentally preferred goods and services to help mitigate these impacts.

SHOWCASE

There are a multitude of environmental benefits from reducing paper consumption. The Civil Service Commission noted a 30 per cent reduction in their paper use in 2020. This not only led to a cost savings of over \$7,000 but the Departments' efforts resulted in numerous environmental benefits. Using a paper reduction benefits calculator*, their approximate reduction of 2,400 kg of paper resulted in the following environmental benefits:

- Wood saved – 6.6 metric tons
- Total energy saved - 59 million BTU
- GHG emissions saved – 17.7 metric tons
- Water saved – 54,600 litres
- Solid waste reduction – 1374 kilograms

*Environmental impact estimates were made using the Environmental Paper Network Paper Calculator Version 4.0. For more information visit www.papercalculator.org

Increasing Use of Zero Emission and Reducing Fuel Consumption of Vehicles

Manitoba Central Services (Vehicle Equipment and Management Agency-VEMA) and Manitoba Finance (Treasury Board Secretariat) completed the installation of Automated Vehicle Locators (AVLs) in vehicles used by government departments. These real-time tracking devices monitor fuel consumption, distance driven, fuel efficiency and vehicle idling, etc. The data recorded by the devices is used to create policy to reduce fuel usage, fuel costs and GHG emissions.

The AVL Policy and Framework is included in the General Manual of Administration (GMA).

By implementing AVL and anti-idling practices, there has been a reduction in idling time by 30 per cent. Departments implemented monitoring and reporting processes in 2021. Comparative reporting will be available in 2022.

The use of AVLs to manage government fleet vehicles is considered a best practice. Others within the GRE, such as Manitoba Liquor and Lotteries Corp. have employed AVLs since 2015 and, similar to the planned activities of the Manitoba government, use the data to educate fleet drivers on the impacts of their driving habits on energy efficiency and develop directives to mitigate fuel wasting activities such as unnecessary idling.

Looking into the future, government is considering recommendations made by the Expert Advisory Council in their recommendations on provincial green transportation policy.

Waste Management

GRE organizations follow the “reduce, reuse, recycle” hierarchy to improve waste reduction and waste management. The hierarchy is incorporated into procurement decisions and the disposal of assets. GRE organizations use Manitoba’s Extended Producer Responsibility recycling programs to dispose of their recyclable materials.

There is significant emphasis on procurement to support the purchase of environmentally preferred goods to reduce waste. By requesting manufacturers and suppliers support strategies such as requirements for product repair, providing longer product warranty, offering vendor take back strategies and reducing packaging associated with product shipment, the GRE is reducing waste associated with product delivery, product replacement and supporting the circular economy.

The federal government recently announced their intention to ban plastic bags, straws, cutlery and other single-use items by the end of 2021. Many within the GRE who are impacted by the ban have made the transition to re-usable items only and/or substituted with compostable products.

GRE organizations are participating in Manitoba’s Extended Producer Responsibility Programs to recycle end of life materials including electronics, batteries, fluorescent lights and tubes, paints etc.

In addition to the Extended Producer Responsibility Programs, there are other incremental practices for waste management and recycling practices underway in the GRE which include, but are not limited to:

- Shared Health is a member of a Health Canada Committee working with other provinces and territories, through the Canadian Council of Environment Ministers (CCME), to keep Personal Protective Equipment out of the environment.
- Red River College and University of Manitoba provide collection bins for pens and markers and send these items to a recycler.
- University of Winnipeg, Manitoba Public Insurance and several school divisions deconstruct furniture that is no longer required and can not be repurposed through selling or donating. By dismantling the furniture, they are separating the recyclable materials such as wood, metal, and plastic, and sending to local recyclers.
- Natural cork recycling is offered to customers at Manitoba Liquor Marts. The collected corks are sent to ReCORK, a natural wine cork recycling program and the corks ground down for use in a wide variety of products, replacing environmentally-harmful foams and plastics.
- Manitoba Infrastructure has a pilot project underway reusing roof shingle materials in road construction.
- The Materials Distribution Agency of the Manitoba government gathers and redistributes furniture and supplies to where they are needed most.

Climate Resilience and Adaptation Planning in the GRE

Core government departments are undertaking vulnerability and risk assessments to climate impacts. This is the first step in adaptation planning and building resiliency to a changing climate for organizations. A guide to risk assessment that includes templates to assess climate impacts has been developed by Climate and Green Plan Implementation Office.

Next Steps

The LCGO prepared an Action Plan describing the progressive approach required to assist the GRE in achieving the mandate “sustainable and climate ready government operations”. Three – five year phases coinciding with the Carbon Saving Account periods (CSAs) were developed, each focusing on distinct stages of progress. The Plan is reviewed on a regular basis and adjusted to ensure actions and priorities are sufficient to meet the mandate and align with government priorities. The LCGO conducted a review of progress to date on its Plan and has identified the following activities for action:

- Streamline the GRE’s annual energy and greenhouse gas emission data collection process and develop capacity to track and report energy use and fuel use at the building level for the 2021 calendar reporting year.
- Request the reporting of leased gross floor area (GFA) in addition to owned GFA to identify impacts of sustainability policies such as: work from home and carbon footprint reduction.
- Enhance efforts to improve water tracking and reporting.
- Enhance communication and information sharing amongst the GRE.
- Establish best practices (opportunities) for GHG reduction and sustainable operations amongst the GRE within each of the Climate and Green Plan Act focus areas.
- Conduct annual surveys of the GRE to measure the status of implementation of best practices and resulting benefits.

These actions will help to accelerate implementation of the Plan, reduce greenhouse gas emissions and advance the development of a climate ready government.

Appendix A

Description of Vehicle & Equipment Classes used by the GRE

Light Duty Vehicles: passenger vehicles (fuel & electric & hybrid), passenger vans, pick up trucks, sport utilities (fuel & hybrid).

Medium Duty Vehicles: ambulances, cargo vans, mobile buses, school buses, shuttle/casino buses, tow trucks F550/F650.

Heavy Duty Vehicles: graders, loaders, rollers, spreaders, mixers, diesel tractors, tractors. Reefer trucks, construction & services vehicles, bobcats & wolverines, distributor trucks, heavy duty trucks, transport trucks (semi), mobile screen trucks, sloop/shoulder eliminator (attachments), medical buses, skid steers & bobcats.

Specialized Units: mobile cranes, tar kettles, fire engines/pumpers, ground source heat pumps, Zambonis, amphibex, airplanes, boom lifts, forklifts, centreline paint machine, under bridge cranes, skyjacks, asphalt plants, gators, ATV/Argo/Rangers & snowmobiles.

Small Engines: water pumps, compressors, generators, welders, Herman Nelson heaters, steam generators, back pack blowers, billy goat vacuums, power rakes/dethatches, power brooms/sweepers, chain saws, pressure washers, even spray portable water systems, hedge trimmers, lawn mowers, leaf blowers/shredder/vacuums, riding mowers, rustler four wheelers, string trimmers, weed whackers/tillers, yard/garden tractors, outboard motors and boats, and walk behind BCS brushes.

Other: engines/vehicles for academic training, mule, airport tug, ground power unit, frost fire heater, snow blowers, telehandler, concrete saw, lawn aerator, lawn edger, soil auger, small soil spreaders, sod cutter, stump grinder, pole saw, hedge clipper, chipper/Vermeer, backhoe, rail car mover, tracked vehicles, madvac (outdoor riding sweeper/vacuum), handheld power brush, auger, fuel pump, walk behind plate tamper, walk behind centre line marker, snow pusher, scissor lift, propane forklift, concrete mixes, plate packer, cube can, tree chipper, line painters, quick cut saw, tire changer (electric), BCS walk behind tractor/rototiller, brush cutter, electric water pump, electric compressors, electric pressure washers, battery leaf blowers, gas pruning saw, gas wood chipper, gas aerator, gas roller, gas plate pack, gas split and shaft power head.



Manitoba Government Initiatives Under the Climate and Green Plan *Annual Report*

Manitoba
Conservation
and Climate

2020-2021



Climate Pillar

Keystones	Department	Activity	Description	Results
Adaptation	Economic Development & Jobs	Aboriginal Cultural Awareness & Engagement course	Manitoba Environmental Industries Association (MEIA) delivered the course to 6 Partner organizations.	20 Participants (limited due to COVID)
	Infrastructure	Pilot project to test recycled asphalt shingles in road use	Test road completed in June 2021. Materials Engineering staff will be monitoring the performance of recycled materials in the road for the next several years to determine long term effectiveness.	All projects that use recycled materials will be monitored over time to ensure the material performs and to determine where the government can expand the use of environmentally friendly recycled materials in road construction. Data collection will be done annually and Strength testing will be performed approx. every three years to ensure durability and public safety.
	Infrastructure	Highway Maintenance Program on Strategic Flood Routes for Damage Prevention & Climate Resiliency (DPCR)	Damage Prevention and Climate Resiliency Projects, including \$16M to provide an alternate route for PTH 75 to support movement of goods and people during flooding. Ongoing work includes mobilisation and re-assignment of personnel and equipment to flood control duties during high water events, inspection of affected highway routes, and ongoing consideration of options for flood-prone strategic routes (upgrades to road and/or alternate routes).	Safe movement of goods and services during significant Red River Valley flood events. The project is not yet complete. Anticipated completion is in October 2021.
	Infrastructure	511 Road conditions service	The 511 service provides real time, up to date information on the conditions of Manitoba roads including road closures due to weather events and high water events.	This service is provided real time and available 24/7. Number of service outages and delays and number of site visits and calls will be measured.
	Infrastructure	Aquarius	Real time water level and flow information on rivers and streams throughout Manitoba that is accessible to the public to deliver timely information.	This service is provided real time and available 24/7. Number of service outages and delays and number of site visits and calls will be measured.
	Infrastructure	Disaster Financial Assistance (DFA) Mitigation and Preparedness Program	Assist municipalities to mitigate against future disasters, when Manitoba establishes a DFA program that is eligible for cost-sharing with Canada under the Disaster Financial Assistance Arrangements, municipalities would have the option to invest an amount equal to the Provincial/Municipal DFA deductible into a disaster mitigation and preparedness project. Manitoba would then reimburse municipalities for 100% of their eligible DFA claim.	Investment in Mitigation and Preparedness is ongoing.
	Infrastructure	Amortization and interest related to the existing network of water-related assets owned by the province	The program includes projects to increase the flood protection levels and resiliency of flood protection structures, repair dams used for water supply (domestic and irrigation) to improve drought resilience, and increase the capacity of the agricultural drains to improve drainage times post-flooding.	The water-related network of assets are operated to provide flood protection and manage water supply during flood and drought conditions.



Climate Pillar

Keystones	Department	Activity	Description	Results
Increasing Climate Knowledge	Central Services	Sustainable Procurement Policy Revision	Revisions were made to the Procurement Administration Manual (PAM) to include sustainable procurement analysis in tenders as a prompt for departments to explore environmental impact of procurements and adapt where possible.	Draft policy statement created in collaboration with Conservation and Climate staff; awaiting senior management review.
	Central Services	Embed sustainable procurement procedures in tendering	In alignment with PAM revisions, procedures are being drafted to advise procurement staff how and when to conduct sustainable procurement analyses in tenders.	Ongoing
	Agriculture and Resource Development	Ag Action Manitoba Program for Farmers - Assurance: Beneficial Management Practices	Ag Action Manitoba helps farmers implement beneficial management practices (BMPs) on their farms identified in their Environmental Farm Plans, including practices with climate change adaptation benefits.	Through the BMP funding stream the Ag Action Manitoba program funded 94 projects in 2020/21, many of which had adaptation co-benefits, and approximately 50 were specifically water source development projects on farms to supply water to agricultural operations.
	Municipal Relations	Fire Protection Grant	The Fire Protection Grant was open to municipalities and Northern Affairs communities to support projects or activities that would improve fire protection and emergency response. Eligible fire protection projects included items such as preparedness planning, training and safety equipment.	\$9.14 Mil in funding for 296 projects
	Municipal Relations	2020 Flood Preparedness Program	One-time funding support to municipalities in enhancing municipal capacity for flood preparedness and building resiliency for future floods. All municipalities were invited to apply for funding for eligible equipment and services.	Originally announced as a \$3M program but due to overwhelming demand total funding awarded was increased to \$7.8M.
Adaptation	Infrastructure	Disaster Prevention and Climate Resiliency Program	One time investment of \$32M for municipal infrastructure projects, and \$16M for flood-proofing of PR246, to build up local infrastructure that will better prepare municipalities to withstand the impacts of natural disasters and extreme weather events.	\$32M for 18 municipal projects \$16M for highway upgrades
	Economic Development & Jobs	\$15 million for disaster prevention and climate resilience projects in Winnipeg Metropolitan region	12 projects in the Winnipeg Metropolitan Region (WMMR) to receive provincial financial support through a \$48-million fund for disaster prevention and climate resilience improvements. 12 projects will receive a total of \$15 million to build up local infrastructure to better prepare municipalities to withstand the impacts of natural disasters and extreme weather events. The \$15-million commitment is part of the province's one-time capital investment in damage prevention and climate resiliency measures announced in November 2019.	Ongoing



Climate Pillar

Keystones	Department	Activity	Description	Results
	Indigenous Reconciliation and Northern Relations	NAC Digital Infrastructure Project for IRNR Water Treatment Plants and Council Offices	17 laptop computers provided to water treatment plants and council offices to minimize travel required for training and meetings. Also improved Internet connectivity, and provided Ipads in effort to reduce greenhouse gas emissions.	
Adaptation	Indigenous Reconciliation and Northern Relations	Project to Support Water Treatment Plant Upgrades for IRNR Communities (SCADA upgrades supports climate readiness to allow for remote oversight, reduces travel; backup generators manage power outages from increased storms)	Substantial completion of SCADA, UV, and Filter Upgrades for 12 communities; and backup generators installed at 3 communities. Provides improved resiliency to deal with extreme climate events. SCADA – Supervisory Control and Data Acquisition	
Carbon Pricing	Economic Development & Jobs	MEIA delivered 'The Big Sleeper': Federal Carbon Tax webinar	Webinar on the Federal Carbon Tax to help partner organization better understand the tax and Manitoba's position on it.	64 Participants
Clean Energy	Central Services	Ceasing operations of the Selkirk Generation station	Manitoba has four natural-gas fired units at the Selkirk and Brandon generating stations. These are all converted coal to natural gas units to reduce GHG emissions. In April 2021, the two generating thermal units at Selkirk Generating Station ceased its operation.	Estimated GHG reduction for the reporting year are 2.5kt.
	Central Services	Keeyask Generating Station	In February 2021, the first generating unit of Keeyask Generating Station came into commercial service, and an expected total commissioning in 2022.	
Sector Emission Reductions	Economic Development & Jobs	Reduce transportation emissions	Provide support to Manitoba heavy-duty vehicle and equipment manufacturers to undertake projects for: <ul style="list-style-type: none"> • Development of vehicles towards zero emissions, or • Adoption of advanced manufacturing technologies 	7 industry projects
	Economic Development & Jobs	Reduce Waste Emissions	Delivered two webinars: <ol style="list-style-type: none"> 7. Designing, Developing and Managing an Effective and Efficient 4Rs/Waste Transfer Site 8. Managing Waste Plastics in Manitoba 9. 	<ol style="list-style-type: none"> 1. 88 Participants 2. 110 Participants 3.
	Conservation & Climate	Reduce Waste Emissions – Waste Reduction & Recycling Support Program (WRARS)	Recycling Expansion Opportunities for Furniture and Car Seats Supported pilot project exploring feasibility and opportunities for diverting bulky materials, such as furniture and car seats, from landfills.	Results not yet available.



Climate Pillar

Keystones	Department	Activity	Description	Results
	Conservation & Climate	Reduce Waste Emissions – Waste Reduction & Recycling Support Program (WRARS)	Agricultural Film and Twine Recycling Pilot Project - Supported pilot project to test the feasibility of introducing a regulated stewardship program for additional agricultural plastics.	79,286 kg of agricultural plastics were diverted from landfill over the two-years of this pilot. This pilot transitioned into a permanent industry-funded extended producer responsibility program in April 2021.
Sector Emission Reductions	Conservation & Climate	Reduce Waste Emissions – Waste Reduction & Recycling Program (WRARS)	Residential hazardous waste management - Supported the collection and proper disposal of residential household hazardous waste from collection sites across Manitoba. Products collected through this program are not included in any of the provincially regulated extended producer responsibility programs.	Approximately 250 tonnes of hazardous products, including flammable, reactive, corrosive and toxic materials were safely disposed.
	Conservation & Climate	Reduce Waste Emissions – Waste Reduction & Recycling Program (WRARS)	Stockpiled household hazardous waste clean-up project - Supported the collection and proper disposal of stockpiled household hazardous waste from communities across Manitoba, with a focus on northern communities, to ensure these materials do not enter the environment. This project managed the disposal of pressurized cylinders that are not included in provincially regulated extended producer responsibility programs, which had been stockpiled at waste disposal sites across Manitoba.	6,109 compressed gas and spray foam insulation cylinders were safely disposed.
Sector Emission Reductions	Conservation & Climate	Reduce Waste Emissions – Industry Funded	Extended Producer Responsibility Program for Household Medical Sharps - Department reviewed, consulted on and approved a regulated extended producer responsibly program for managing household medical sharps. Program received Ministerial approval in January 2021.	Results not yet available
	Conservation & Climate	Reduce Waste Emissions – Waste Reduction & Recycling Program (WRARS)	Manitoba Compost Support Payments - A total of 55,113 tonnes of organic waste was diverted to municipal and commercial compost facilities participating in the Manitoba Composts Support Payment program in 2020.	Tonnes of organic waste diverted from landfill will be measured.
	Conservation & Climate	Reduce Waste Emissions – Treasury Board	Organics Green Impact Bond - Launched Manitoba's first Green Impact Bond with a focus on diverting organic waste from landfill, creating green jobs, and reducing greenhouse gas emissions.	Results not yet Available Metrics will include: Tonnes of organic waste diverted from landfill; Full-time equivalent green jobs; Tonnes GHG emissions reduced.



Climate Pillar

Keystones	Department	Activity	Description	Results
	Conservation & Climate	Reduce Waste Emissions – Waste Reduction & Recycling Program (WRARS)	Building the Markets for Quality Compost (Compost Council of Canada) - The project involved the creation of educational and communication tools to increase demand for quality compost in Manitoba. The intent was for compost producers to increase their understanding of the various markets for compost and learn how to assess their product with respect to market demands.	Results not yet Available
	Conservation & Climate	Reduce Waste Emissions – Waste Reduction & Recycling Program (WRARS)	Residential Food Waste Collection Pilot Project Expansion (City of Winnipeg) - Residential organic waste was collected from homes in several areas of Winnipeg and processed into compost at the Brady Road Resource Management Facility.	Results not yet Available.
Sector Emission Reductions	Conservation & Climate	Reduce Waste Emissions – Waste Reduction & Recycling Program (WRARS)	Reducing Greenhouse Gas Emissions through Organics Diversion (Winnipeg Metropolitan Region) - The project explored collaborative management of organics and plastics, development of better approaches to reducing burning of woody waste, and facilitation of workshops and engagement to support the development of resource materials and action plans for use by participating communities in the Winnipeg Metropolitan Region.	Results not yet Available
	Conservation & Climate	Reduce Waste Emissions – Waste Reduction & Recycling Program (WRARS)	Looking at Waste Management through a Regional Lens in Rural Manitoba (Eco-West Canada) - Waste characterization study and evaluation for the Village of Dunnottar (the first of four waste studies in rural Manitoba).	Results not yet Available
	Conservation & Climate		Hazardous Waste is prohibited from disposal at landfills - Continued inclusion of clauses in Environment Act Licences for landfills prohibiting disposal of hazardous waste.	Results not yet Available
	Agriculture and Resource Development	Involvement with Soil Carbon Roadmap	The Soil Carbon Roadmap project, being led by the Canadian Forage and Grassland Association together with Viresco Solutions aims to build capacity to quantify SOC change on Canada's grazing and forage lands through the design and development of two major components: 1. The Canadian Soil Observation Network; and 2. The Soil Carbon Tool.	In August, September and October 2020, staff participated in two technical advisory group meetings and one stakeholder meeting of the Soil Carbon Roadmap project.
	Indigenous Reconciliation and Northern Relations	Project to improve landfill operations	Purchasing compaction equipment, improved management of waste, minimizing airborne contaminants, eliminating waste burning, etc.	Completed



Climate Pillar

Keystones	Department	Activity	Description	Results
	Indigenous Reconciliation and Northern Relations	On-going work to establish regional waste disposal sites to improve water management, including hazardous wastes, and reduce on-site burning		Ongoing
	Indigenous Reconciliation and Northern Relations	Create Sustainable and Climate Ready Communities	Northern Healthy Foods Initiative (NHFI): Reduce long-haul transportation by supporting greenhouse and gardening projects to allow for localized food production.	Ongoing
	Indigenous Reconciliation and Northern Relations	Reduce Transportation Emissions	NHFI Winter Roads Project: Cost of shipping materials is reduced when material orders are coordinated and transported together.	Ongoing
Reduce Building Emissions	Municipal Relations	Adoption of 2015 Construction Codes, including 2017 National Energy Codes	Signed RCT agreement for adoption of 2015 Codes and subsequent timely adoption of newer revisions.	
Reduce Agriculture Emissions	Agriculture and Resource Development	Ag Action Manitoba Program for Farmers - Assurance: Beneficial Management Practices (BMP)	Ag Action Manitoba helps farmers implement beneficial management practices (BMPs) on their farms identified in their Environmental Farm Plans, including practices with climate change mitigation benefits.	Through the BMP funding stream the Ag Action Manitoba program funded 94 projects in 2020/21, many of which had GHG emission reductions or carbon sequestration as a primary environmental benefit, including 26 projects related to improved cropping systems for carbon sequestration and reduced reliance on nitrogen fertilizer, and 10 projects related to improved grazing and pasture management for carbon sequestration and reduced emissions from livestock.
Reduce Industrial and Processing Emissions	Central Services	Automated Vehicle Locator(AVL)	Automated Vehicle Locator (AVL) devices installed in all provincial vehicles to monitor and modify driver behaviours resulting in emission reduction.	Continued review of AVL data to assess driver behaviours and fleet utilization to seek further emission reduction opportunities.
	Agriculture and Resource Development	Lifecycle Evaluation of GHG Emission Intensity of Beef Produced in Manitoba	The objectives of this work included: to conduct a lifecycle evaluation of the current GHG emission intensity of beef produced in Manitoba; and, to assess alternative beef cattle management strategies and their impact on total and intensity-based GHG emissions.	A lifecycle evaluation of the current GHG emission intensity of beef produced in Manitoba was completed, and alternative management strategies were modeled to assess their potential for reducing GHG emissions from beef production.



Jobs Pillar

Keystones	Department	Activity	Description	Results
Develop Climate and Green Expertise	Economic Development & Jobs	Promote Clean Technologies	Manitoba Environmental Industries Association (MEIA) delivered webinars on the following topics: <ul style="list-style-type: none"> • Optimizing Geothermal Design • Indigenous Clean Energy • Heating Manitoba's Buildings Affordably Without Fossil Fuel • Fisher River Solar Presentation 	216 Participants
	Economic Development & Jobs	Innovation Growth Program (IGP)	The IGP provides cost-sharing assistance to Small and Medium-Sized Enterprises (SMEs) to assist in developing and commercializing new innovative products and processes. The IGP supports SMEs in the development and growth stages of the business life-cycle to reduce the risks associated with innovative product development, accelerate growth and strengthen their financial position so they can secure future funding to build their Manitoba-based business.	Support for 18 SME's
	Economic Development & Jobs	Sector Council Program (SCP) - Manitoba Environmental Industries Association (MEIA)	MEIA is the four-year SCP agreement holder for the Natural Resources, Energy & Environment sector. Funding is provided for workforce training and development activities to assist in achieving sector goals: Support the growth, competitiveness and environmental sustainability performance of companies in Manitoba's: <ul style="list-style-type: none"> • natural resources subsector • energy subsector • renewable energy industries subsector • Environment and Cleantech sector 	<ul style="list-style-type: none"> • Skills and labour gaps are reduced in the subsector • The overall environmental sustainability performance and reputation of the subsectors improves, thereby enhancing competitiveness, attracting investment, reducing opposition and facilitating responsible industry growth.
Skills & Training	Economic Development & Jobs	Sector Council Program	MEIA's Climate Smart program has successfully engaged Manitoba companies from a variety of sectors to help reduce their greenhouse gas emissions.	12 Companies from 10 Sectors of the Economy.
	Economic Development & Jobs	Brandon Energy Efficient Program (BEEP)	Provide skills development support to eligible individuals while participating in skills training required to secure employment. In 2020/21, the department provided individuals with training and skills development supports to attend training in climate and/or green related areas, including: Geoscientists and oceanographers, Conservation and Fishery Officers, Forestry Technologists and Technicians, Inspectors in Public and Environmental Health and Occupational Health and Safety and Land Surveyors.	More than 50 clients were provided training support to attend training in climate and/or green related areas, including: <ul style="list-style-type: none"> • Geoscientists and oceanographers • Conservation and Fishery Officers • Forestry Technologists and Technicians • Inspectors in Public and Environmental Health and Occupational Health and Safety • Land Surveyors



Jobs Pillar

Keystones	Department	Activity	Description	Results
	Economic Development & Jobs	Fort Whyte Farms Program	The Fort Whyte Farms program works with marginalized youth, the majority of whom are Indigenous youth, to teach employment and life-skills through the operation of a social enterprise via the practice of sustainable urban agriculture.	5 Participants
	Central Services	Position Sustainable Procurement in Manitoba (SPM) as trusted partner in sustainable procurement	Procurement and Supply Chain has actively participated in the SPM working group since inception. Discussions this past year have included positioning SPM as a trusted partner for informing sustainable procurement analyses and enhancing integration with the Buying Group (particularly the Business Partner Working Group).	SPM internal discussions completed and initial discussions with the Procurement Centre of Excellence have taken place. Integration is factored into the procurement policy and procedure revisions in progress.
Finance and Investment	Agriculture and Resource Development	Manitoba Protein Advantage Strategy	<p>The Sustainable Protein Action Plan identifies 10 pillars and specific short and long term actions needed to position Manitoba as the leader in sustainable protein industry development. The 10 pillars include:</p> <ol style="list-style-type: none"> 1. measurement, monitoring and verification, 2. soil, ecosystems and biodiversity, 3. branding, communications and marketing, 4. sustainable protein, 5. innovation, 6. finance, 7. working together, 8. information & knowledge, 9. workforce, and 10. enabling policy and infrastructure. <p>The long-term goal for the Action Plan is to strengthen collaboration and accelerate innovation for the Province to realize its collective and equitable potential to producing diverse, high-quality, healthy and increasingly sustainable protein.</p>	The Manitoba Protein Consortium championed a global Sustainable Protein Challenge Dialogue by engaging over 85 stakeholders and working with a Sustainable Protein Design Team of 17 industry leaders from Canada (Manitoba, Ontario and Saskatchewan), the Netherlands and Bulgaria to prioritize strategic actions and identify opportunities for scalable impact within the Manitoba Protein Advantage Strategy. The Protein Consortium has also joined a national coalition along with 37 organizations to develop a National Index to create a verifiable and credible index to showcase “the unique characteristics of Manitoba’s protein industry to the world” through metrics that build consumer trust in both domestic and export markets.
Natural Infrastructure Projects	Conservation & Climate		Environmental Compliance and Enforcement Branch (ECE) - Town of St Pierre Jolys/ RM of La Broquerie/ RM of St. Anne wastewater lagoons using cattails in the final stages of Phosphorus removal prior to discharging. ECE is supporting the initiative, by ensuring limits are met prior to discharge and working with these areas to foster the use of the natural processes.	Opportunity to look at discharge compliance numbers and times since the changes were made.



Jobs Pillar

Keystones	Department	Activity	Description	Results
Innovation and Cleantech	Agriculture and Resource Development	Manitoba Ag Action Manitoba Research and Innovation Activity	Provides grants for applied research, capacity building and knowledge transfer projects that advance the growth and sustainability of the agriculture industry.	Five research projects focused on improving resiliency of agriculture through water management and crop breeding.
	Agriculture and Resource Development	Manitoba Protein Research Strategy	This strategy will identify key research opportunities to enhance the sustainable protein eco-system, which will be critical in positioning Manitoba as a global leader of sustainable protein.	ARD has provided the University of Manitoba with up to \$100K for the development of a new Protein Research Strategy. Engagement was conducted with the research community and industry to identify key protein research priorities under the four pillars of sustainability – society, environment, culture and economy. A Protein Research Chair will be appointed in 2022.



Water Pillar

Keystones	Department	Activity	Description	Results
Wetlands & Watersheds	Conservation & Climate	Develop measure to protect groundwater and recharge areas	Inspect and regulate waste management facilities, petroleum storage facilities, mining operations, and spills through the Emergency Response Teams (ERT) and regional offices to ensure potential pollutants are not introduced to surface or ground water.	Number of inspections conducted year on year so a comparison could be made; would require a data pull and data integrity confirmation. Going forward, continue to identify high-risk areas and pro-actively target these for more frequent and/or extensive inspections.
	Conservation & Climate	Identify potential vulnerabilities to community drinking water sources	Adoption of the microcystin standard and the posting of the operational guidelines and monitoring form, as increased algae blooms are expected to result from climate change.	Not yet Available
	Conservation & Climate	Identify potential vulnerabilities to community drinking water sources	Development of a drinking water system Operational Guideline on Planning for Climate Change.	Not yet Available
Water Quality	Conservation and Climate and Central Services	Improve wastewater treatment to reduce nutrient loading	Working with City of Winnipeg to address legacy issues surrounding pollution control centres to protect receiving waters by reducing the amount of nutrients released. Established a Stakeholder engagement committee with the City of Winnipeg to engage interested organizations in activity on nutrient reduction; established a plan for the City of Winnipeg to make progress on upgrades to the North End Water Pollution Control Centre; worked with the City of Winnipeg on its Master Plan for reducing combined sewage overflows.	Current measures are range bound by ability to complete upgrades. Also Monthly and quarterly reports from the City of Winnipeg on progress.
	Central Services	Materials Distribution Agency (MDA) Green Project	MDA has 260 janitorial/other products which are Eco or green certified. The project is to seek environmentally friendly products to replace non-eco products.	By March 31, 2021, MDA has 267 environmentally friendly products and has replaced 19 non-eco products with greener options.
Wetlands and Watersheds	Conservation and Climate	Work with municipalities, farmer, business leaders & Manitobans to protect water quality	Inspect and regulate waste management facilities, petroleum storage facilities, manure storage facilities, mining operations, and spills through the ERT and regional offices to ensure potential pollutants are not introduced to surface or ground water.	Number of inspections conducted year on year so a comparison could be made; would require a data pull and data integrity confirmation. Going forward, continue to identify high-risk areas and pro-actively target these for more frequent and/or extensive inspections.
	Conservation & Climate		Develop and launch the use of an online hazardous waste generator e-form. By using technology to make it easier to apply and reduce the turn around time for applications, there is more likelihood that industry will make the necessary application, becoming registered sooner and therefore more apt to divert hazardous waste from areas where it may eventually pollute surface or ground water.	Time to service standards.



Water Pillar

Keystones	Department	Activity	Description	Results
Wetlands and Watersheds	Agriculture and Resource Development	Integrated Watershed Management Planning	Led by Manitoba's Watershed Districts, Integrated watershed management planning is a cooperative effort by watershed residents, government and other stakeholders to create a long term plan to manage land and water resources on a watershed basis in Manitoba.	In 2020-21, development of watershed management plans continued in the Boyne-Morris, Roseau, Northwest Interlake and Souris River Watersheds. In November 2020, the East Interlake Watershed District initiated the renewal of the Netley-Grassmere and Willow Creek Integrated Watershed Management Plans, the Pembina Valley Watershed District initiated a first watershed planning process in the Plum-Marais Watershed and Inter-Mountain Watershed District initiated a pilot project to enhance surface water management planning as an amendment to the Dauphin Lake IWMP.
		A Wetland Permanence Classification Tool for the Prairie Pothole Region of Manitoba	This project will fund the completion of a web-based wetland permanence classification tool, capable of distinguishing wetland basins from wetlands of higher permanence. This web-based app will serve as a decision support tool to help watershed districts and conservation organizations efficiently and consistently deliver wetland conservation programming in the province.	Inventory in progress - led by Manitoba Association of Watersheds in partnership with Ducks Unlimited Canada to determine acres of wetlands mapped.
Agriculture and Land Use	Agriculture and Resource Development	Ag Action Manitoba Program - Assurance: Watershed Ecological Goods and Services (EGS)	Ag Action Manitoba is a five-year, \$176 million, all-encompassing program offered to farmers, agriprocessors, industry organizations, researchers and industry service providers. Watershed Ecological Goods and Services grant helps watershed districts to work with farmers to implement sustainable environmental practices.	Water retention and runoff management, wetland restoration and enhancement, soil health improvement, riparian area enhancement, natural upland area rejuvenation and enhancement, land rehabilitation, tree plantings and woodlot management.
		Agriculture and Resource Development	GROW – Growing Outcomes in Watersheds	GROW is a framework delivered by watershed districts and supported by the GROW and Conservation Trusts and many other sources of funding. Priority outcomes for GROW are improved watershed resilience to the impacts of a changing climate, and improved water quality. Delivered by Manitoba's 14 Watershed Districts, these outcomes are supported by activities such as water retention, wetland and riparian area conservation and restoration, buffer establishment, and upland area enhancement throughout Manitoba's 14 Watershed Districts.



Water Pillar

Keystones	Department	Activity	Description	Results
Flood and Drought	Agriculture and Resource Development	Light Detection and Ranging (LiDAR) acquisition at Assiniboine West Watershed District and Inter-Mountain Watershed District	Collection of LiDAR data for the Assiniboine West WD and Inter-Mountain WD for use in planning water management, flood and drought protection projects. These activities assist with capture of LiDAR data for all of agricultural Manitoba but data gaps still remain.	Not yet available
	Agriculture and Resource Development	Conduct distributed storage studies to determine where and how to construct water retention structures for maximum benefit relative to cost.	Work is underway through the integrated watershed management planning process. As part of each planning process, the Water Branch conducts a distributed storage study.	Not yet available
	Agriculture and Resource Development	Drought Management Strategy	TomorrowNow-Manitoba's Green Plan is an eight-year strategic action plan to protect the environment while ensuring a prosperous and environmentally-conscious economy.	Ongoing
Flood and Drought	Infrastructure	Flood Risk Mapping under the National Disaster Mitigation Program (NDMP)	Mapping under NDMP completed in 2019/2020. Department undertook flood risk mapping of vulnerable rivers and waterways, as well as developing internal analyses and policy implications.	Mapping complete and delivered to federal government. Provide flood protection and manage water supply during flood and drought conditions. Provide accurate data so that flood mitigation and water management programs and decisions are made in an efficient, economical and sustainable manner, including flood risk maps, hydraulic and hydrological data.
	Infrastructure	Permanent Outlet Channels (POC) Project (Lake Manitoba and Lake St. Martin Outlet Channels project)	MI continued to advance through the provincial and federal environmental assessment processes. MI received and provided initial responses to technical information requests, met with federal regulators/departments/Technical Advisory Group to discuss the project Environmental Impact Statement, undertook pre-construction field work.	Construction of the Lake Manitoba and Lake St. Martin Outlet Channels Project will enhance flood protection to surrounding area, and help to strengthen Manitoba's existing network of flood mitigation infrastructure. The outlet channels will: <ul style="list-style-type: none"> • Improve water regulation of Lake Manitoba and Lake St. Martin • Reduce the likelihood of flooding on both lakes • Lower the risk of flood related damages and disruption to communities in the area
	Infrastructure	Bridge Resiliency - Implement improved design standards for increased resiliency and adaptation during flood events	Safe movement of goods and people on Provincial Roads including emergency services during significant flood events.	Ongoing



Water Pillar

Keystones	Department	Activity	Description	Results
	Infrastructure	Water Infrastructure Resiliency - Implement improved design standards for increased resiliency and adaptation during flood events	Dam inspections, channel development, flood protection infrastructure, drains and ditches.	Protection of Manitobans from flood events, and drought events, e.g., achieved 1:100 year flood protection for community ring dikes, moving to 1:200 year protection in the red river valley.
	Infrastructure	Maintenance and Preservation of Water Related Assets (Part A)	Operation and maintenance of provincial drains, flood protection structures, and dams; hydrological forecasting; flood risk mapping.	The water-related network of assets are operated to provide flood protection and manage water supply during flood and drought conditions. Provide accurate data so that flood mitigation and water management programs and decisions are made in an efficient, economical and sustainable manner, including flood risk maps, hydraulic and hydrological data.
	Infrastructure	Ice Jam Mitigation Program	Implemented a new delivery model through a private service provider.	Successful ice cutting and breaking in the lower red river valley.
	Infrastructure	The Water Resources Administration Amendment Act was tabled - bill was passed in May/June 2021	Amendments to protect provincial water infrastructure: <ul style="list-style-type: none"> Permits are now required for activities likely to interfere with provincial water infrastructure, such as construction or the removal of fill. 	Timely repairs to damaged water infrastructure and corresponding recovery from individuals/companies who caused the damage.
Water Quality	Agriculture and Resource Development	Water Quality Trading	Work is underway to set nutrient targets for Lake Winnipeg and its tributaries - this is a critical first step in developing a water quality trading program.	Ongoing
	Agriculture and Resource Development	Nutrient Concentration and Loading Targets for Lake Winnipeg and its Tributaries	Manitoba is proposing a Nutrient Targets Regulation under The Water Protection Act that would establish nutrient loading targets for the four major tributaries (Red, Winnipeg, Saskatchewan, and Dauphin Rivers) flowing into Lake Winnipeg and nutrient concentration targets for total phosphorus and total nitrogen in Lake Winnipeg. The proposed nutrient targets will provide important guidance for nutrient reduction activities and provide science-based benchmarks to track and evaluate progress over time.	Ongoing
Water Quality	Agriculture and Resource Development	Nutrient Management Regulation (NMR)	The NMR prohibits construction of nutrient generating facilities and application of nutrients in buffer zones around wetlands, sinkholes and wells. Reviewed nutrient management plans, land application of bio solids proposals, livestock operation proposals, and onsite wastewater management system (OWMS) applications in high risk areas for compliance with NMR buffer zones.	Ongoing
	Agriculture and Resource Development	Integrated Watershed Management Planning	Watershed management plans include information on source water protection.	Ongoing



Water Pillar

Keystones	Department	Activity	Description	Results
	Agriculture and Resource Development	Water Quality Standards for Nutrients in Wastewater	As of 2016, the Manitoba Water Quality Standards, Objectives and Guidelines Regulation (196/2011) require wastewater facilities serving >2,000 people and all government owned facilities to meet a <1mg/L total phosphorous standard.	Completed an annual review of total phosphorus concentrations in wastewater discharge from 104 facilities.
	Agriculture and Resource Development	GROW; nutrient management plans; ban on winter application of nutrients; regulation and restriction of nutrient application based on risk to surface and ground water (nutrient management zones)	In 2018, the Conservation Trust was created by Manitoba with a \$102 million contribution to an endowment fund, managed by The Winnipeg Foundation and administered by the Manitoba Habitat Heritage Corporation. In 2019, the GROW Trust and the Wetlands GROW Trust, were created, bringing Manitoba's total investment in these three trusts to \$204 million. The interest generated from this funding will be used to enhance ecological goods and services on working landscapes through activities such as wetland conservation and restoration, water retention projects, grassland conservation, soil health improvements, buffer establishments (e.g., shelterbelts), and riparian area conservation and restoration. Over time, enhancing ecological goods and services will improve water quality and nutrient management.	Manitoba's Watershed Districts are leading the implementation of GROW. Reviewed soil test-based nutrient management plans, reviewed livestock operation proposals and onsite wastewater management system (OWMS) applications in high risk areas to determine nutrient management zone, varied the date on the winter nutrient application ban based on weather and soil conditions, reviewed proposals for land application of bio solids.



Nature Pillar

Keystones	Department	Activity	Description	Results
Conservation	Agriculture and Resource Development	Boreal Wetland Conservation Codes of Practice	Applying to resource and access roads and crossings in the boreal region of Manitoba, the document follows the mitigation sequence of avoid, minimize, and offset for impacts to boreal wetlands.	Published final version of the Boreal Wetlands Conservation Codes of Practice.
	Agriculture and Resource Development	Assisted Migration	Research trials have been established in spring of 2015 at three replicate sites (i.e., near Menisino, Marchand, and Stead). Seed lots from warmer areas (Minnesota, Wisconsin, and Ontario) are being tested to explore their potential to grow and survive north of their current location/ range (e.g., southeastern Manitoba) as compared to local seed sources.	Five years of growth and survival data have been collected and have been analyzed in 2020; a climate-based seed transfer web application tool has been developed to assist with the identification of suitable seed transfer zones under climate change.
Forests and Natural Areas	Agriculture and Resource Development	Northern Prairie Forests Integrated Regional Climate Change Assessment Proposal	The objectives of the project are to: <ol style="list-style-type: none"> 1. Assist partner organizations in understanding their vulnerability to climate change and variability; 2. Assist partners in identifying adaptation options that can be mainstreamed into planning and decision-making systems; 3. Integrate the results across companies, governments and a large multi-use landscape into a regional assessment of climate change vulnerability with real-world implementable adaptation options for the partner organizations; 4. Provide partners with tools for vulnerability assessment and adaptation planning that can be incorporated into their planning systems after project completion. 	<ol style="list-style-type: none"> 1. Used Canadian Council of Forest Ministers (CCFM) adaptation guidebook approach for forest vulnerability assessment; 2. Used LANDIS II modeling system to integrate the effects of a changing climate and changing disturbance regimes on forest productivity and species composition; 3. Two reports presenting the project results have been written.
	Agriculture and Resource Development	Use of UAVs and Deep Learning for more efficient forest renewal survey for improved forest regrowth and carbon sequestration	<ol style="list-style-type: none"> 1. Individual tree species and crown detection as well as tree height determination; 2. determine if harvest sites meet tree regeneration success requirements; 3. propose necessary mitigation actions to ensure harvest sites are successfully regenerated. 	<ol style="list-style-type: none"> 1. Over 140 forest sites totalling of ~5,620 ha have been flown, the majority of which were on silviculture cut block sites; 2. A UAV-Deep Learning workflow has been developed for individual tree species and crown detection as well as tree height determination.
Parks & Protected Areas	Conservation & Climate	Leading development of a Provincial Trails Strategy working with a province wide network of stakeholders.	Development of an advisory group/ development of what you told us document and a draft strategy/public consultation completed through ENGAGEMB.	A provincial framework for developing new trails and networks and increased development and use and enjoyment of trails by Manitobans.



Nature Pillar

Keystones	Department	Activity	Description	Results
	Conservation & Climate	Ongoing work to upgrade parks and add amenities to enhance the park visitor experience	Falcon Lake road improvements/ completion of Phase 1 of Duff Roblin Provincial Park/ new water treatment plant at Big Whiteshell, upgraded water treatment plants at Grand Beach and Birds Hill Parks/ new playgrounds at six parks / new \$1 million preventative infrastructure maintenance program / enhanced cleaning and sanitizing protocols to keep patrons safe during COVID / new bike trails in Whiteshell.	Keeping Provincial Park visitors safe, and enhancing their visitor experience
	Conservation & Climate	\$16.6 million investment in parks infrastructure	Falcon Lake road improvements/ completion of Phase 1 of Duff Roblin Provincial Park/ new water treatment plant at Big Whiteshell, upgraded water treatment plants at Grand Beach and Birds Hill Parks/ new playgrounds at six parks.	Ongoing
	Conservation & Climate	Resource Tourism Operators Program	In 2020/21, the Resource Tourism Operators Program Issued 425 outfitting licences and 750 associated facility permits to resource tourism operations (e.g., lodges and outfitters) under the Resource Tourism Operators Act.	Number of permits and licences issued annually
	Municipal Relations	Investment of more than \$325,000 in trails for healthy active living	A partnership with Trails Manitoba and the National Trans Canada Trail (TCT) organization to support the development and promotion of a system of recreational trails.	Investment made in 2020
	Municipal Relations	Investment of \$7 million in trails for healthy active living	The \$1-million Trails Manitoba Operating Endowment Fund will serve as ongoing operating funding for Trails Manitoba. The \$4-million Manitoba Trails Improvement Endowment Fund will support annual application based grants to create new trails or improve existing ones. The third fund, a \$2-million Manitoba Trails Strategic Fund, is designed to support capital projects that advance recreational trail development in Winnipeg and will be distributed as matching grants.	Investment made in 2021
Wild Species and Habitat	Agriculture and Resource Development	Conserve species at risk, assess, monitor, protect and recover vulnerable species	Completed species-at-risk (SAR) surveys throughout southern Manitoba to monitor and map populations, assess habitat conditions; provided SAR occurrence data to stakeholders to facilitate stewardship and mitigation of SAR populations and habitat; work with stakeholders to conserve and manage species-at-risk and their habitat.	Area surveyed for species-at-risk: approx. 49,000 ha Number of species targeted for surveys: 20 Number of data requests answered: 991
	Agriculture and Resource Development	Conserve Aquatic species at risk, assess, monitor, protect and recover vulnerable species	Monitor, Assess and conserve aquatic species at risk - especially Lake Sturgeon.	Monitor several significant waterbodies for trends in population abundance; track stocked fish to learn about habitat requirements in the face of drought.



Nature Pillar

Keystones	Department	Activity	Description	Results
	Agriculture and Resource Development	Develop strategy to certify commercial fisheries to meet demands for sustainably harvested fish	Monitor fish populations and adjust management to improve the long-term sustainability of these important fisheries.	<p>Conducted over 40 fish stock monitoring programs to assess fisheries.</p> <p>Provided \$20,000 to support an eco-certification review for the Cedar Lake fishery.</p> <p>Secured over \$650,000 to support future efforts to advance progress towards sustainable fisheries and eco-certification.</p>
	Agriculture and Resource Development	Aquatic Invasive Species (AIS) - prevention programs	Through the public outreach and watercraft inspection programs, inform the public and intercept at-risk watercraft to prevent the spread of AIS.	Inspected >20,300 watercraft in 2020 open water season and >2000 decontaminations of infected or risky watercraft.
	Agriculture and Resource Development	Undertake effective and innovative surveys of big game species and develop harvest co management strategies	Monitor big game populations and adjust seasons as needed. Work with local communities to develop shared management harvest plans to improve the long-term sustainability of these species.	<p>Development of big game management documents to refine species management is ongoing (drafts targeted for completion Fall 2021). Partnering on a project to investigate drone use for big game surveys.</p> <p>Working with communities to establish local shared management committees.</p>
	Indigenous Reconciliation and Northern Relations	\$1 million to support key economic development initiatives	In partnership with Manitoba Agriculture and Resource Development, grant funding of up to \$875,000 will be distributed between the following two initiatives: \$675,000 will be provided to Advance Commercial Fishery Certification and increase market competitiveness for Manitoba's commercial fisheries. \$200,000 will be provided to improve the viability of Manitoba's forest sector by encouraging enhanced Indigenous participation in the forest economy.	Ongoing



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