Natural Infrastructure and Prairie Prosperity

Current contributions and opportunities for growth in the natural infrastructure sector

IISD REPORT

IISD | Natural Infrastructure for Water Solutions

DELPHI GROUP

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International Institute for Sustainable Development

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Natural Infrastructure for Water Solutions (NIWS) is a 5-year initiative (2022 to 2026) led by IISD to scale up natural infrastructure across the Canadian prairies (Manitoba, Saskatchewan, and Alberta). The NIWS initiative aims for natural infrastructure to be well-understood, adopted, financed, and enabled by policy.

While science and policy are the foundation for this work, IISD is also taking a systems view—looking for opportunities and creative approaches to achieve real impact across the region, working with a network of champions, partners, and decision-makers.

Natural Infrastructure and Prairie Prosperity: Current contributions and opportunities for growth in the natural infrastructure sector

November 2023

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Acknowledgements

Indigenous Lands and Cultures

Indigenous Peoples of the Prairie region are rightsholders with robust knowledge and close connection to their traditional lands and with jurisdiction over their territories. The region we refer to as the Prairies—spanning the provinces of Alberta, Saskatchewan, and Manitoba, is home to incredibly diverse Indigenous lands and cultures, with multiple Treaties, including Treaties 1, 2, 3, 4, 5, 6, 7, 8, and 10. We would like to acknowledge the traditional territories of the Anishinaabe, Cree, Oji-Cree, Dakota, Dene, Assiniboine, Saulteaux, Nakota, Lakota, Blackfoot, Nakota Sioux, Tsuut'ina, Iyarhe Nakoda, and the homeland of the Métis Nation. We offer respect to those who have long lived with and stewarded lands and waters across the Prairies and recognize the ongoing leadership of First Nations and Métis communities. With careful consideration and collaboration, natural infrastructure efforts can be an important part of reconciliation and an opportunity to uphold the United Nations Declaration on the Rights of Indigenous Peoples.

Executive Summary

There is growing momentum across the Canadian Prairies (Alberta, Saskatchewan, and Manitoba) to implement natural infrastructure as an approach to help meet water infrastructure needs (Méthot et al., 2023). Natural infrastructure is a way to plan and work with nature to meet infrastructure needs—for example, water treatment, flood protection, and water supply—while providing a range of social, economic, and environmental benefits.

The scope of the natural infrastructure sector is broad, involving activities to conserve and restore ecosystems (e.g., wetlands, riparian areas) and to actively build with nature (e.g., green roofs) in urban and rural areas.

This study investigates two questions:

1. How much does the natural infrastructure sector, broadly defined, contribute to economic activity across the Canadian Prairies?
2. How might public investment drive future growth in the natural infrastructure sector, contributing to jobs and GDP?

Based on a combination of economic analysis, desktop research, and key informant interviews, the study identifies and classifies industries relevant to natural infrastructure and estimates how the natural infrastructure sector is creating jobs and boosting GDP across the three Prairie provinces.

Jobs and GDP Generated by Natural Infrastructure Today

The natural infrastructure sector on the Canadian Prairies contributes billions to the economy, boosts jobs, and increases resilience in the face of climate impacts like floods, droughts, and wildfires.

In 2022, it is estimated that the Canadian Prairies' natural infrastructure sector directly employed over 33,400 people and contributed over CAD 4.1 billion to Prairie-wide GDP. Looking beyond direct employment and GDP and taking in the broader impacts of natural infrastructure across the Canadian Prairies, the sector supports over 58,500 diverse jobs throughout urban and rural areas, with over CAD 7 billion in economic contributions.

Sector employment includes those involved with the planning, design, implementation, administration, and oversight of natural infrastructure projects—for example, landscape architects, technical and environmental consultants, construction labourers, government and non-government stakeholders, watershed groups, non-profits, and key personnel within local and Indigenous governments.
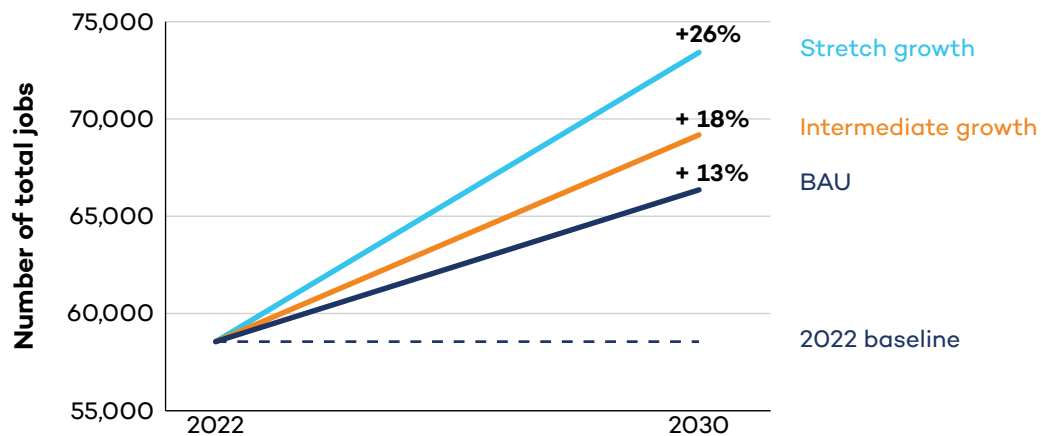
The Opportunity to Grow Natural Infrastructure

At its current rate of growth and investment, or business as usual, it is estimated that jobs in the Canadian Prairies' natural infrastructure sector have the potential to increase by approximately 13%, and sector GDP could grow by 6% by 2030 when compared to 2022 estimates. Two investment scenarios indicate that an additional annual investment of CAD 40 million (intermediate scenario) or CAD 100 million (stretch scenario) across the Prairies in the natural infrastructure sector could boost direct jobs by 18% to 26% by 2030, and direct sector GDP by 10% to 16%.

Scenario analyses show that growing investment in natural infrastructure can yield potential economic impacts, including promising job and economic returns, while aligning with other provincial priorities, informing policy decisions, and enhancing resilience.

Figure ES1. Estimated growth potential in total employment in the natural infrastructure sector to 2030

Source: Authors' calculations.

Capturing the Opportunity

Figure ES2. Three wins when investing in natural infrastructure

Drives Prairie economic growth and jobs

Bridges the water infrastructure gap

Boosts resiliency against severe weather events

Source: Authors' diagram.

Table of Contents

List of Figures

List of Tables

List of Boxes

1.0 Introduction

Households, towns, farms, industries, and businesses across the Canadian Prairies rely on infrastructure to deliver services to support transportation, electricity, food, and water. Water infrastructure is further supported by an intricate system of rivers, lakes, wetlands, and aquifers that sustain vital ecosystems and economies. Increasingly, these systems and services, both natural and human made, are operating against a backdrop of stretched budgets and climate impacts, challenging the infrastructure service delivery that communities depend on. For example, across the Prairies, the depreciation of water-related grey infrastructure (e.g., pipes, water treatment plants) has outpaced investments by almost CAD 3 billion between 2017 and 2021 (Statistics Canada, 2023d).

As urban, rural, and Indigenous communities across the Prairies seek solutions, attention is turning to natural infrastructure to support water infrastructure needs related to flood and drought protection, water treatment and supply, and more. A growing number of people and organizations are leading the way by installing green roofs to manage stormwater, using treatment wetlands to treat wastewater, or managing upstream natural areas for flood protection. By working with nature, including conserved ecosystems, restored ecosystems, and nature-based engineered features (Canadian Council of Ministers of the Environment [CCME], 2021; Méthot et al., 2023), communities can reduce capital expenditures and operating costs, providing benefits to governments, taxpayers, and other stakeholders over more traditional grey infrastructure in some applications. Plus, natural infrastructure brings extra benefits—for example, wetlands can protect against flooding while also storing carbon, supporting biodiversity, and even raising property values in some cases. Importantly, natural infrastructure and grey infrastructure can work together to support more reliable water infrastructure service delivery.

As the natural infrastructure sector grows, employing people in urban and rural areas across the Prairies, there is a need to better understand its contribution to economic development in the region. This report aims to fill that gap.

1.1 Purpose of the Report

This report defines, analyzes, and projects the size of the natural infrastructure sector across the Canadian Prairies. Specifically, this report

- scopes and quantifies the current size of the Canadian Prairies' natural infrastructure sector in economic terms (jobs and GDP) and
- forecasts potential growth scenarios for the Canadian Prairies' natural infrastructure sector, based on varying levels of public investment.

By establishing the current and future economic benefits of natural infrastructure across the Canadian Prairies, this report serves to strengthen the business case for increased funding and prioritization of natural infrastructure to meet infrastructure needs while helping communities across the Canadian Prairies to adapt to climate change.

1.2 Setting the Context

The Canadian Prairies face a range of challenges linked to infrastructure, including an infrastructure funding gap, rising costs, and risks linked to climate change (Loxley, 2022; Méthot et al., 2023). Natural infrastructure is one approach that can help to bridge the funding gap while also increasing resilience in the face of extreme events like flooding or drought. Natural infrastructure harnesses the power of nature to provide infrastructure services, such as flood and erosion protection, water supply and water treatment, and can also provide co-benefits, such as heat regulation and carbon sequestration (CCME, 2021).

In the simplest terms, natural infrastructure enables communities to plan and work with nature to deliver infrastructure services. Natural infrastructure is multifaceted in that its benefits can be realized by preserving natural ecosystems, restoring disturbed or degraded ecosystems, or constructing new features (CCME, 2021).

For the Canadian Prairies, water infrastructure is a daily necessity in managing drinking water, wastewater, stormwater, irrigation, and flood control and protection (Méthot et al., 2023). There is a unique role for natural infrastructure to play in supporting these water services, recognizing that natural infrastructure can often work with existing grey infrastructure (e.g., pipes, treatment plants, etc.) to strengthen the resilience of overall infrastructure and the delivery of services. This is particularly important across the Prairies, which is recognized as a global hotspot for climate change where warming is occurring faster than the global average, altering the water cycle and increasing risks linked to flood, drought, wildfires, extreme heat, and more (Loxley, 2022). Viewed through this lens, natural infrastructure can be a type of climate-resilient infrastructure (Swanson et al., 2021), helping to meet infrastructure needs while also providing an important buffer against major climate risks. Finally, there are important social and economic benefits linked to natural infrastructure—for example, improved livability or recreation in neighbourhoods and, the focus of this report, supporting economic development and job creation.

2.0 Approach and Methodology

This research was conducted in three general steps:

1. **Scoping the natural infrastructure sector:** The project team developed a definitional framework to identify the industries relevant to the natural infrastructure sector, beginning with identifying four relevant subsectors: 1) watershed management; 2) municipal natural infrastructure; 3) education, training, and capacity building; and 4) regulatory and public administration. Relevant industries within each subsector were identified and classified using industry-level codes from the North American Industry Classification System (NAICS). The NAICS system is a standard used by Canada, the United States, and Mexico to classify economic activity by industry.

2. **Assessing the current economic impact of the sector:** The project team quantified the direct, indirect, and induced jobs and GDP for the natural infrastructure sector as a whole and for each of the four identified subsectors (for each province) for the year 2022. The economic analysis was based on "intensity ratios" for each relevant industry, estimating the share of economic activity within each industry reasonably attributable to the natural infrastructure sector.

3. **Estimating the growth potential of the sector:** Three scenarios were developed to estimate the growth potential of the natural infrastructure sector across the Canadian Prairies to 2030: A Business-As-Usual (BAU) scenario, an Intermediate Growth scenario, and a Stretch Growth scenario (see Section 4).

Appendices A, B, and C provide further details on the methods and data sources for the three steps above. These activities involved a mix of key informant interviews, desktop research, and economic analysis. A similar methodology has been used previously to estimate the growth potential of the watershed sector in British Columbia (Delphi Group, 2021) and to estimate the growth potential of the green infrastructure sector in Ontario (Delphi Group, 2020).

Box 1. Direct, indirect, and induced effects

Direct effects are the results of the initial spending in the sector.

Indirect effects are the results of business-to-business transactions indirectly caused by the direct effects. The positive impacts increase if investments flow to the local supply chain of goods and services. For example, for a riparian habitat restoration project, indirect effects may include sales from a local native plant nursery, supplies purchased from a local wholesaler of building materials and landscaping supplies, and equipment rental for an excavator.

Induced effects are the results of increased personal income caused by the direct and indirect effects. As households gain income, they spend money in the community, creating additional jobs and local economic benefits.

Figure 1. Examples of direct, indirect, and induced economic effects
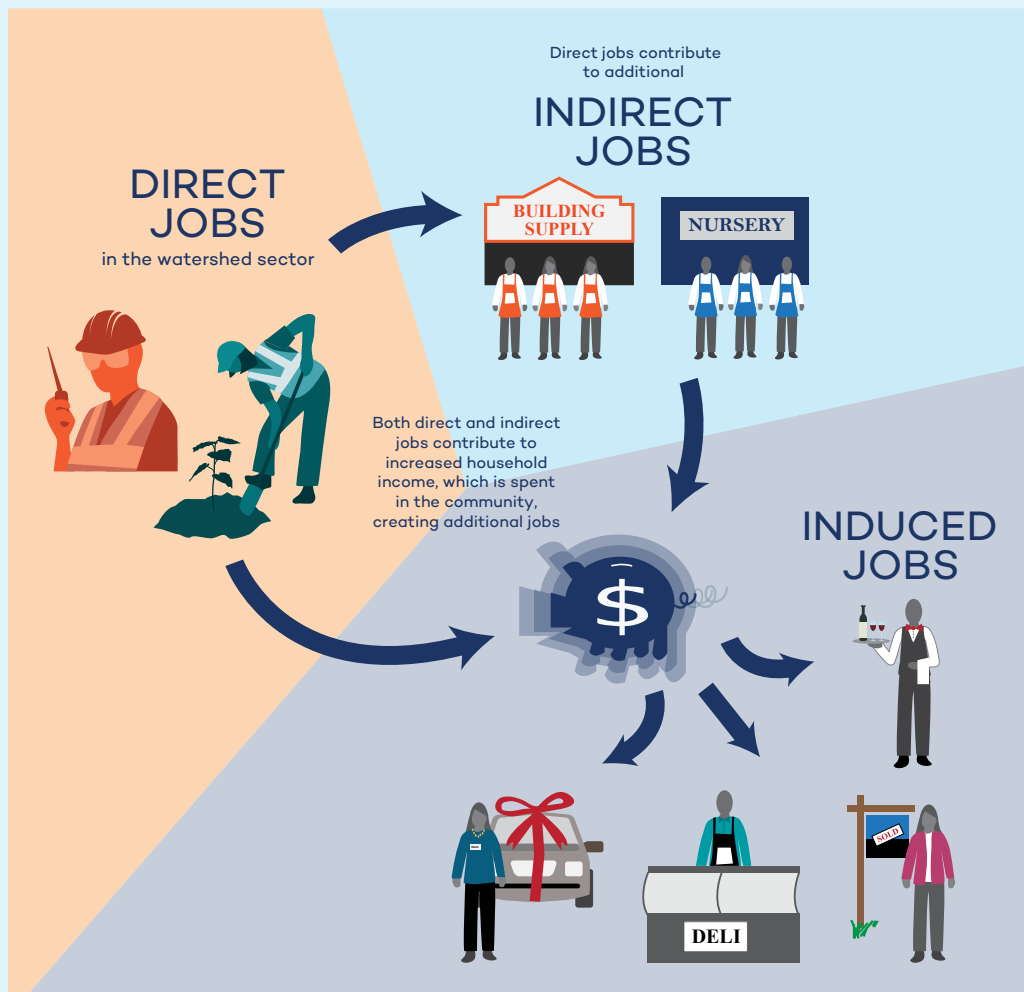
Source: Delphi Group. Adapted from report focused on the watershed sector.

2.1 Scope and Limitations

This report aims to identify the scope of the natural infrastructure sector and estimate the contributions of this sector to Prairie-wide GDP and job creation. It does not attempt to quantify

- the value of natural infrastructure, natural assets, ecosystems, or ecosystem services;
- the full spectrum of industries that rely on natural infrastructure or healthy watersheds;
- the economic losses avoided by investing in natural infrastructure (e.g., if natural infrastructure helps to avoid damages in an extreme flood) (Boyd & Markandya, 2021) or the economic impacts of climate change (Boyd, 2023); or
- the economic, social, environmental, or cultural impacts or damage linked to the loss of natural infrastructure (e.g., loss of intact natural assets).

While this study focuses on the current economic impacts and growth potential of natural infrastructure-related industries and activities, it is important to note the following limitations:

- The results of the analysis are influenced by the definitional framework and the ability of statistical codes and data sources to accurately reflect real-world activity. While efforts have been made to produce reliable and representative estimates, limitations include data sources, time, project scope, and availability of subject matter experts. As such, the findings should be interpreted with these limitations in mind.
- Some of the economic impact occurs because of environmental damage caused by industry activities (e.g., some economic activity from forest restoration occurs only due to previous logging yet is still counted as relevant to natural infrastructure). Potential negative environmental and social impacts of resource extraction are not accounted for in this study.

3.0 Current Economic Impacts of Natural Infrastructure

3.1 Natural Infrastructure on the Canadian Prairies

As governments explore opportunities to stimulate local economies, it is important to understand the current contributions of the natural infrastructure sector, broadly defined, to GDP and job creation across the Canadian Prairies. To help frame the scope of the natural infrastructure sector in economic terms across the Canadian Prairies, the project team developed a definitional framework that includes four major subsectors and key industries.

Table 1. A framework for the economic scope of the natural infrastructure sector

Natural infrastructure subsector	What it includes
Watershed management	Ecosystem conservation and restoration, rural parks, managed natural areas, wetlands, riparian areas, and other privately managed and funded industrial solutions (this includes land/water management activities related to agriculture)
Municipal natural infrastructure	Green roofs, natural stormwater management, urban forests and parks, and other public and municipally funded natural infrastructure (this will account for both urban and rural)
Natural infrastructure-related education, training, and capacity building	Training and educational institutions, civil society organizations, and philanthropic organizations
Regulatory and public administration	Indigenous governments, federal government, provincial governments, and local governments

3.2 The Big Picture: Natural infrastructure jobs and GDP

This section describes the Canadian Prairies' existing natural infrastructure sector, drawing primarily on 2022 data. It quantifies direct, indirect, and induced jobs and GDP for the natural infrastructure sector as a whole and for each of the identified four subsectors.

3.2.1 Prairie-Wide Analysis

Direct Contributions

The natural infrastructure sector directly supports GDP and jobs in the Prairies.

- **33,454 jobs.** The natural infrastructure sector supported 33,454 jobs across the Prairies in 2022.
- **CAD 4.1 billion.** The natural infrastructure sector contributed CAD 4.1 billion to Prairie-wide GDP in 2022, underscoring its crucial function in generating essential goods and services.

Total Contributions

The natural infrastructure sector creates positive ripple effects for GDP and jobs in the Prairies.

- **58,553 jobs.** Prairie-wide jobs jump to 58,533 when factoring in direct, indirect, and induced economic activity.
- **CAD 7 billion.** Prairie-wide GDP is as high as CAD 7 billion, with direct, indirect, and induced economic activity included

Box 2. What are examples of natural infrastructure jobs?

Natural infrastructure requires a skilled workforce to plan, design, implement, manage, and oversee projects, particularly as they affect a broad land base across the Prairies. Natural infrastructure-related work might be in rural or urban communities, in the field with muddy boots, at a desk with design blueprints, or in a government office reviewing spreadsheets. Examples of natural infrastructure-related jobs might include:

1. Watershed management: Restoration ecologist, landscape architect, watershed manager, hydrologist.

2. Municipal natural infrastructure: Urban planner, stormwater management specialist, arborist.

3. Education, training, and capacity building: Training coordinator, program manager, environmental consultant.

4. Regulatory and public administration: Conservation officer, environmental policy analyst.

Economic contributions to jobs and GDP also vary across the four subsectors (Figure 2), with the highest contributions from the regulatory and public administration and municipal natural infrastructure subsectors. Notably, while the watershed management subsector is smaller than other subsectors, it has tremendous growth opportunities, and targeted programming and investment could help realize this potential.

Figure 2. Prairie-wide direct and indirect jobs and GDP across four major subsectors that make up the natural infrastructure sector, based on 2022 economic data

Watershed Management

DIRECT JOBS ⟶ 2,452

DIRECT GDP ⟶ CAD 214 million

INDIRECT JOBS ⟶ 3,906

INDIRECT GDP ⟶ CAD 395 million

Municipal Natural Infrastructure

DIRECT JOBS ⟶ 11,914

DIRECT GDP ⟶ CAD 1.5 billion

INDIRECT JOBS ⟶ 22,089

INDIRECT GDP ⟶ CAD 2.8 billion

Education, Training, and Capacity Building

DIRECT JOBS ⟶ 3,760

DIRECT GDP ⟶ CAD 351 million

INDIRECT JOBS ⟶ 5,455

INDIRECT GDP ⟶ CAD 545 million

Regulatory and Public Administration

DIRECT JOBS ⟶ 15,327

DIRECT GDP ⟶ CAD 2 billion

INDIRECT JOBS ⟶ 27,103

INDIRECT GDP ⟶ CAD 3.3 billion

Source: See the Appendices.

3.3 Provincial-Level Results

The following is a summary of the employment impacts of the natural infrastructure sector in each Prairie province.

3.3.1 Alberta

In 2022, Alberta's natural infrastructure sector directly employed approximately 21,823 people. When considering indirect and induced effects, the natural infrastructure sector provided 39,489 jobs. The sector contributed approximately CAD 2.9 billion directly to the province's GDP, rising to CAD 5.1 billion when considering indirect and induced impacts (Figure 3).

Figure 3. Alberta direct jobs and GDP from the natural infrastructure sector in 2022, by subsector

TOTAL DIRECT JOBS	21,823	TOTAL DIRECT GDP	CAD 2.9 billion
Watershed Management	1,866	Watershed Management	CAD 168,834,000
Municipal Natural Infrastructure	9,529	Municipal Natural Infrastructure	CAD 1.2 billion
Education, Training, and Capacity Building	2,296	Education, Training, and Capacity Building	CAD 232,108,000
Regulatory and Public Administration	8,131	Regulatory and Public Administration	CAD 1.3 billion
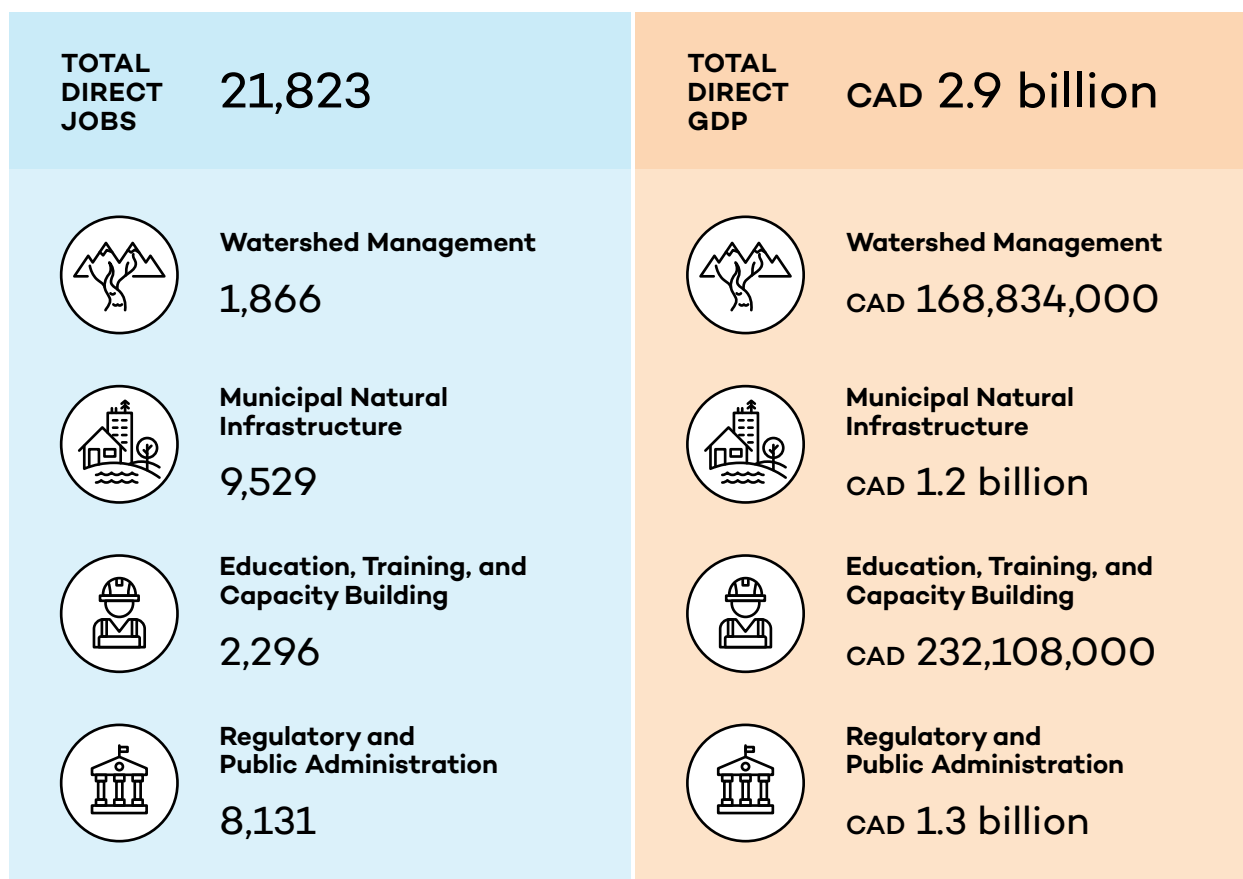
Source: Authors' calculations.

Thanks to Alberta's higher GDP and larger population (Box 3), its proportion of jobs and GDP in the natural infrastructure sector across the Prairies is significantly higher compared to the other two provinces. Results from this study show that around 65% of direct jobs in the natural

infrastructure sector across the Prairies are in Alberta. Similarly, an estimated 71% of direct GDP driven by the natural infrastructure sector in the Prairies is contributed by Alberta (see Figure 3).

Box 3. Alberta's larger GDP and population

Alberta accounts for around 70% of the total GDP of the Prairie provinces, while Saskatchewan and Manitoba account for 17% and 13%, respectively (Statistics Canada, 2023b). The difference in economic productivity aligns with the respective population sizes of the provinces, as Alberta has a population of 4.7 million in contrast to Saskatchewan's 1.2 million and Manitoba's 1.4 million (Statistics Canada, 2023c, 2023f).

According to the 2022 estimates, Alberta also has the highest GDP per capita (CAD 73,742) compared to Saskatchewan (CAD 67,890), Manitoba (CAD 45,480), and other provinces in Canada (Government of Alberta, 2022a).

Thanks to Alberta's higher GDP and larger population, its proportion of jobs and GDP in the natural infrastructure sector across the Prairies is significantly higher compared to the other two provinces. Furthermore, this difference might impact the overall availability of funds to invest in natural infrastructure from each province.

Figure 4. Relative share of GDP and population in the Prairie provinces

Share of GDP:
- 13% Manitoba
- 17% Saskatchewan
- 70% Alberta

Share of population:
- 20% Manitoba
- 16% Saskatchewan
- 64% Alberta
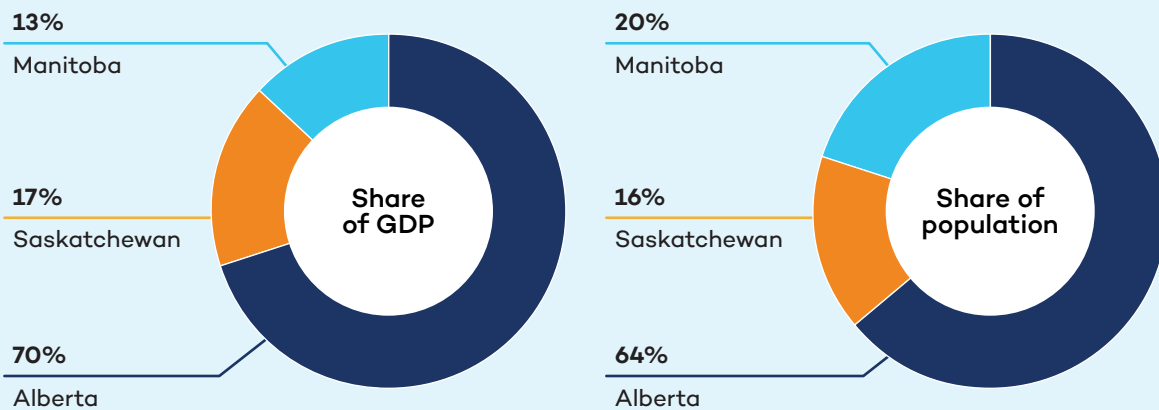
3.3.2 Saskatchewan

In 2022, Saskatchewan's natural infrastructure sector directly employed approximately 5,839 people. When considering indirect and induced effects, the natural infrastructure sector provided 9,496 jobs. The sector contributed an estimated CAD 640 million directly to the province's GDP, which rises to CAD 1 billion when considering indirect and induced impacts (Figure 5).

Figure 5. Saskatchewan direct jobs and GDP from the natural infrastructure sector in 2022, by subsector

TOTAL DIRECT JOBS	5,839	**TOTAL DIRECT GDP**	CAD 640 million
	Watershed Management 265		**Watershed Management** CAD 26,014,000
	Municipal Natural Infrastructure 1,378		**Municipal Natural Infrastructure** CAD 193,698,000
	Education, Training, and Capacity Building 772		**Education, Training, and Capacity Building** CAD 60,287,000
	Regulatory and Public Administration 3,423		**Regulatory and Public Administration** CAD 360,419,000

Source: Authors' calculations.

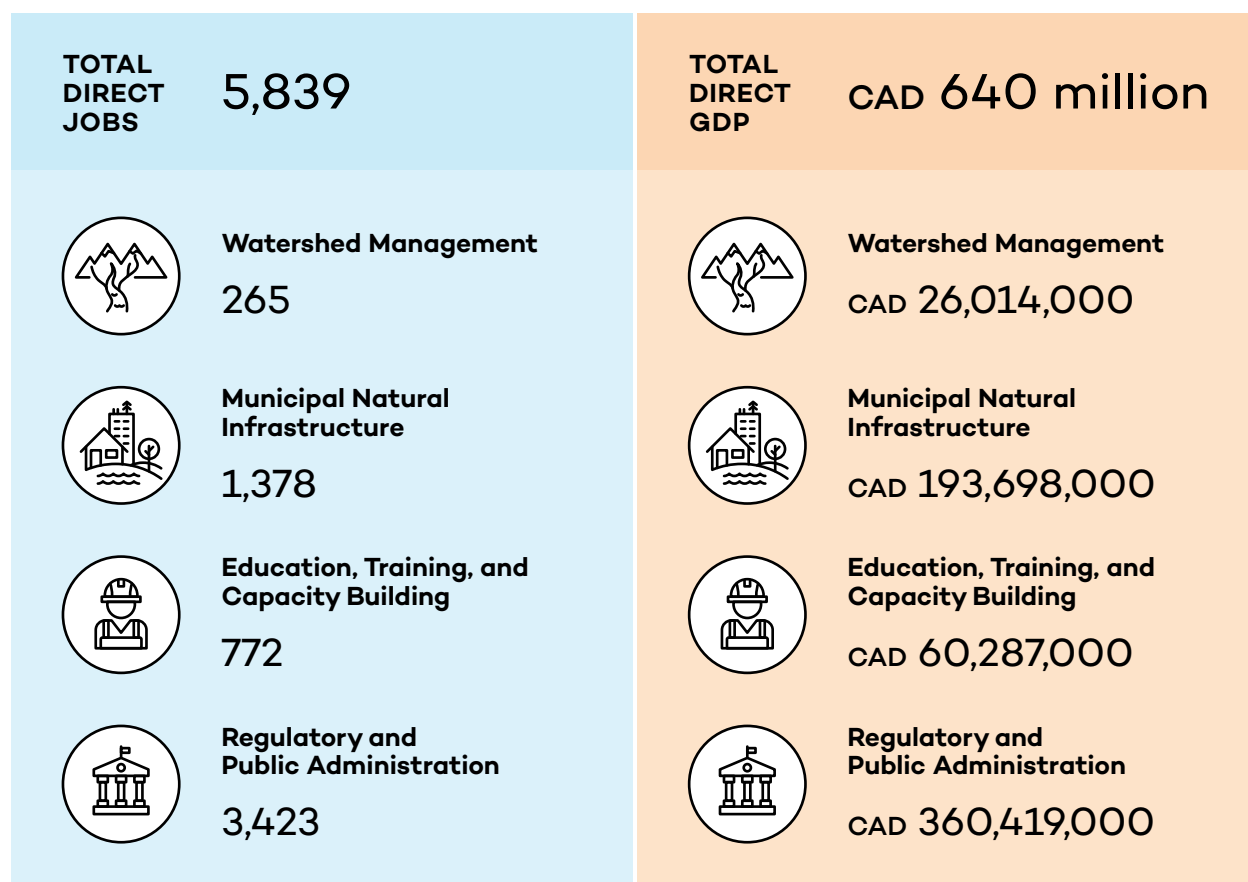### 3.3.3 Manitoba

In 2022, Manitoba's natural infrastructure sector directly employed approximately 5,792 people. When considering indirect and induced effects, the natural infrastructure sector provided 9,569 jobs. The sector directly contributed an estimated CAD 548 million to the province's GDP, and this contribution rises to CAD 925 million when considering indirect and induced impacts (Figure 6).

Figure 6. Manitoba direct jobs and GDP from the natural infrastructure sector in 2022, by subsector

TOTAL DIRECT JOBS	5,792	TOTAL DIRECT GDP	CAD 549 million
Watershed Management	321	Watershed Management	CAD 19,676,000
Municipal Natural Infrastructure	1,006	Municipal Natural Infrastructure	CAD 123,808,000
Education, Training, and Capacity Building	692	Education, Training, and Capacity Building	CAD 58,978,000
Regulatory and Public Administration	3,773	Regulatory and Public Administration	CAD 346,104,000
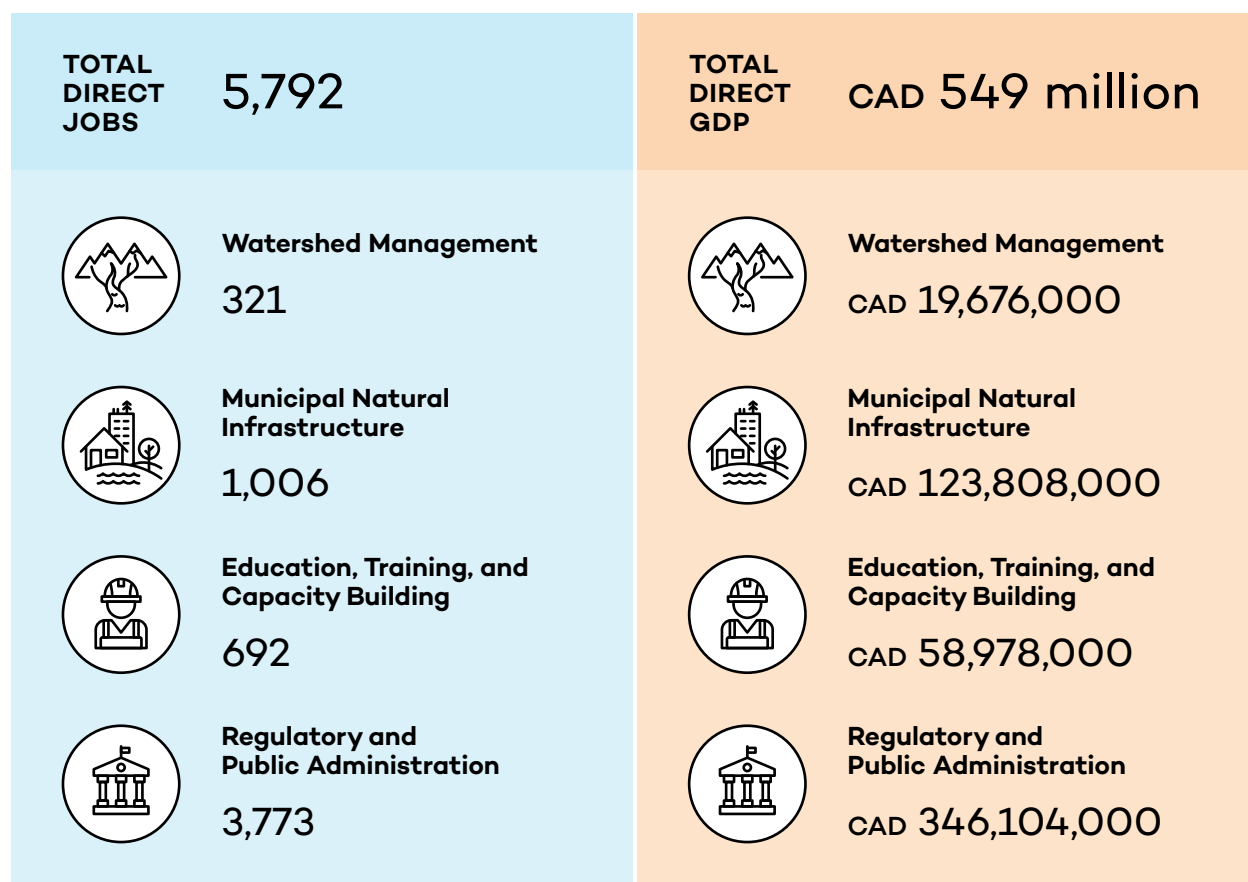
Source: Authors' calculations.
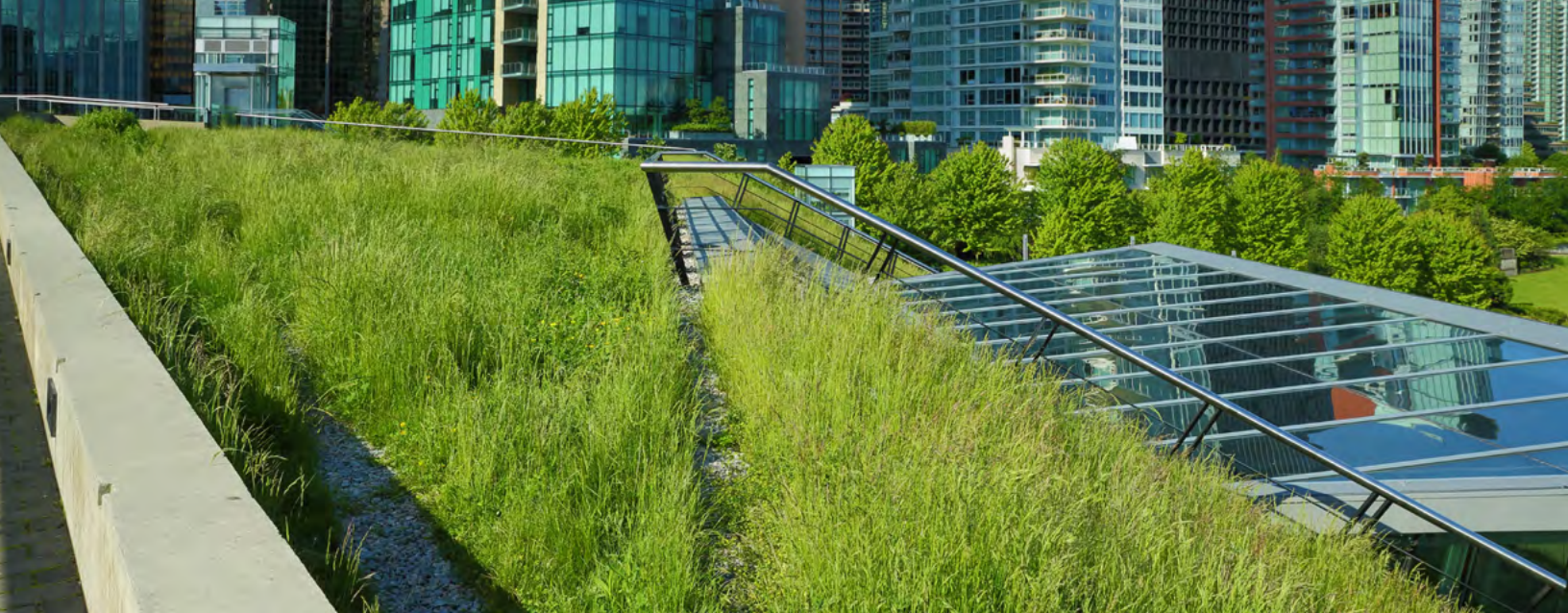
4.0 Forecasting Natural Infrastructure Investment and Sector Growth

This section provides a forecast of the natural infrastructure sector's growth potential to 2030 under three scenarios: (i) a BAU scenario, (ii) an Intermediate Growth scenario, and (iii) a Stretch Growth scenario. Summary tables for all results are found in the Appendices.

4.1 Scenario 1: Business as Usual

4.1.1 What Is BAU?

In this scenario, activities in the natural infrastructure sector will continue to grow based on historical patterns until 2030. Using historical job and GDP data from 2014 to 2022, the BAU scenario estimates the historical compound annual growth rate and applies that to ongoing growth to 2030.

4.1.2 Results

Under BAU conditions, total direct jobs across the Canadian Prairies are expected to grow by 13%, up to 37,823 jobs by 2030. Meanwhile, direct GDP is estimated to reach CAD 4.4 billion by 2030, an increase of 6%. When considering direct, indirect, and induced effects, jobs and GDP rise to 66,356 and CAD 7.5 billion, respectively, by 2030 (a 13% and 6% increase, respectively).

Manitoba

With a 4 % increase compared to the 2022 baseline, Manitoba sees 6,003 total direct jobs by 2030 in the natural infrastructure sector. Direct GDP contribution of the sector is estimated to be around CAD 629 million by 2030, a 15% increase.

When bringing into account direct, indirect, and induced effects, total jobs will increase by 4% to 9,907 by 2030, and GDP will increase to CAD 1 billion by 2030 (a 15% increase).

Saskatchewan

The natural infrastructure sector in Saskatchewan is expected to generate over 7,603 direct jobs by 2030 in the BAU scenario, totalling a 30% increase. With a 23% increase, Saskatchewan's direct GDP contribution in the sector is estimated to be CAD 785 million by 2030.

Total jobs rise to 12,518 by 2030, a 32% increase, when accounting for direct, indirect, and induced effects. Similarly, the GDP contribution rises to CAD 1.3 billion when accounting for the direct, indirect, and induced effects (a 23% increase).

Alberta

Among the three provinces, Alberta leads the group with 24,216 direct jobs by 2030, an 11% increase in a BAU scenario. At CAD 2.9 billion, the direct GDP contribution of the natural infrastructure sector in Alberta is also significantly higher than in Manitoba and Saskatchewan.

Factoring in direct, indirect, and induced effects, a BAU scenario in Alberta could yield 43,931 jobs by 2030 (an 11% increase) and CAD 5.1 billion in GDP by 2030 (a 1% increase).

4.2 Scenario 2: Intermediate Growth Scenario

4.2.1 What Is Intermediate Growth?

This scenario assumes a CAD 40 million per year additional total investment in natural infrastructure sector activities in the three Prairie provinces (combined) from 2022 to 2030. Recognizing the relative sizes of the natural infrastructure sectors in each province, the additional CAD 40 million annual investment is split as follows: 50% in Alberta, 25% in Saskatchewan, and 25% in Manitoba.

4.2.2 Results

The findings from the scenario analysis point to notable increases in jobs and GDP across the three provinces due to greater investment in the Canadian Prairies' natural infrastructure sector. The total yields for jobs and GDP in an intermediate scenario for natural infrastructure sector investment are summarized in Table 2.

Table 2. Job and GDP growth in an Intermediate Growth natural infrastructure investment scenario across the three provinces

Direct jobs and GDP	Direct, indirect, and induced jobs and GDP
39,552 jobs by 2030 *(18% increase)*	69,182 jobs by 2030 *(18% increase)*
CAD 4.5 billion GDP by 2030 *(10% increase)*	CAF 7.7 billion GDP by 2030 *(10% increase)*

4.3 Scenario 3: Stretch Growth Scenario

4.3.1 What Is Stretch Growth?

This scenario assumes a CAD 100 million per year additional total investment in natural infrastructure sector activities in the three Prairie provinces (combined) from 2022 to 2030. The CAD 100 million per year value was chosen to remain consistent with previous research on the potential impact of a Watershed Security Fund in British Columbia, Canada, which modelled the potential economic impacts of a CAD 100 million per year investment (Delphi Group, 2021). Like the Intermediate Growth scenario, the investment is split across the provinces: 50% in Alberta, 25% in Saskatchewan, and 25% in Manitoba.

4.3.2 Results

By increasing the investment value to CAD 100 million per year in the Stretch Growth scenario, the natural infrastructure sector could boost direct jobs by 26% and direct GDP by 16%, compared to 2022, with a similar percentage growth for direct, indirect, and induced jobs and GDP.

Table 3. Job and GDP growth in a natural infrastructure Stretch Growth investment scenario

Direct jobs and GDP	Direct, indirect, and induced jobs and GDP
42,147 jobs by 2030 *(26% increase)*	73,420 jobs by 2030 *(25% increase)*
CAD 4.8 billion in GDP by 2030 *(16% increase)*	CAD 8.2 billion GDP by 2030 *(16% increase)*

Investing CAD 100 million per year in the Canadian Prairie natural infrastructure sector results in 42,147 jobs (26% increase) and CAD 4.8 billion in direct GDP (16% increase) by 2030, as compared to BAU.

Box 4. Boosting sector growth in other jurisdictions

Looking beyond the Prairies, studies in other jurisdictions have showcased the value of investing in the natural infrastructure sector.

For instance, the British Columbia (B.C.) *Working for Watersheds* study (Delphi Group, 2021) forecasted how a CAD 100 million annual investment in watershed security over 10 years could generate 13,000 more jobs and an additional CAD 1.3 billion in GDP by 2030. Since then, the Province of B.C. announced a CAD 100 million investment in healthy watersheds (Government of B.C., 2023) and the joint development of a watershed security strategy with First Nations.

In Ontario, the green infrastructure sector was estimated to have generated CAD 8.6 billion in gross output (revenues) in 2018, and projections indicated the sector has the potential to grow by between 22% and 73% by 2030 if supported by increased investment and new policies (Delphi Group, 2020).

4.4 Summary Results

Figure 7. Projected growth in direct jobs in the natural infrastructure sector to 2030, compared to 2022 baseline

JOB GROWTH Annual investment →	BAU	Intermediate Growth CAD 40 million	Stretch Growth CAD 100 million
Prairies	↑13%	↑18%	↑26%
Alberta	↑11%	↑14%	↑19%
Saskatchewan	↑30%	↑39%	↑51%
Manitoba	↑4%	↑12%	↑25%

Source: Authors' calculations.

Figure 8. Projected growth in direct GDP in the natural infrastructure sector to 2030, compared to 2022 baseline

GDP GROWTH Annual investment →	BAU	Intermediate Growth CAD 40 million	Stretch Growth CAD 100 million
Prairies	↑6%	↑10%	↑16%
Alberta	↑1%	↑4%	↑8%
Saskatchewan	↑23%	↑30%	↑40%
Manitoba	↑15%	↑23%	↑34%

Source: Authors' calculations.

Table 4 provides an overall perspective on the growth rates across three scenarios, including the BAU scenario. These results indicate that investment in the Canadian Prairie natural infrastructure sector has the potential to spur economic growth, much of which is in the form of direct jobs and GDP. For the breakdown of job and GDP growth for each investment scenario per province, see Appendix C.

Table 4. Growth rates compared to baseline (2022): Total for the Canadian Prairies

	2022 Baseline (000s)	**2030** BAU (000s)	**2030** Intermediate Growth (000s)	**2030** Stretch Growth (000s)
Direct jobs	33,454	37,823	39,552	42,147
% Growth	0%	13%	18%	26%
Direct, indirect, and induced jobs	58,553	66,356	69,182	73,420
% Growth	0%	13%	18%	25%
Direct GDP (CAD)	$4,144,863	$4,403,131	$4,571,969	$48,25227
% Growth	0%	6%	10%	16%
Direct, indirect, and induced GDP (CAD)	$7,091,396	$7,504,128	$7,792,693	$8,225,540
% Growth	0%	6%	10%	16%

5.0 Building Momentum

As governments grapple with the need to find infrastructure solutions while supporting good jobs in urban and rural areas, investing in **natural infrastructure is a powerful strategy to strengthen the economy and the resilience of the Prairies.**

Results from scenario analyses show that additional investments of CAD 40 million or CAD 100 million per year in the natural infrastructure sector across the Prairies can expand employment opportunities (Figure 9) and boost GDP.

- An additional CAD 40 million/year investment could boost direct sector jobs by 18% and sector GDP by 10% by 2030.
- An additional CAD 100 million/year investment in the natural infrastructure sector could boost direct sector jobs by 26% and direct sector GDP by 16% by 2030.

Figure 9. Estimated growth potential in prairie-wide direct jobs from the NI sector to 2030
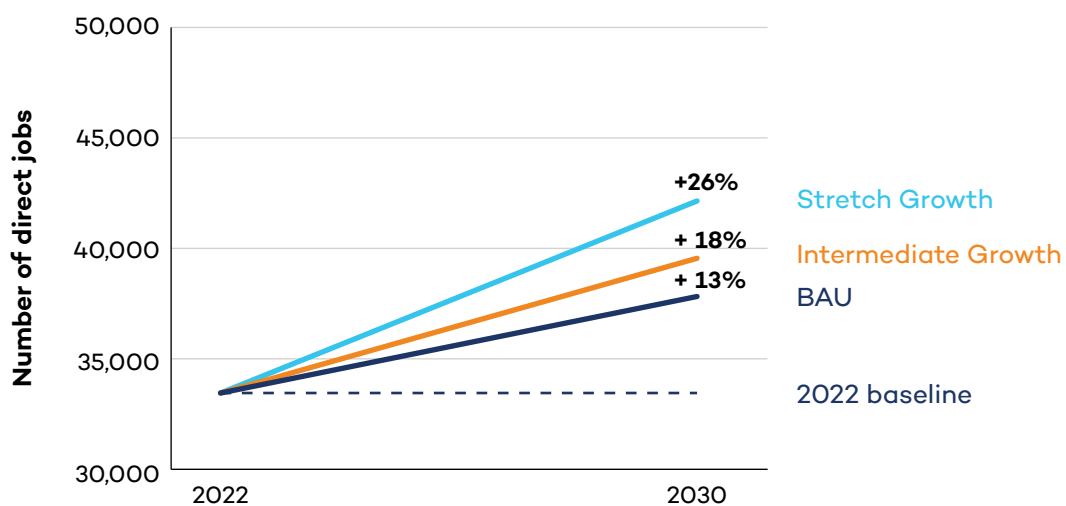
Source: Authors' calculations.

5.1 Practical Considerations

Importantly, Prairie governments are not starting from scratch. There is an opportunity to build on existing strengths and models by investing in and learning from what is working. Table 5 highlights a few examples of notable funding programs from each of the Prairie provinces spanning a spectrum of investments in conserved, restored, and nature-based engineered natural infrastructure types. Additional examples of natural infrastructure funding programs are described in Méthot et al. (2023), although no comprehensive analysis exists for the Prairies or across Canada to our knowledge.

While this study does not make specific recommendations on the types or structures of programs for natural infrastructure investment, results show the economic benefits that could be created for people and industries in Alberta, Saskatchewan, and Manitoba.

Table 5. Examples of provincial funding programs relevant to natural infrastructure

	Description	Examples of natural infrastructure supported through this funding
Alberta	The Watershed Resiliency and Restoration Program aims to reduce the intensity, magnitude, duration, and effects of floods and droughts through natural watershed mitigation measures. Since the program was initiated in 2014, CAD 40 million in funding has been distributed, with CAD 7 million planned for projects in 2023 and 2024 (Government of Alberta, 2022b).	• Riparian buffers • Restored wetlands
	The Alberta Community Resilience Program also supports select types of natural infrastructure, although the focus is on grey infrastructure and supporting long-term resilience to floods and droughts. Program funds are allocated annually and cover 70% of costs up to CAD 3 million and 90% of costs greater than CAD 3 million for design and construction (Government of Alberta, 2023).	• Bioswales • Engineered wetlands
Saskatchewan	The Resilient Agricultural Landscapes Program promotes beneficial management practices for sustainability in agriculture (RealAgriculture, 2023). The program is funded through the federal/provincial Sustainable Canadian Agricultural Partnership (2023–2028), and each province delivers similar programming aligned with its priorities.	• Native and tame grasslands • Riparian management

	Description	Examples of natural infrastructure supported through this funding
Manitoba	The Manitoba government invested CAD 204 million to establish three endowment funds since 2018: the Conservation Trust, the Wetland Trust, and the Growing Outcomes in Watersheds (GROW) Trust. Together, these ensure long-term support for natural infrastructure and conservation initiatives (Government of Manitoba, 2020). As of June 2021, CAD 17.9 million has been granted to fund 119 conservation projects in Manitoba via the Conservation Trust (est. 2018), the GROW Trust (est. 2019), and the Wetlands GROW Trust (est. 2020) (Manitoba Habitat Heritage Corporation, 2021).	• Wetland and grassland conservation and restoration • Riparian buffers • Water retention

Previous research has also highlighted a range of natural infrastructure projects and nature-based solutions already implemented across the Prairies (Eyzaguirre et al., 2023; Horizon Advisors, 2019; Méthot et al, 2023;). There are notable examples in each of the provinces.

Alberta

Okotoks' Resilient Landscapes

The Town of Okotoks has taken important steps to promote natural solutions and resilient landscapes throughout its community. Okotoks installed a bioretention bed with underground water storage that supplies a solar-powered irrigation system that polishes stormwater and reduces water demand. Okotoks also implemented a deeper topsoil bylaw for public space, requiring 300 mm of soil depth beneath turf (as opposed to the more typical 150 mm), allowing for more stormwater absorption and water availability for plants. Okotoks also has a Water Conservation Rebate Program that provides residents with rebates to reduce water use during peak demand and supports long-term conservation with efforts like rainwater harvesting systems and barrels, drought-tolerant or alternative turf, and drought-tolerant vegetation.

Job examples: municipal staff, engineers, construction specialists, landscape architects, landscapers, plant ecologists, and nursery technicians.

Waterton Natural Area

The Waterton Natural Area in southwestern Alberta is a region of native grassland, parkland forest, wetlands, and riparian areas rich in natural assets that support wildlife and a clean, abundant water supply and sequesters carbon. The Nature Conservancy of Canada has

secured conservation protection on approximately 35,000 ha—30% of the Waterton Reservoir Watershed—through conservation easements or by purchasing and leasing land back to ranchers. The collaborative initiative preserves watershed benefits for generations to come and helps ranchers maintain their way of life.

Job examples: farmers, ranchers, biologists, ecologists, agrologists, lawyers, and tourism.

Saskatchewan

Saskatoon's Green Roofs

In Saskatoon, local residents are installing green roofs on their homes. Green roofs, or rooftop gardens, provide multiple ecological and economic benefits, like reducing stormflow and reducing heating and cooling needs for the building. While the total number remains small, residents hope the trend will continue to grow, showcasing how private residents can support natural infrastructure.

Job examples: municipal staff, landscape architects, landscapers, plant ecologists, and nursery technicians.

Dry Lake Coordinated Drainage Network

The Dry Lake project in the Gooseberry watershed is a coordinated approach to agricultural water management that benefits from the collaboration of 73 landowners over 18,000 acres

under a single approval. The project includes the installation of 30 staging culverts for controlled spring water release on agriculture fields and the restoration and retention of 13.8 ha and 8.5 ha of wetland habitat, respectively. The intent is to take a landscape approach to managing water to allow field access, especially in the face of climate change, while reducing the risk of flooding to downstream neighbours.

Job examples: provincial staff, farmers, ranchers, biologists, agrologists, lawyers, and construction specialists.

Manitoba

Winnipeg Naturalized Stormwater Ponds

Across Winnipeg, suburban neighbourhoods have implemented naturalized stormwater ponds, designed and built by Native Plant Solutions, that are surrounded by native grassland species, as opposed to the more common turf grasses. The success of these naturalized systems has resulted in transformational change at the local level, where all new stormwater ponds in Winnipeg must be naturalized. These ponds reduce stormwater runoff and improve local water quality. Additionally, the City of Winnipeg has initiated a major infrastructure upgrade program called the Combined Sewer Overflow Master Plan, which is intended to reduce the impact of combined sewer overflows on the local waterways. In the city's budget, 10% is allocated to green infrastructure solutions, like rain gardens, bioswales, green roofs, rainwater collection, permeable pavement, and green streets strategies that maintain tree canopies, promote healthy soils, and protect existing habitats.

Job examples: municipal staff, engineers, surveyors, construction specialists, landscape architects, urban developers, plant ecologists, agrologists, and agricultural sales (equipment, seed, and inputs).

Sagkeeng Shoreline Stabilization

As part of a riparian restoration initiative, Sagkeeng First Nation is planting hundreds of native trees along shorelines for bank stabilization and protection against erosion, employing local contractors and workers. The trees will also help filter phosphorus to prevent it from contributing to algal blooms in Lake Winnipeg. This Indigenous-led project showcases how natural infrastructure can also support social and economic benefits to communities.

Job examples: First Nations staff, construction specialists, plant ecologists, and labourers.

6.0 Conclusion: Leveraging opportunities to grow the Prairies' natural infrastructure sector

The momentum around natural infrastructure is growing globally, as increased investment in natural infrastructure represents an opportunity to help solve infrastructure challenges while bringing along a suite of environmental and social co-benefits. Governments at all levels play a key role in building and maintaining the infrastructure that our communities depend on. This is especially relevant for Canadian Prairie provinces, as communities look for ways to strengthen local resilience in the face of climate impacts that stress infrastructure delivery.

Based on the research conducted for this study, the growth potential of the natural infrastructure sector is significant.

A CAD 40 million or CAD 100 million annual investment in the natural infrastructure sector could boost direct sector jobs by between 18% to 26% and sector GDP by 10% to 16% by 2030 across the Prairies.

This is even more significant when we consider the natural value and critical ecosystem functions that natural infrastructure provides. While this is starting to be quantified and put on the balance sheet (Eyquem et al., 2022), there are many economic, social, and environmental benefits that come with hybrid and natural infrastructure approaches. These are increasingly important as the projected economic losses linked to climate change across the Prairies become clearer—for example, Boyd (2023) estimates losses of CAD 1.2 billion to CAD 1.8 billion annually from damages to building structures and contents resulting from river and stormwater flooding
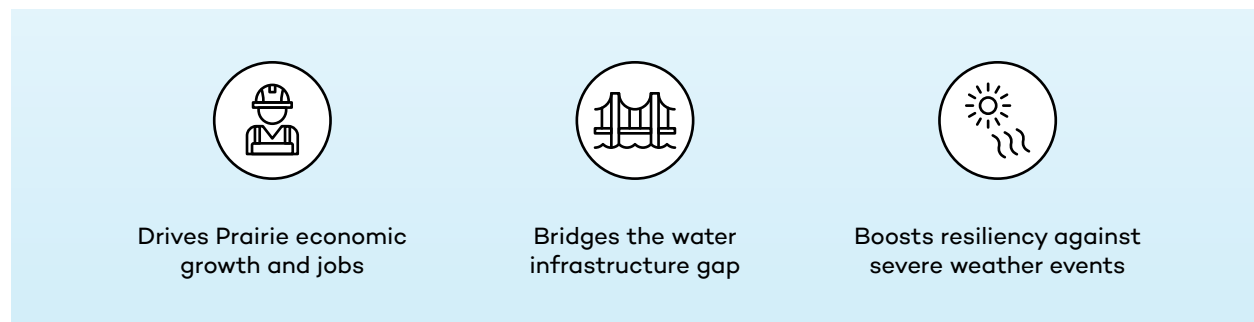
across the Prairies. Importantly, every dollar spent on adaptation measures (including natural infrastructure) saves up to CAD 15 in Canada, including through both direct and indirect economic benefits (Canadian Climate Institute, 2022).

In the coming months and years, building a better understanding of natural infrastructure approaches and tools will help decision-makers determine where to direct increased investments in natural infrastructure while building on existing strengths. Connecting urban, rural, and Indigenous communities to targeted infrastructure support is one key avenue for scaling natural infrastructure while creating jobs across the Prairies. For example, investments in natural infrastructure can be coupled with investments in grey water infrastructure (e.g., pipes, treatment plants), recognizing the need to invest in aging and deteriorating grey water infrastructure while also boosting overall system resilience. Investing in natural infrastructure champions and networks with the capacity to support implementation on the ground—for example, watershed and conservation groups, technical and extension staff, and more—is another key opportunity.

People across the Prairies expect reliable water infrastructure. Working with nature can help, while also contributing to jobs and GDP.

Figure 10. Three wins when investing in natural infrastructure

| Drives Prairie economic growth and jobs | Bridges the water infrastructure gap | Boosts resiliency against severe weather events |

Source: Authors' diagram.

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