Figure 1. The City of Selkirk

Prairie Climate Dollars and Sense: Action is Cheaper than Inaction

The City of Selkirk Climate Adaptation Strategy (2019-2029)

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1.0 Introduction

Climate dollars and sense address why climate change is a cause for concern. Different eco-regions are projected to experience notable changes to their seasons, with the Prairies as a potential hotspot for more frequent extreme weather events. Municipalities can take the first action in transforming societies from risk to resilience. With help from climate research agencies, the City of Selkirk is a local example that other Manitobans can follow to build their own plans.

> *"Adaptation is how we as a community respond to changes. ...preparing now is a lot more cost effective, and less harmful socially, and environmentally if we start now and develop those strategies."*
>
> *- CCAS Project Team Member (City of Selkirk, 2019, p.7)*

Figure 2. A view of the Red River.

Figure 3. A frozen Red River.

2.0 Background and Context

Climate Change is an arising concern that has made itself more blatantly alarming over the years. Climate resilience, adaptation and mitigation were only seriously considered and more commonly adopted after changes became more evident in climates across different eco-regions. The Intergovernmental Panel on Climate Change (IPCC) has been a leading advocate of climate change since 1988 (Intergovernmental Panel on Climate Change, 1990). They have addressed climate dollars and sense as an economic measure claiming that preventing climate change is a cheaper option than avoiding it altogether (Nuccitelli, April 2014). Now more agencies and organizations are taking initiatives on climate change like the Prairie Climate Centre (PCC), the Manitoba Climate Resilience Training (MCRT) – funded by BRACE, an intergovernmental funded project – and the Federation of Canadian Municipalities (FCM). The prairies, in particular, are recognized as a "potential climate change 'hotspot' due to their relatively high latitude and location in the middle of the continent" (Prairies Regional Adaptation Collaborative, 2022). Their prediction for climate change in the prairies include:

- The prairies will have a dramatic increase in the winter's average temperatures.
- The prairies' average annual precipitation levels will increase in the fall, winter, and spring seasons, with a potential decline in the summer.
- The prairies are at a greater risk of extreme events such as spring flooding, more intense snowstorms, and higher temperatures combined with static or declining precipitation.
- Potentially more droughts in the summer as evapotranspiration increases.

The 2011 Flooding of the Assiniboine, Roseau and Red River cost almost $700-million, which at the time was considered a 1-in-300-year event (Prairie Climate Centre, 2022). Then in 2014, the most expensive flooding in Manitoba reached over $1 billion. Droughts have continued to persist since 1999, which affect agriculture, tourism, health, hydropower generation, and forestry, including forest fires and dust storms, roughly impacting 41,000 jobs in the Canadian prairies (Prairie Climate Centre, 2022).

3.0 Case Summary

The City of Selkirk is a progressive town that established a Capital Asset Management Program (CAMP) in 2014, which defined baseline levels of service the City is expected to achieve in the future. The six steps outlined in the City's Climate Change Adaptation Strategy (CCAS) framework are integrated into the City's ongoing CAMP activities (City of Selkirk, 2019).

STEP ONE: Get Started

Along with the support of the PCC, experts from the City's service areas who have invaluable frontline experience were included in the planning workshop (City of Selkirk, 2019).

Figure 4. Selkirk's eight service areas.

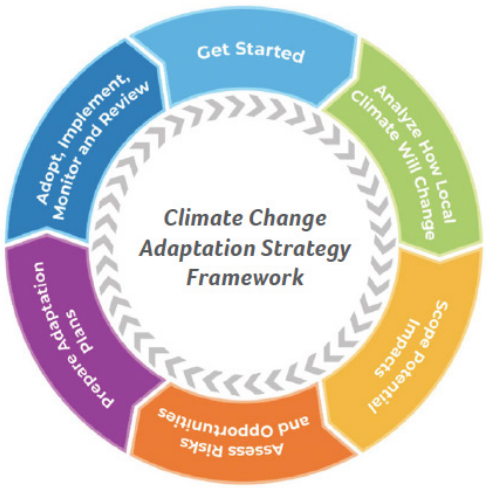

Figure 5. CCAS' six-step framework.

STEP TWO:
Analyze How Local Climate Will Change

This step gathered locally relevant climate change projections by observing trends between climate, weather and climate variabilities (a data comparison between a seemingly random year and variations in weather patterns). A seasonal analysis of weather events considered the climate atlas by the PCC, the CIP's climate adaptation planning framework, and observations of the City of Selkirk team resulted in this list:

- More wind year-round.
- Increase in extremely hot days.
- Less snow precipitation.
- Extreme cold snaps but mild winters.
- Snow later in the year.
- Rainfall more frequently as downpours.
- Low insulating snow with deeper frost.
- Higher humidity levels with warmer summers.
- Lower river levels, especially near freezing times.
- Increased short-term temperature variations.

Ultimately, this anticipated change list was associated with service areas likely impacted. Four likely outcomes were 'shortlisted,' which helped focus the following steps, including:

- More frequent and intense heatwaves
- Warmer winters
- More intense rainstorms capable of causing flooding
- Shoulder season (spring and fall) cold snaps

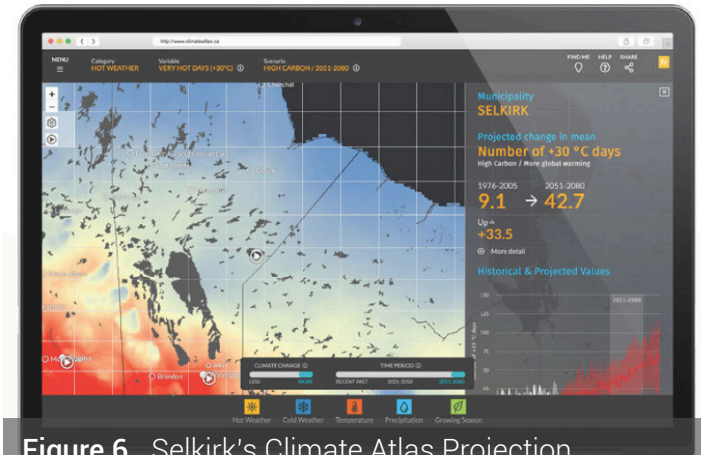

Figure 6. Selkirk's Climate Atlas Projection.

STEP THREE: Scope Potential Impacts

This process generated a list of potential impacts and opportunities that the shortlisted four changes may have on the City. The identified outcomes will impact the municipal services differently per season. The list is further referred to as "consequences" in step four.

> *"The lack of snow cover in the winter creates deeper frost levels. So that creates pressure on our pipes, that creates pressure on our road systems, so then we have more water main breaks, we have more potholes and alligator cracking in our roads."*
>
> *- CCAS Project Team Member (City of Selkirk, 2019, p.26)*

STEP FOUR:
Assess Risks and Opportunities

A risk evaluation matrix activity evaluated the four outcomes and their pre-identified consequences to determine the level of risk they posed for the community. Each was assessed based on the expected magnitude of endangering human lives and the likelihood of occurring in a lifetime. Actions were only developed for consequences deemed high or extreme risk levels.

All the consequences were ranked into a master list following this risk rating (City of Selkirk, 2019, p.32):

No adaptation actions required.

- **Blue – Negligible Risk**

No adaptation actions required at this time.

- **Green – Slight Risk**

Adaptation actions should address these risks.

- **Yellow – Moderate Risk**

Adaptation actions will need to address these.

- **Orange – High Risk**

Adaptation actions must address these risks.

- **Red – Extreme Risk**

These resulted in a priority table acting as a checklist for high priorities. This step was critical as it linked service areas, programs and potential budget to the potential impacts and associated costs.

STEP FIVE:
Prepare Final Adaptation Actions

"Adaptation action planning worksheets" were developed to generate all possible adaptation actions, which were critically ranked with the priorities based on another scoring system (Figure 7). Twenty-two (22) consequences were identified, each having one to five adaptation actions and ranging from 13 to 24. An assessment score of 24 would be the highest with six (6) criteria, each having a maximum score of 4. The higher the score, the more preferred the action (City of Selkirk, 2019, p.36).

Criteria	Score 1	Score 2	Score 3	Score 4
Effectiveness	Minor Contribution to effective management of risk			Vital to effective management of risk and achievement of objectives
Affordability	Requires significant additional budget for implementation			Can be completed within planned budgets
Feasibility	Lack of human, legal knowledge, technical, or administrative capacity to implement			Sufficient human, legal, knowledge, technical and administrative capacity to implement
Acceptability	Significant pushback likely from specific stakeholders, elected officials			Supported by majority of stakeholders, elected officials
Equitability	Has unintended or undesirable distributional effects			Costs and benefit equally shared across community
Flexibility	Difficult to reverse, inflexible			Easy to scale up or down, flexible, no regret

Figure 7.
Evaluation criteria for prioritizing actions.

This evaluation was paired against the calculated investment and annual costs (Figure 8), which aim to help the City's decision-makers prioritize identified climate change actions.

Criteria	Score 1	Score 2	Score 3	Score 4
Investment Cost (Implementation)	$ (<$25,000)	$$ ($25,000-$74,999)	$$$ ($75,000 - $199,999)	$$$$ (> $200,000)
Annual Cost (Recurring)	$ (<$5,000)	$$ ($5,000 - $19,999)	$$$ ($20,000 - $49,999)	$$$$ (> $50,000)
Timeframe (to have action implemented by)	Short Term (< 3 Years)	Medium Term (3-6 Years)	Long Term (> 6 Years)	On Going

Figure 8. Decision-making factors score card.

STEP SIX:
Adopt, Implement, Monitor & Review

This document contains a dynamic strategy enabling the City to have viable options for adapting to climate changes. Visiting, reviewing, and updating the plan as necessary is one of the CCAS' most important characteristics. The identified actions were ensured to have the ability to alter current services as needed that also strongly support the City of Selkirk's 2014 Strategic Plan, which aligns closely with the four priorities below (City of Selkirk, 2019, p.44):

▶ To be a vibrant, safe, and healthy community.

▶ Ensure safe and sustainable infrastructure.

▶ Maximum value from community resources.

▶ Environmental Stewardship

NEXT STEPS: Business Planning Process

One of the biggest challenges in successfully implementing adaptation or mitigation plans is integrating them into pre-existing business and governance systems. The City of Selkirk has linked their developed tactics to the City's CAMP, tracking and accounting for immediate to long-term financial implications. Resiliency is a dynamic process that can relevantly respond to current and future climate changes. Regular reviews and updates should be carried out, reflecting on lessons learned to incorporate into the latest projections and continue to match ongoing strategic priorities.

4.0 Outcomes

The City of Selkirk was the only one in Manitoba to join the FCM's Climate and Asset Management Network. A total of 19 communities across Canada were selected, with Selkirk as the smallest City to join this two-year program for developing an asset management policy, strategy and governance framework (City of Selkirk, 2019). Furthermore, they consulted the PCC's Climate Atlas of Canada, which connected climate model data and community-based stories into a visualized format for all of Canada's regions (City of Selkirk, 2019, p.16). The City's initiative and commitment to mitigating climate change impacts on its community are showcased through these efforts after they experienced detrimental weather events (Climate Atlas of Canada, 2019).

The City of Selkirk's next steps involves a business planning process toward resiliency by addressing the four prominent climate change projections aligned closely with the Prairies Regional Adaptation Collaborative's (2022) predicted prairie climate changes. The City developed tools and resources, including:

- A tactics list aligning the related adaptation action with the City's strategic plan and correlating them with expected implementation in the short-, medium-, and long-term
- Evaluative tools measuring risks based on the magnitude and likelihood of their consequences.
- Adaptation action planning worksheets to ensure project team members consider all possible actions.

Figure 9. The Selkirk Bridge (City of Selkirk, 2019).

Figure 10. The City of Selkirk's Water Tower.

5.0 Lessons Learned

Long-term commitments are required for the feasibility of plans at this calibre to fit the municipalities' budgeting, planning and governance continually. The potential for a community's livability depends on these set infrastructures and systems that anticipate its future. Having steps laid out to measure what can be done about unexpected circumstances is crucial for experiencing less costly consequences. Tracking the history of weather patterns and noting trends from lived experiences help to align the communities' visions in a foreseeable direction.

Planning can take a long time. The City of Selkirk started the CAMP in 2014, but many steps were taken before its establishment. Further on, the council also applied for FCM's Climate and Assessment Network in 2017 to integrate more knowledge into the City's tactical measures. These two initiatives resulted in the City's CCAS 10-year plan.

The responsibility of action ultimately falls onto municipal governments to ensure that their communities have the proper tools and resources for continual growth with as least economic burden (Climate Change of Canada, 2019). The higher governmental bodies may aid through funding and guidance, but the first responders are the cities and towns directly affected to any calamity. The City of Selkirk prepared and operated the CCAS into their long-term budget, allowing them to know the best next step when planning.

6.0 Conclusion

The biggest hurdle is getting started, where budget is often a reasonable excuse. Understanding how climate change differs between eco-regions will directly influence a community's strategic response. Seeking guidance from climate change research advocates can ensure planning priorities identify and address relevant elements. Generating tactics should result in unique tools suitable for meeting diverse needs, like evaluative measures that would help determine key next steps based on projected extremities and occurrences of events. The process might be costly on time and council resources, but intergovernmental agencies began supporting these long-term commitments more. Ultimately, narrowing down viable options between immediate to long-term implementable efforts makes action relatively easier and cheaper than trying to recover from calamities.

The City of Selkirk Climate Adaptation Strategy can be found at: https://www.myselkirk.ca/wp-content/uploads/2019/07/Climate-Change-Adaptation-Strategy-Final-May2019.pdf

Final Thoughts

There are other options like more holistic approaches for action on climate change, such as plans by the Resilient Rurals, the Kainai First Nation and the City of Kawartha Lakes (Manitoba Climate Resilience Training, 2022).

As an evolving nationwide concern, the federal government is an excellent resource supporting climate change adaptive measures at different jurisdiction levels by funding initiatives; more information here:https://www.canada.ca/en/environment-climate-change/services/climate-change/adapting/funding.html

7.0 References

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