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Unlocking the Economic Power of Natural Climate Solutions

Smart Prosperity Institute

Nature United

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The Smart Prosperity Institute is Canada's largest policy think tank and global research network focused on the environment and the economy. We believe that a thriving planet and its people are the pillars of true economic prosperity. Based at the University of Ottawa, we conduct leading-edge research and innovate policies and market solutions to improve environmental, economic and social outcomes for Canada.

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About Nature United

Nature United was founded as a Canadian charity in 2014, building on decades of conservation in Canada. Headquartered in Toronto, our organization has field staff located across the country. Nature United supports Indigenous leadership, sustainable economic development and science, and large-scale conservation primarily in British Columbia, the Northwest Territories and Manitoba. The organization is also working to accelerate Natural Climate Solutions at national and regional scales. To learn more, visit natureunited.ca or follow @natureunited_ca.

Nature United is the Canadian affiliate of The Nature Conservancy, a global conservation organization with more than a million members and a diverse team that includes more than 400 scientists. The global organization works in 79 countries — either directly or through partnerships — to conserve the lands and waters on which all life depends. To learn more, visit www.nature.org or follow @nature_press.

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A note on dollars & units: To facilitate comparability, all financial data has been standardized to 2023 Canadian dollars unless otherwise stated. Where possible, all outcome data is presented on a: (1) per hectare and year basis; or (2) per tonne (t) or megatonne (Mt) of carbon dioxide equivalents (CO_2e) per year basis, unless otherwise stated.

Message to readers: This report is intended to support public- and private-sector actors in Canada to design and implement Natural Climate Solution projects to optimize climate, nature and socio-economic outcomes. This includes Indigenous leaders, businesses and community organizations, non-government organizations and private landowners seeking to reduce emissions and build nature-positive local economies as well as governments and corporate entities working to achieve net-zero commitments.

This report may also be useful to financial sector actors, public and private investors and the public.

This report does not necessarily reflect the views of the funder, nor any of the reviewers. Any errors remain the sole responsibility of the authors.

Key messages

Investing in natural climate solutions (NCS) makes economic sense.

Fully accounting for benefits created by investments in nature can generate returns of more than $US 21 per $US 1 of investment. Properly accounting for these benefits will be key to unlocking the economic potential of NCS in Canada.

Indigenous-led NCS efforts are critical, underway and in demand.

They can be supported and scaled through partnerships that boost the capacity and resource needs that Indigenous communities identify.

Fully value, count and compensate NCS investments.

New accounting methods that recognize the full value of nature do exist. **National project-level guidelines can help combine these approaches to create stronger, more competitive business cases.**

Investing in greater data availability, accessibility and interoperability can reduce up-front costs of data collection for those seeking to advance NCS projects.

Standardizing and improving data collection capacity is emerging as a key priority among private investors. Recent recommendations from the Taskforce on Nature-related Financial Disclosures (TNFD) identify key metrics that can help speed up action.

Scaling investments in restoration.

Restoration projects can be one of the most cost-effective ways to grow the economy with investment returns of up to 30:1. They also reduce emissions and conserve nature. A longer time horizon for restoration investments can help public and private investors hedge their NCS portfolios.

Investing in the right skills, technologies and transitional supports.

New technologies can support research with the knowledge gaps in NCS business cases. They can provide investors with a breadth of accessible data points for analysis. Deploying cost-effective tools to support the design, measurement and implementation can greatly reduce the initial costs of pursuing NCS projects.

Build public-private partnerships to diversify and de-risk action on NCS.

Natural systems do not abide by political or sector-based boundaries. Successfully growing NCS investments in Canada will require an expansion of resources and mandates that go beyond these boundaries to create action-oriented coalitions that can reduce risk and uncertainty during the transition.

Supporting improvements and innovations in emerging offset and credit markets.

Current demand in voluntary carbon and offset markets is comparatively low and inconsistent in Canada. It will be important to develop dynamic baselines, protocols and best practices that can support rapidly evolving nature-based investment markets while also addressing complex issues such as additionality, permanence and leakage.

Executive summary

Canada has a golden opportunity to unlock the economic power of Natural Climate Solutions (NCS). There are substantial risks to not acting, and major benefits if communities, sectors and governments take urgent action to scale investments in these solutions.

The many benefits of Natural Climate Solutions

By better protecting, managing and restoring nature, NCS are one of our best ways to immediately reduce emissions effectively, inclusively and competitively. These solutions include a variety of landscape-specific actions that can reduce or avoid emissions, such as protecting wetlands at risk of conversion, better managing agricultural lands and restoring forests. A landmark study estimated the mitigation potential of investing in NCS in Canada at 78 megatonnes of CO_2e annually, the equivalent of approximately 11% reduction in annual emissions in 2021.[1] Natural Climate Solutions are essential alongside other actions to achieve net zero, such as reducing emissions from fossil fuel use. As a complement to reducing fossil fuel use overall, NCS represent 33% of all potential emissions reductions and can help achieve Canada's 2030 climate targets.

Natural climate solutions also offer other benefits when compared to non-NCS projects:

1. Emissions reductions are substantial and achieved at a comparatively low cost to their technological counterparts. Most are readily scaled and available now.
2. Benefits are created for people and the planet. It is well established that they enhance Canadians' well-being, from cleaner water, flood protection and healthy air to recreation in nature, employment, food security and cultural and spiritual significance.
3. Opportunities are locally led and regionally specific, which helps ensure that Indigenous as well as rural and remote communities are leaders and beneficiaries when it comes to these solutions.

Looking at the big picture of vast emissions reductions, boosted biodiversity and a suite of socio-economic benefits for people, NCS have a clear competitive edge.

However, what has been severely underestimated is how NCS can yield significant economic benefits.

The unrealized economic opportunity of Natural Climate Solutions

Natural Climate Solutions promise economic benefits that are often undervalued, unaccounted for and uncompensated. This results in suppressing investments and leaving money on the table. Canada is missing out, but it is not too late. Compelling business cases that capture the full suite of benefits of NCS can be created to seize this economic opportunity and attract investment that scales and sustains these solutions and their positive outcomes.

Nature is valuable. Canada is home to some of the world's largest forest, prairie, wetland and freshwater ecosystems. These vast natural assets present a significant opportunity to harness the power of nature in driving economic growth while reducing emissions. Fully accounting for that value can support smarter decisions across industry, Indigenous leaders and governments, and lead to more competitive, resilient and profitable land-based businesses. For example, the restoration of forest cover in Southern Ontario can lead to an increase of $6.50 in GDP for every tree planted, amounting to $12 million annually. When it comes to agriculture, investment in nutrient management practices can result in up to $153 in on-farm benefits per hectare each year.

Investors want to put their dollars toward protecting nature's value. Natural Climate Solutions can bolster the profitability and resilience of the forestry and agricultural sectors and offer the potential for substantial capital flowing into rural and remote communities. Projects that implement NCS can create economic returns, such as creating jobs, generating income and increasing profits. Forests Ontario's tree planting efforts in Southern Ontario, for example, are estimated to have created 104 full-time-equivalent jobs. In B.C., adopting improved forest management (IFM) practices can create an additional 2,776 full-time jobs.[2] The Randle Reef project in Hamilton, Ontario is anticipating $168 million in terms of job creation, business growth and tourism. Natural Climate Solutions can also offer financial returns for investors, through traditional and innovative funding mechanisms, such as bonds, funds and carbon credits.

Natural Climate Solutions offer good value for money, especially when fully accounting for benefits that are worth billions annually for people and nature, such as flood protection and water purification. A recent global study evaluated the return on nature-based investments by fully accounting for key benefits to be $US 20 for every $US 1 of investment. Accounting for these values is increasingly critical as droughts, floods and fires are more frequent and intense. Investing in wetland restoration, for example, can reduce future flooding risks, but avoiding the future costs of remediation are not typically counted under current investment practices in Canada. Mitigating these future costs is increasingly salient considering extreme weather, as highlighted by the July 2024 flooding in Toronto and Southern Ontario, estimated to have caused more than $940 million in damage to insured assets.[3] Similarly, in 2013, the Calgary floods cost an estimated $5 billion in damages and prompted the city to consider the protection and restoration of wetlands as cost-effective urban flood management infrastructure.[4] There are significant economic risks Canada will face without action on NCS — and substantial economic opportunity if nature is properly accounted for and invested in accordingly.

Overwhelming public support for Natural Climate Solutions

Canadians strongly support investments in NCS. People care about nature, and they care about the economy. It is time to connect the dots and broaden the understanding that investing in nature is good for the economy, addressing multiple concerns at once.

New polling from Abacus Data commissioned by Nature United shows that 84% of Canadians across the country support the pursuit of more NCS (see Appendix 1). Canadians are ready to stand behind these solutions, with support for NCS coming from a variety of ages, genders, geographies, educational backgrounds and political orientations.

This polling shows that Canadians are deeply worried about losing wildlife, fish and natural spaces. When it comes to nature, Canadians care about matters related to their health, such as clean water and healthy air, as well as environmental issues facing their region, including wildfires in northern forests and protecting coastlines in Atlantic Canada. At the same time, most Canadians are preoccupied with economic concerns, including affordability, cost of living and job security.

Canadians want to see governments and businesses take action to advance NCS. The polling also showed a high degree of support — more than 80% — for the federal and provincial governments to create the conditions for businesses to adopt NCS to achieve environmental, ecological and economic goals.

Connecting the dots between nature, climate action and economic benefit

This new report, *Unlocking the Economic Power of Natural Climate Solutions,* connects the dots between nature, climate action and economic benefit. The report illustrates how NCS offer a major economic opportunity, sheds light on several investment-ready hotspots and outlines key actions that will unlock this economic power for Canada.

Action at scale is lagging in Canada, even though interest in NCS continues to grow and there are cutting-edge demonstration pilots. Record levels of public funding have set the stage for additional action to build momentum to increase public and private investments in line with global trends.[5] There is clear potential to leverage our wealth of natural resources to reduce emissions and stimulate economic growth.

In the first section, *Build better Natural Climate Solutions business cases in Canada*, it becomes clear that compelling business cases that capture financial, climate and human benefits are crucial to attracting interest among public and private investors. Business cases will make sense at a local and regional level and can complement a national strategy for scaling investments in NCS. Clear business cases to advance NCS projects are widely recognized at the international level as a precursor to being able to unlock greater public and private investments.[6] The report outlines how to build better NCS business cases in Canada through eight steps:

1. Developing the project rationale and aligning with NCS principles
2. Identifying a clear value proposition
3. Identifying opportunities for partnership and reconciliation
4. Identifying key project costs and benefits
5. Evaluating ecosystem services and assessing measurement, reporting and verification needs
6. Evaluating project alternatives
7. Evaluating and mitigating project risks
8. Selecting the right funding instrument

The second section, *Unlocking the value of Natural Climate Solutions in Canada,* looks at the state of Canadian grasslands, forests, wetlands and agricultural landscapes. For each landscape, the report highlights the current investment conditions for NCS in Canada by summarizing the state and extent of each landscape type in Canada; identifying the key drivers impacting changes in these landscapes such as threats of conversion or degradation; analyzing the diversity of cost, benefits and value expressions reported across twenty-four NCS pathways in Canada and globally; and advancing a practical discussion of key ecosystem services. The report unpacks cost-effective pathways for grasslands, forests, wetlands and agricultural landscapes to unlock the ecosystem services and economic benefits of each.

The *Assessing the market readiness for Natural Climate Solutions investments* digs into key challenges and opportunities. Four key challenges stand in the way of catalyzing NCS investment in Canada:

1. Data issues that make accounting for and evaluating the benefits of NCS difficult
2. The need to find ways to cost-effectively replicate successful Canadian pilots at scale
3. Slow uptake of international standards for environmental-economic accounting in decision-making processes
4. The need to translate the value of NCS projects into a compelling business case that attracts multi-stakeholder, long-term investment

There are three main opportunities to accelerate action on NCS in Canada:

Enhance:

Properly accounting for benefits will be one of the keys to unlocking the economic potential of NCS in Canada. Fully accounting for benefits generated by investments in nature can generate returns of more than $US 21 per $US 1 of investment.

Building support around Indigenous-led projects. Investing in building partnerships with Indigenous leaders, businesses and communities is necessary to identify where capacity can be enhanced to meet the growing demand for Indigenous-led NCS projects.

Fully valuing, counting and compensating NCS investments. Innovative benefit accounting methods that include the full value of nature are available and national project-level guidelines can help integrate these approaches to create stronger and more competitive business cases.

Encourage:

Investing in greater data availability, accessibility and interoperability can reduce up-front data collection costs for those seeking to advance NCS projects. Standardizing and improving data collection capacity are emerging as a key priority among private investors. Recent recommendations from the Taskforce on Nature-related Financial Disclosures (TNFD) identify key metrics that can help accelerate action.

Scaling investments in restoration. Restoration projects can be one of the most cost-effective ways to grow the economy with investment returns up to 30:1, while also reducing emissions and conserving nature. The longer time horizon for restoration investments can help public and private investors in hedging their NCS portfolios.

Investing in the right skills, technologies and transitional supports. New technologies can support research on the knowledge gaps persistent in NCS business cases and provide investors with a breadth of accessible data points for analysis. Deploying cost-effective tools to support the design, measurement and implementation can greatly reduce the initial costs of pursuing NCS projects.

Enable:

Building public-private partnerships to diversify and de-risk action on Natural Climate Solutions. Natural systems do not abide by political or sector-based boundaries. Successfully growing NCS investments in Canada will require an expansion of resources and mandates that go beyond these boundaries to create action-oriented coalitions capable of reducing risk and uncertainty during the transition.

Supporting improvements and innovations in the emerging offset and credit markets. Current demand in voluntary carbon and offset markets is low and inconsistent in Canada. Developing dynamic baselines, protocols and best practices that can support rapidly evolving nature-based investment markets while simultaneously addressing complex issues, such as additionality, permanence and leakage.

By working across sectors and public-private partnerships, barriers can be addressed to maximize these opportunities to scale NCS investments in Canada more quickly.

Finally, *Hotspots for Natural Climate Solutions investment in Canada* hones in on several hotspots that are ripe for NCS investment: the Southern Prairies Region, Southern Ontario, and B.C., as well as more capacity to support Indigenous-led initiatives in various regions. These hotspots contain at least two different landscape types or can support multiple NCS, experience significant land conversion pressures or historical loss, provide substantial economic opportunities and ecosystem services, demonstrate a supportive policy environment or recent developments related to NCS, and provide opportunities to attract blended finance investments. This section illustrates how a strong business case can be developed and tailored to attract NCS investments in these regions.

It is time to unlock the Natural Climate Solutions economic opportunity

Canada has a golden opportunity to unlock the economic power of Natural Climate Solutions. There are substantial risks to not acting, and major benefits if communities, sectors and governments take urgent action to scale investments. Orienting dollars towards investment-ready hotspot regions would help seize opportunities that are ready now.

Investment from the public and private sector is essential, with nature-based industries, investors and Canadian communities having an opportunity to experience win-win-win rewards. This report lays the groundwork for future action to seize those rewards. It catalyzes further collaboration and the implementation of high-impact solutions. Investing in and scaling NCS can deliver significant benefits for the economy, nature and people today — and for generations to come.

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Introduction

The power of NCS in Canada

Increasing investments in Natural Climate Solutions (NCS) will be crucial for Canada to meet its climate targets while continuing to build a resilient and competitive economy that works for people and the planet.[7] In 2021, a landmark study by Drever et al. (2021) identified the mitigation potential of NCS in Canada at 78 megatonnes of CO_2e annually by 2030, the equivalent of an 11% reduction in annual emissions in 2021.[8]

From the project to policy level, the need to better account for the broader socio-economic and environmental values that NCS provide is growing.[9] Without better accounting, important benefits like building community resilience to climate change, improving physical and mental health outcomes and providing opportunities for meaningful reconciliation will continue to be undervalued, unaccounted for and uncompensated.

There is growing recognition that investing in NCS will be necessary to drive future economic growth in Canada that is more resilient and inclusive. A recent poll indicates **81% of Canadians support private-sector transitions to address climate change**, with strong support (77%–86%) for different levels of government to assist in adopting more NCS.[10]

This is leading to an increased focus on scaling and catalyzing the implementation of several different **NCS pathways** across Canada. As found by Drever et al., (2021), **these pathways can immediately reduce emissions in Canada without compromising economic growth, affordability and community resilience** (Figure 1).

Globally, NCS currently represent 33% of all untapped mitigation potential.[11] The cost-effectiveness of investing in this potential is becoming more apparent. A national study in the U.S. identified the economic return of investing in nature to be $2.4 for every $1 spent.[12] A global study accounting for the broader economic, social and environmental benefits identified a return on investment of **more than $20 for every $1 spent**.[13] While NCS markets continue to evolve in Canada,[14] this comparison helps illustrate the need to better account for the social, environmental and economic benefits of nature to unlock the full potential of NCS.

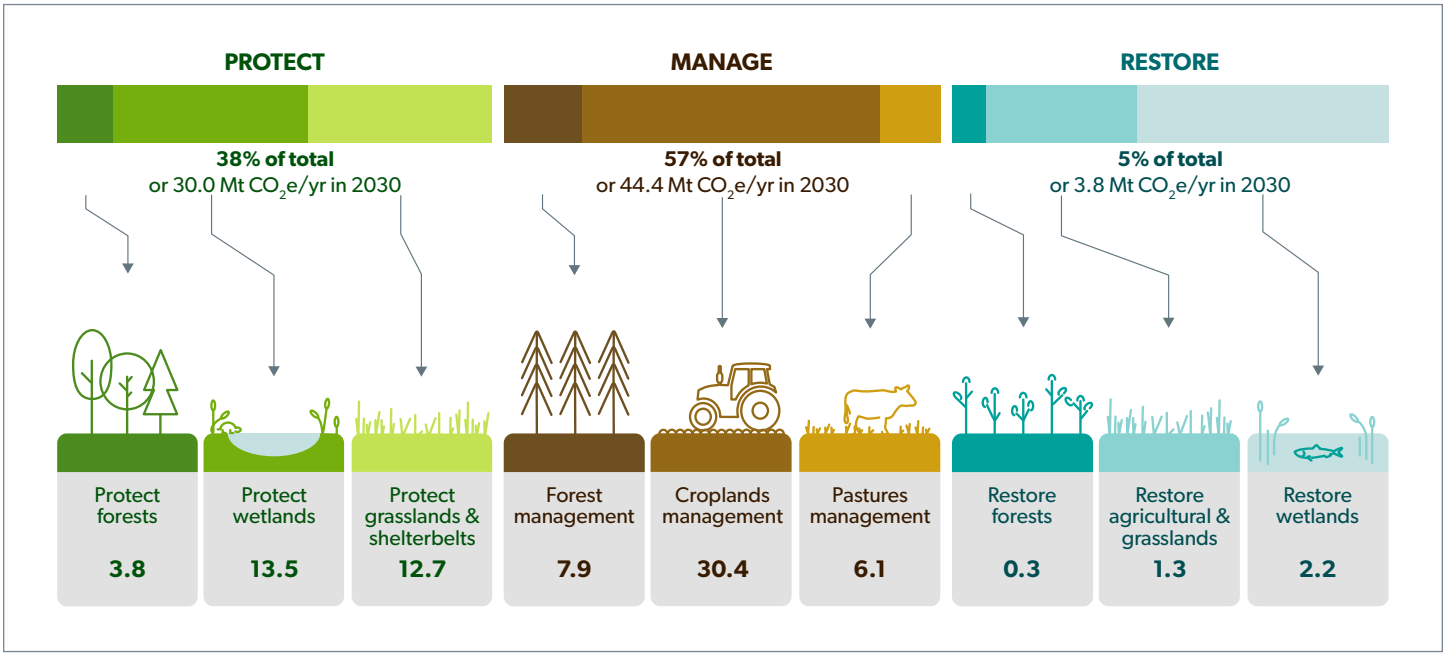
Catalyzing NCS in Canada

Despite substantial potential benefits and a wealth of natural assets, action at scale is lagging in Canada. Cutting-edge demonstration pilots and recent record levels of public funding are ready to support the growing momentum to increase public and private investments in line with global trends.[15]

Four key challenges stand in the way of catalyzing NCS investment:

1. **Data issues make accounting for and evaluating the benefits of NCS difficult**. While improvements have been made in understanding the upfront and opportunity costs of NCS projects in Canada, there are still issues to address. These are significant data gaps, a lack of coordinated efforts to standardize data collection formats or outcomes reporting (e.g., into "per tonne of CO_2e" for mitigation) across initiatives, and disagreement on the right discount rates to accurately capture the size of the impacts.

Figure 1. Potential NCS pathways in Canada



Source: Nature United[16]

2. **Finding ways to cost-effectively replicate successful Canadian pilots at scale**. World-class demonstration pilots that harness the potential of NCS as a cost-effective driver of economic growth and emissions reductions are advancing in Canada.[17] However, in the absence of substantial upfront and ongoing resources needed to get these projects to market, what's needed to replicate success is unlikely to meet the necessary threshold to capture the attention of private investors. Projects end up being too small to attract investor interest, or the amount of resources needed to ensure success makes it too risky of an investment.
3. **Including the consideration of non-monetary values in the decision-making process in Canada.** While emissions mitigation remains the primary goal of NCS projects, there are few effective approaches to compare the full range of ecosystem services provided by NCS projects against their implementation and maintenance costs, effectively making them seem less competitive from an economic perspective.
4. **Translating the value of NCS projects into a compelling business case.** Even when data, replication and integration issues can be overcome, project developers must also create a compelling business case that attracts multi-stakeholder, long-term investment into the project. Creating these types of business cases is still a key challenge for unlocking NCS investment.

Harnessing the economic power and improving the mitigation potential of NCS in Canada will hinge on equipping project developers, policymakers and other supporting actors with the right tools to assess, compare and advance NCS projects across Canada.

To aid in this effort, the objective of this report is twofold:

1. **To improve alignment among public- and private-sector actors** in advancing NCS as a driver of resilient socio-economic growth in Canada
2. **To improve the conditions for decision-makers to explore NCS** that advance social, environmental and economic outcomes.

This report presents logical, step-by-step guidelines for decision-makers across Canada to help clarify the social, economic and environmental advantages of prioritizing NCS investments. It also highlights the existing assessed values of NCS in Canada, highlighting both gaps and opportunities.[18] Each section of this report addresses a different challenge. They also contribute to catalyzing NCS implementation and investment in Canada by:

- Advancing guidelines to select the right project tools and supporting information to Build better NCS business cases
- Compiling the available data and research on the unique economic, environmental and socio-cultural value of NCS to Unlock the value of NCS in Canada
- Highlighting the current conditions in the nature-based investment landscape to Assess the market readiness for NCS investments in Canada
- Identifying where compelling cases for NCS investments exist to create Hotspots for NCS Investments in Canada

The guidelines provided in this report are a starting point for further identifying, measuring and comparing of key socio-economic and environmental evaluation criteria that can help practitioners and supporters recognize that **investing in NCS makes economic sense**.

Section 1: Building better NCS business cases in Canada

Canada's natural systems generate a range of direct and indirect ecosystem services that help people and the planet. These benefits include carbon sequestration, flood mitigation and providing healthy food and clean water, among many others. These benefits are essential to build thriving communities. They can be measured in terms of their monetary value and their positive impacts on ecological systems and socio-cultural well-being (Figure 2).[19]

While the integration and expression of these values are crucial in advancing the cost-effectiveness of NCS, decision-makers have an equally important role in creating a compelling story to engage potential investors: *a business case for investing in NCS*.[20]

Developing a clear business case to advance NCS projects is recognized at the international level as a precursor to being able to unlock greater public and private investments.[21] The guidelines in this section aim to help unlock those investments by equipping NCS practitioners with the right information to appropriately account for the benefits of NCS projects. This step-based approach includes some standard components of business case development, so it is still recognizable and relevant to investors, and includes considerations unique to NCS projects (Box 2).[22]

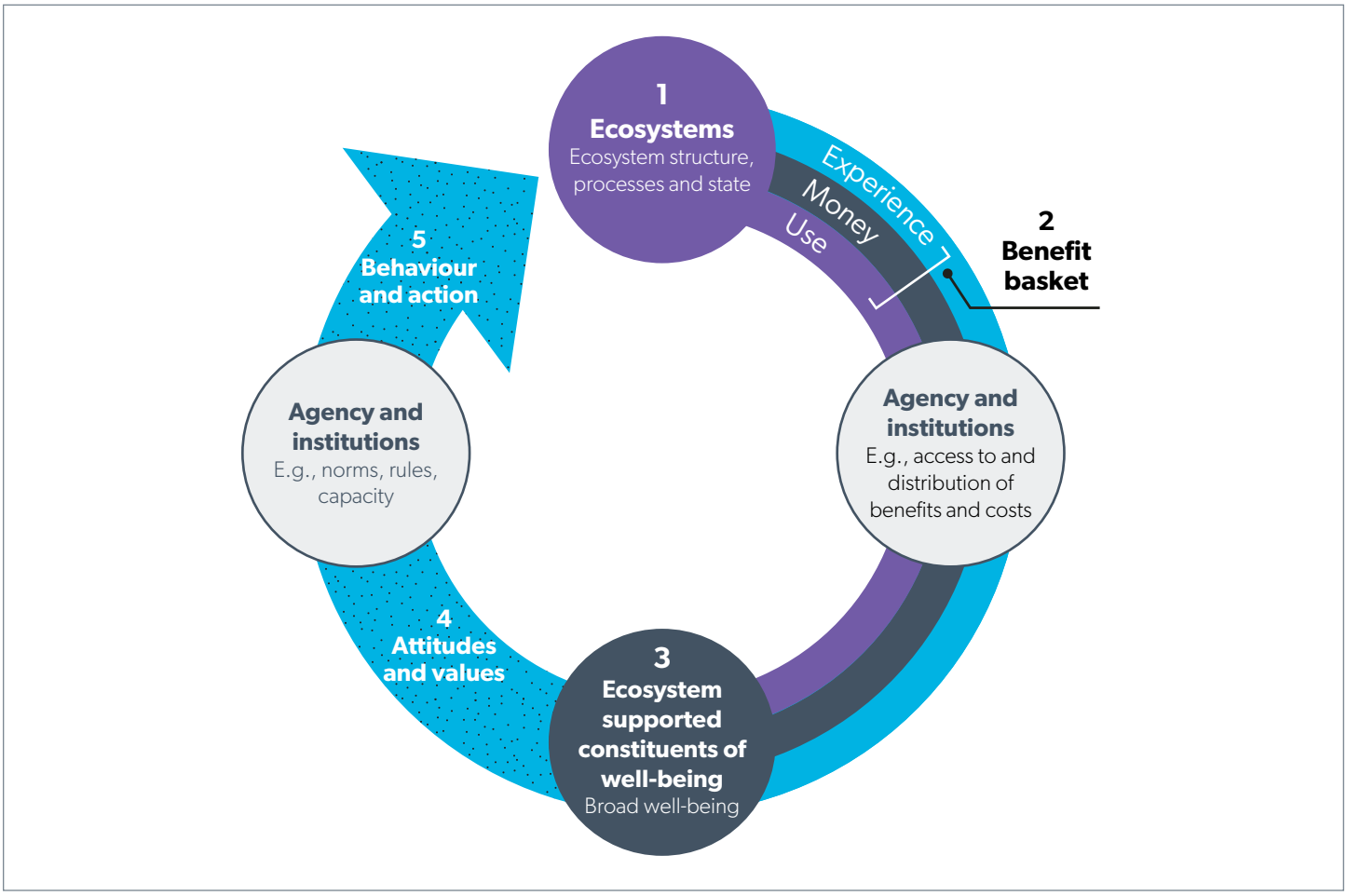
Box 1

Investors and investments in nature-based markets

In finance arenas and capital markets, investors typically expect a competitive economic return on their investments. However, **in the NCS space, investors are often seeking economic returns ranging from market rate to no-net loss**, or even avoided costs, in addition to measurable improvements in ecosystem services and common goods (e.g., clean air, stable climate, etc.). The same investors might take part in both spaces but are likely aware that market-rate economic returns are often eight percent or higher. Returns on blended finance investments, which include funding from public and private entities in the nature-based space typically range from a 2 to 12% internal rate of return (IRR).[23]

For example, investing in wetland restoration can reduce future flooding risks. But avoiding the future costs of remediation are not typically viewed as a tangible economic return under current investment practices in Canada. Mitigating these future costs is becoming increasingly important considering extreme weather, with the July 2024 flooding in Toronto and Southern Ontario causing more than $940 million in estimated damage to insured assets.[24] Examples like this should create a strong business case for the parties that must shoulder the indemnity and remediation costs.

Figure 2. Model illustrating the dynamic relation between ecosystems (1), their benefits to people (2), well-being (3) and people's values and actions (4–5)



Source: Masterson et al., 2019[25]

Box 2

Eight steps to build better NCS business cases

1. Develop the project rationale and align with NCS principles[26]
2. Identify a clear value proposition
3. Identify opportunities for partnerships and reconciliation
4. Identify key financial and non-financial costs or benefits associated with the project
5. Evaluate ecosystem services and assess data or metrics needed for MRV purposes
6. Evaluate project alternatives
7. Evaluate the risks and risk mitigation potential
8. Select the right funding model

These steps are adaptable to different organizations and communities across Canada. They can serve any phase of project readiness from concept to implementation. By following these steps, NCS project developers will be able to:

1. Identify the value of NCS projects and compare against non-NCS counterparts
2. Develop a compelling business case for attracting investment based on direct economic or financial benefits and the provision of relevant ecosystem services
3. Implement (or scale) an NCS project in Canada.

Step 1: Develop the project rationale and align with NCS principles

The first step in designing a compelling NCS business case involves identifying:

- the scope of the project and why it is important (e.g., mitigation potential, types of additional benefits and ecosystem services provided)
- whether the project aligns with NCS principles

NCS projects are a subset of Nature-based solutions (NBS) projects that focus first on climate mitigation and second on co-benefits such as biodiversity, climate adaptation, human health or provisioning services. To ensure that a project aligns with the definition of NCS, project developers can evaluate their projects according to the five principles outlined below in Box 3.

Box 3

Principles of NCS

Figure 3. The five principles of Natural Climate Solutions and their sub-categories

1. **Projects use nature-based approaches** to preserve or enhance the natural state of the ecosystem through human stewardship.
2. **While climate mitigation is paramount, NCS must be sustainable** and can provide additional benefits to biodiversity, food production, wood or fiber production and climate adaptation.
3. **Projects should represent additional outcomes** that would not otherwise occur without human intervention and will persist over time.
4. **Projects should be measurable**, state relevant uncertainties and avoid double counting.
5. **Projects should be equitable and inclusive** of human rights and Indigenous rights to self-determination.

Source: Ellis et al., 2024[27]

Step 2: Identify a clear value proposition

Measuring project success in a way that is aligned with both target beneficiaries' and investors' priorities is crucial to advance successful NCS projects (e.g., beneficiaries being those who benefit from the implementation of the project, such as the public, and investors being those who generate a return of some sort for their involvement, such as a Scope 3 emissions reduction).

There are a variety of potential investors and beneficiaries for NCS, each with a unique set of priorities and objectives (Table 1). This diversity creates a range of opportunities for attracting investment into NCS and will require project developers to unite multiple actors' interests behind one project to maximize success.

The most effective value propositions will find creative ways to benefit investors and the target beneficiaries at the same time. This can be achieved with a better understanding of their current needs and any past or present efforts to solve the identified problem.[28] This type of engagement can help build buy-in for the project amongst the impacted communities or can develop new partnership opportunities.

Community-level engagement is attractive in the NCS space, given the context-specific nature of the benefits associated with each pathway and the diverse set of actors that could be impacted by an NCS project. However, community-level engagement can become costly and time-consuming. Community engagement is vital, and project developers will need to strike the right balance between resource-intensive engagement and buy-in development.

Aligning value propositions to capture interests across different investor groups is another way to improve project buy-in. This means generating value propositions that are aligned across government, industry and Indigenous interests (Table 1). This enables project developers to tap into different funding streams, diversifying and securing more resources for the project. Varying the funding source also helps spread risk. Having a range of investors can build credibility and potentially lead to further investment opportunities.

For example, certain agricultural NCS can reduce emissions in a way that provides direct benefits to farmers and food system actors. It also provides corporations and governments an avenue for achieving crucial climate targets. Flood mitigation programs that protect wetlands and watersheds by using NCS are another well-understood example of a value proposition that can be beneficial to multiple actors.

Table 1. Summary of priorities of different investor types and examples of value propositions

Investor	Common priorities	Example value proposition	Example beneficiary
Governments	Climate or nature targets, risk reduction, economic development, land use, trade, water management, air quality, infrastructure, health	Investments generate greatest public benefits, international competitiveness and reduce indirect costs (e.g., health care)	Public, Indigenous communities, private sector, governments
Indigenous communities	Conservation, community development, health and well-being, economic prosperity, social empowerment, cultural vitality	Investment revitalizes and empowers communities, and creates new jobs or revenue streams	Indigenous communities, public
Farmers and landowners	Profitability, productivity, risk reduction	Investment in better management increases output, reduces risk	Farmers and landowners, public, Indigenous communities, private sector, governments (insurance)
Corporations	ESG targets, market access, social license, access to capital, competitive advantage, risk reduction	Investment enhances access, reduces risk, provides reporting or disclosure benefits and social license	Private sector, value-chain actors, public, Indigenous communities
Financial sector	Market rates of return, risk reduction, diversified investment portfolio	Investment generates cash flow or returns (e.g., salable offsets, food, fibre, interest)	Financial sector, public, Indigenous communities
Insurance	Reducing risk	Investments reduce severity or frequency of indemnity payouts	Insurance actors, public, Indigenous communities

Step 3: Identify opportunities for partnerships and reconciliation

Note: Project developers should be aware that some partners need to be engaged as early in the process as possible, even before defining "Step 1" and especially in cases where Indigenous lands or communities will be impacted.

Given the complexity, reach and importance of natural systems for all peoples across Canada, project developers should explore opportunities for engaging more partners in the implementation of their project. This type of collaborative approach can build credibility and buy-in to the intervention. Potential partners with overlapping interests can be shortlisted during the value-proposition development process.

While the previous step focuses on the design of the value proposition to address alignment between different actors' priorities, this step should focus on how to approach potential partners and the process for working together and sharing data.

Forging successful partnerships to advance NCS projects will often require project developers to answer the following questions:

- Are there equitable arrangements to distribute the project's financial benefits (e.g., revenue from carbon credits)?
- Are there mechanisms to respect and incorporate Indigenous knowledge and practices?
- How are the principles of *free, prior and informed consent* (FPIC) being integrated?
- What type of engagement, consultation or partnership is most appropriate?
- What are the best practices to ensure proper data ownership, governance and privacy?
- What are the best practices to ensure equitable and diverse representation?
- How are roles and responsibilities being defined to manage expectations?

When NCS projects are undertaken on Indigenous territory, Indigenous communities should be engaged as early in the process as possible to respect the rights granted to them under the UN Declaration of the Rights of Indigenous Peoples. One of these rights is FPIC, which represents the right to withhold or withdraw consent at any time when it comes to projects that impact their territories. This type of consent needs to be granted far in advance of starting project activities and must respect community-directed expectations and timelines.[29]

When developing the engagement strategy for Indigenous communities, recent research from the Restore, Assert and Defend (RAD) Network highlights that engagement efforts and requests need to be better coordinated by proponents in the nature-based solutions space. A multitude of similar yet disconnected requests can drain community resources and further stretch capacity.[30]

In addition, these recommendations identify the need to consider the types of tools and resources being used when engaging Indigenous leaders and communities. To develop successful partnerships and engagement strategies, the tools and resources used should be designed to promote the reciprocal sharing of knowledge or information. They should present data in a way that is accessible to Indigenous leaders, youth and community members.[31]

Finally, project developers should be aware that any data collection, use or sharing needs to be governed under the principles of Indigenous data sovereignty.[32]

These principles are defined by the First Nations Indigenous Governance Center as:[33]

- **Ownership** of all cultural knowledge, data and information collectively by the community in line with principles and regulations that determine individual, private data ownership.
- **Control** over granting access and usage permissions for all research, information and management processes to be collectively exercised by impacted Indigenous Nations or their representative bodies. Defining the level of control should be one of the first steps in the exploration of potential projects and extend in perpetuity to any subsequent data governance and management systems.
- **Access** freely granted to all information and data that concern impacted Indigenous peoples and communities, regardless of where it is being held. The principle of access extends to Indigenous peoples, communities and organizations when making decisions on the management and access to collective information resources.
- **Possession** of all data and information that goes beyond simple principles of ownership to understand possession, stewardship and "the mechanism by which ownership can be asserted and protected."

Successfully bringing together Indigenous leadership, governments, industry and civil society to drive action around NCS remains a challenge. But investing in these efforts can help create clear opportunities to accelerate NCS adoption. Partnerships with Indigenous leaders and communities must first acknowledge the rights of Indigenous peoples. Doing so will help develop a common language, terms and procedures that reflect the opportunities for these partnerships to advance NCS in Canada.

Step 4: Identify key project costs and benefits

The next step is to identify the different types of benefits of the NCS project to show the competitive advantage of investing in it. These costs and benefits can include economic costs and returns, the mitigation potential or sequestration rate and any other ecosystem services provided by the project, such as air quality improvements or recreation values.

Although the types of project costs will depend on the type of NCS project, there are three cost categories to consider for NCS projects that go beyond project accounting approaches for non-NCS projects:

- Opportunity costs
- Management and maintenance costs
- Project inputs and equipment costs

Evaluating existing NCS project accounting frameworks

There are an increasing number of ways to account and compare these costs with the benefits that give NCS projects their competitive value. But accurate and accessible support for Canadian practitioners to help apply these strategies is just starting to emerge. CSA Group's national standard on the Specifications for Natural Asset Inventories — a first-of-its-kind in Canada — provides this type of support and encourages decision-makers across Canada to revisit how they think about natural asset management.[34]

Building on the momentum of these landmark standards, decision-makers will need guidance on how to compare the values of NCS projects to standard economic measures of non-NCS ones (e.g., job creation and GDP) and highlight the value of pursuing nature-based approaches.

For the purposes of this report, we evaluated 12 accounting frameworks designed to capture the costs and benefits and determine the value of nature-based projects (Table 2). Each framework was scored based on three categories:

1. **How applicable they are for NCS projects in Canada, at scale?**
2. **How comprehensive and interoperable are the nature-based values?**
3. **How practical are these for NCS decision-makers to use?**

Table 2. Scoring of frameworks for NCS project accounting

Guidelines or resource	Applicable	Comprehensive	Practical
Benefit Accounting of Nature-based Solutions for Watersheds[35]	4	4	5
Canadian System of Environmental-Economic Accounting[36]	3	3	1
Comprehensive Rural Wealth Framework[37]	1	4	0
Comprehensive Wealth in Canada[38]	3	4	1
The Ecosystem Services Toolkit[39]	3	5	5
Gross Ecosystem Product (GEP)[40]	1	1	1
Guidance On the Identification and Assessment of Nature-related Issues: The LEAP Approach[41]	1	5	4
Specifications for Natural Asset Inventories[42]	3	3	3
Natural Capital Protocol[43] Social & Human Capital Protocol[44]	1	5	3
System of Environmental-Economic Accounting — Central Framework[45] SEEA — Ecosystem Accounting (SEEA-CF/SEEA-EA)[46]	1	3	3

See Appendix 2 – Guideline scoring and evaluation criteria for more details.

high low

Of those reviewed, the following two provide the best "out-of-box" guidance for decision-makers:

1. **Benefit Accounting of Nature-based Solutions for Watersheds**
    - Scored high on its practicality for NCS decision-makers
    - Scored lower in applicability due to its scope being limited to projects in watersheds. It would need to be adapted for use in other natural systems in Canada.
2. **Ecosystem Services Toolkit**
    - Scored high on its comprehensiveness in value measurement and practicality for NCS decision-makers
    - Scored low in applicability as it was not-NCS specific and would need to be adapted for NCS decision-makers to use.

None of the frameworks fully address the need to incorporate socio-economic and environmental benefits as part of an economic accounting system capable of unpacking the growth potential of Canada's natural systems. While the value of these benefits can change depending on local contexts, the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services' recommendations on the valuation of nature emphasize that finding ways to identify, consider and compare these considerations are key to unlocking the potential of NCS projects.[47] Developing a "made-in-Canada" approach in line with these recommendations can help projects move beyond the pilot phase and encourage novel innovations.

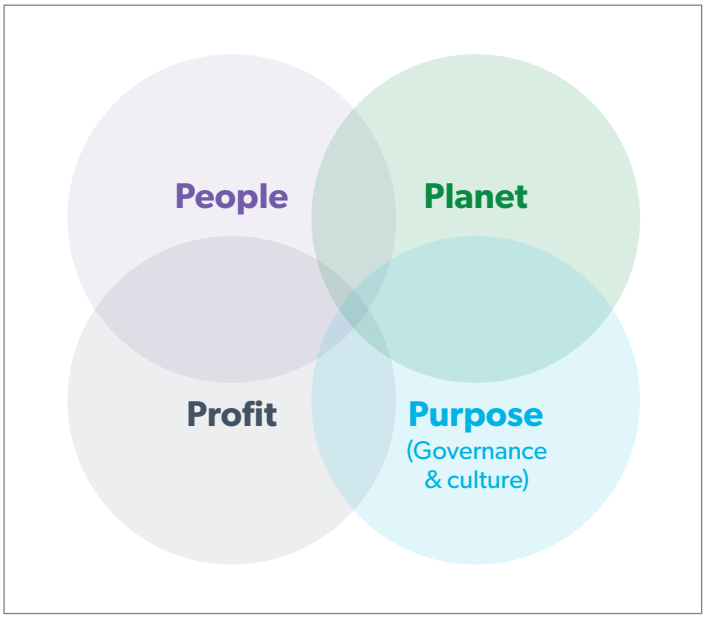
A significant drawback of the examined frameworks is limited guidance and best practices on how to integrate Indigenous values, knowledge and storytelling, and acknowledge Indigenous rights (e.g., data sovereignty) in the consultation process. While the importance of Indigenous engagement is acknowledged in most of the frameworks reviewed, few provide practical guidance, resources or examples to support meaningful partnerships and ongoing consultation with Indigenous leadership, including how to navigate jurisdictional aspects of conducting NCS projects on Indigenous lands or territories across Canada.[48] This extends to little guidance on how to weigh Indigenous values, knowledge and storytelling in the NCS decision-making process.

Similarly, **few examples in existing frameworks address how to incorporate qualitative data more broadly**. Given the challenges in the Canadian context to source the right quantitative data, it is often necessary to rely on qualitative data, or expert-informed models to avoid the risk of discounting nature as a driver of socio-economic growth. These approaches are typically used in the design and development of successful payment for ecosystem services programs or community forest initiatives.

Quadruple bottom-line accounting

To maximize the competitiveness of an NCS project compared to a non-NCS one during the design phase, the existing tools and frameworks are useful to identify project costs and how they stack up against unique NCS benefits, including direct and indirect economic returns and the value of ecosystem services. To help frame this approach to project-level accounting, project developers can consider the impact of their projects using the four Ps of ***quadruple bottom line accounting: Profit, Planet, People, Purpose*** (Figure 4).[49]

Figure 4. Visualization of quadruple bottom-line accounting



This approach expands upon the traditional view of accounting for economic, environmental and social efforts to include governance and/or cultural considerations within the accounting process in the form of ***purpose:***[50]

- A governance outlook can be used to ensure that environmental, social and economic outcomes are achieved in concert and guide fiscal responsibility, engagement and transparency.[51]
- Approaches that operationalize culture in their quadruple bottom line accounting ensure that cultural and spiritual values are preserved when implementing a new management strategy and that any intervention respects the values of the Indigenous communities in the region.[52]

Step 5: Evaluate ecosystem services and assess MRV needs

The need for MRV processes in NCS projects

Once the right set of costs and benefits has been identified, the next step is to evaluate the mitigation potential and ecosystem services relevant to the intended project, while also determining how to measure, report and verify (MRV) the outcomes. This step is vital to attaching clear values to the mitigation and ecosystem services provided by the project so that they can be evaluated against the costs of the project, highlighting the true competitive advantage of an NCS project.

Attaching initial or business-as-usual values to mitigation outcomes and ecosystem services will help establish a benchmark and create a baseline for measuring continuous improvement. The process of establishing the baseline is just as important as ensuring the project will collect the right data to measure, report and verify changes in the outcomes during project implementation. These outcomes will likely be key performance indicators for many of the investors in these types of projects.

Even though both processes are exceptionally important in the NCS space, baselining and ongoing MRV processes can be time and cost-intensive. **Practitioners will need to strike the right balance between MRV accuracy, time and costs while also aligning with investor needs and still delivering an attractive ROI in the project.** Opportunities to streamline and reduce the cost of MRV processes are discussed in Section 3.

Data needs and measurement approaches

To accurately evaluate and measure, report and verify the resulting mitigation potential and ecosystem services of an NCS project, it is important to consider the complexity of natural systems, as well as the challenge of measuring parts of these systems as discrete entities. Accurate measurements that can illustrate the clear value of pursuing NCS projects should include changes in ecosystem functions against a clear project baseline, and how these changes impact investors and beneficiaries.

Value measurements are typically developed using one of the following approaches:

1. **Final ecosystem services** measure the values of these services based on their use, enjoyment and appreciation by different people
2. **Measurable ecological processes** measure quantifiable ecological outcomes, such as nutrient cycling functions measured by changes in soil nutrients over time
3. **Benefit-specific and spatially defined approaches** measure the impacts of specific ecological functions on predetermined economic outcomes, such as shoreline restoration reducing future damage costs.

Table 3 identifies a range of ecosystem services, relevant ecological metrics and associated data needs to give project developers a starting point when developing their business cases and the associated data needs for MRV processes.

Table 3. Examples of ecosystem services and data requirements[53]

Project benefits	Ecosystem services	Ecological metrics	Data needs
Emissions reductions	• Soil formation and fertility • Carbon uptake • Air quality • Erosion control • Regulating services	• Soil health and properties • Soil organic carbon • Carbon storage in trees or other vegetation • Stocks and fluxes of greenhouse gases	• SOC concentrations • Biomass carbon estimates • GHG fluxes • Activity or input use data
Water management	• Sediment retention • Flood resilience • Water filtration • Waste treatment	• Soil moisture • Water levels • Storm surge boundaries • Baseflows • Contaminants • Dissolved O2 • Turbidity • pH • Bioindicators • Nitrates • Temperature • Contaminants	• Hydraulic and hydrological data • Weather data • Water table • Removal rates • Remediation costs
Provisioning and supporting services	• Nutrient cycling • Biological control • Wildlife habitat • Genetic resources • Pollination • Food, fiber, fuel, timber	• Soil fertility • Species richness and abundance • Biodiversity • Agricultural outputs • Natural resource availability • Land use	• Natural accounting inventory • Agricultural yields or production data • Species monitoring, nesting sites, breeding pairs, etc. • Water availability • GIS or activity data
Community well-being	• Spiritual/cultural values • Recreation	• Biodiversity • Habitat quality • Species abundance	• Visitation • Health outcomes • Tourism statistics

Step 6: Evaluate project alternatives

Currently, cost-benefit analyses are the standard approach to evaluating project alternatives to compare NCS and non-NCS projects based on the attributes identified in Steps 4 and 5. While this approach is standard across the public and private sectors and is relatively easy to translate across different scales and landscape types, **this approach is not always the best option for evaluating the merit of NCS projects.**[54]

This is generally due to the limited scope of cost-benefit analyses (e.g., outcomes and timeline), the fact that NCS project benefits typically increase over time and the discount rates typically used to compare NCS and non-NCS projects.[55] Other methods, like lifecycle accounting approaches, cost-effectiveness analysis and multi-criteria assessments are likely more appropriate for evaluating NCS projects.[56] Table 4 describes some of the benefits and limitations associated with each approach.

1. **Lifecycle costing and lifecycle analyses** estimate the costs and benefits of an intervention over the entire life of the project. These approaches do a better job of evaluating the range of economic, environmental and social outcomes associated with NCS projects when compared to traditional cost-benefit analyses.[57]
2. **Cost-effectiveness analyses** measure project benefits using "natural units" — the efficiency of specific interventions in supporting public health outcomes. These approaches are more widely used for health interventions and use fewer cost assumptions to determine overall project benefits, leading to more accurate analyses.[58]
3. **Multi-criteria assessments** (MCA) use a semi-quantitative approach to creating predefined assessment criteria that can be used to assess project alternatives. This approach can be tailored to local contexts and can incorporate criteria from each of the quadruple bottom-line categories.[59]

Table 4. Assessment of different NCS project evaluation approaches[60]

Approach	Scope	Benefits	Limitations
Cost-benefit analyses	Upfront project costs weighed against benefits	Easy to understand Widely used Easy to compare across projects or jurisdictions	Difficult to integrate social and environmental benefits Limited distinction between short- and long-term benefits Standard discount rates disadvantage nature-based projects
Life-cycle costing	Upfront and long-term management and maintenance costs, as well as benefits accrued later in project life cycle	Less resource intensive than an MCA Accurate assessment between NCS and non-NCS project options Easy to replicate across cases	Sensitive to discount rates in long-term cost assumptions Less able to integrate climate risks Connection to benefits may not meet threshold to attract investors
Cost-effectiveness analyses	Efficiency of different project options for achieving a predetermined objective	More accurate when cost assumptions are limited Able to consider variety of means in measuring project outcomes Project outcomes are comparable Benefits from strategic partnerships	Comparisons across jurisdictions and different project outcomes are limited Requires expert input to determine accuracy of potential project outcomes Limited capacity to understand the distribution of project outcomes to beneficiaries
Multi-criteria assessments	Balanced consideration of qualitative and quantitative data, alongside social, economic and environmental costs or benefits	Integrates stakeholder engagement in project planning and design Provides a framework to include a diversity of considerations in project planning — environmental, health, social, economic, etc.	More time-consuming, collaborative ranking of project priorities can lead to stakeholder conflicts during project design Can be a challenge to scale Locally specific evaluation metrics — may limit cross-jurisdictional comparison above the micro-meso level Can produce highly subjective project-level decision-making structures

Step 7: Evaluate project risks and risk mitigation potential

Undertaking a project risk assessment is a necessary step to ensure a cost-effective and successful outcome, regardless of the project type. Compared to non-NCS projects, risk assessments for NCS have not reached the same level of standardization. This is in part due to persistent challenges of comparing assessment metrics, measures and approaches across NCS projects and the overall lack of a clear consensus on the appropriate measures to weigh the different risks associated with nature-based projects.

While there is a growing number of approaches and examples of how to weigh the immediate and long-term risk profiles of different NCS projects (e.g., Risk and Return on Investment Tool or Natural Assets Initiative), these approaches often adopt measures that are incompatible with the dynamic and reciprocal functions of natural systems. Simply put, **NCS represent a significant opportunity for risk mitigation in value chains and communities across Canada** (Box 4), but they are simultaneously exposed to the same risks they mitigate.

Box 4

The power of NCS in risk mitigation

Prioritizing the conservation, management and restoration of natural landscapes can reduce the severity of natural disasters, extreme weather and adverse health impacts. For example:

1. Conserving wetlands can be a critical tool for providing increasingly needed flood mitigation benefits valued at more than $8,800 per hectare per year in a North American context.[61]
2. Wetland restoration can also provide significant benefits in terms of flood risk reduction and the restoration of vital ecosystem services (e.g., water filtration). Restoring coastal wetlands in Louisiana is providing a $17 return in ecosystem services for every $1 invested.[62]
3. Investing in Indigenous Guardians programs is also emerging as a cost-effective strategy to reduce the costs and response times of first responders, while increasing the overall risk mitigation capacity of Indigenous communities across Canada. The Coastal Watchmen in British Columbia identify a per incident cost savings of up to $19,000, and 4.3 million in improved wildfire monitoring.

These impacts speak to the potential for risk reduction through selecting NCS projects and should be highlighted by project developers to keep their projects competitive.

Assessing the risk reduction potential of NCS projects

Being equipped with the right tools, e.g., RROIT, enables project developers to consider a variety of scenarios and metrics related to flood risks. This allows them to report on things like urban and basement flooding risks or health and safety outcomes.[63] Reporting on these outcomes by developing a series of scenarios that represent both baseline and intervention conditions will highlight the change in risk levels expected from the implementation of the NCS project, advancing the argument for action within their business cases.

Flooding risks are only one dimension of climate risk that should be considered in the NCS space. Relevant risks will likely differ according to the type of NCS being implemented. In general, project developers can look to guidance from the United Nations Office for Disaster Risk Reduction. It outlines a variety of climate-related hazards for nature-based projects, such as extreme heat, drought, erosion, wildfire or storms.[64]

Mitigating NCS risk exposure

The growing prevalence of extreme weather events will make it more important for project developers to assess and report on the risks that their project can mitigate. However, climate risks can also endanger the NCS itself. Wildfires are a prime example of a growing risk to forest NCS projects, evidenced by the substantial forest fire losses occurring in recent years.[65]

Parametric insurance products that support project rehabilitation after disasters are one opportunity in the NCS space that could catalyze project implementation.[66] Parametric insurance products are issued when natural disasters occur and are useful because they provide NCS project proponents with guaranteed payments to rehabilitate their project or investment.[67] These products are expected to become significantly more valuable over time. Balancing the growing incidence of natural disasters will be key to driving NCS investment in the future.

Transparency in reporting on these risks to investors will be vital. Project developers will need to simultaneously report on the planned mitigation measures when the threat of natural disaster occurs. In the forest context, this might include outlining the purchase of parametric insurance products as part of the business case or including an ongoing fire management strategy based on Indigenous Traditional Knowledge to proactively reduce the risk or severity of a natural disaster.

Step 8: Select the right funding mechanism

Most existing NCS funding comes from grants or direct spending, including public programs, philanthropy or organizations that have commitments that involve improving their impact on nature (e.g., activities to help meet net-zero targets).

When there are clear links between project benefits and the intent of the grant or direct spending, the logic of investment is straightforward. In these cases, recognizing that the cost of investment can be recuperated, or that it helps meet specific objectives, may be enough to incentivize investment.

Some examples of potential grant or direct spend investments include:

- **Building more resilient agricultural production systems:** engaging in NCS farming practices through government grants, cost-shares, or corporate value chain funding to generate a payback in the form of lower input costs, improved water quality and improved soil carbon storage that supports soil quality and water retention to improve adaptation to drought conditions
- **Advancing efforts for meaningful economic reconciliation:** providing seed funding to help build capacity for Indigenous-led projects, including Indigenous Protected and Conserved Areas, may represent considerable up-front costs, but these can also support broader, long-term economic development objectives to advance meaningful economic reconciliation efforts.

Blended finance

While some benefits can be articulated enough that an organization can develop an internal business case for investment, the range of potential benefits to different actors can foster strategic partnerships that co-fund interventions.

There is substantial potential for growth of this type of funding in a variety of ways, including:

- **Providing matching funds**, as is common in certain government programs
- **De-risking through "first loss," differentiated rates of return and concession funding** (e.g., where public and philanthropic contributions improve the risk profile for private investors to encourage their participation)
- **Providing funding through mechanisms that blend different funding sources** to deliver outcomes and financial ROI.

"Traditional" capital markets

This category represents a direct investment into businesses that are delivering NCS outcomes either through equity or publicly traded stocks, bonds and funds. While there is increased funding and interest to include nature in capital markets, the current level of opportunity is limited (e.g., more demand than supply of projects to include in these funds).

Clearly defining NCS projects, measuring their outcomes and mitigating existing data gaps can build investor confidence and ease the inclusion of NCS and ecosystem services into public green bonds and nature funds. This would likely scale the investment of institutional and financial actors over time.

Understanding the investment spectrum

Funding opportunities for NCS exist across an Investment Spectrum (see Figure 5) where different strategies can help align and incentivize participants to invest in activities that can generate economic returns alongside environmental and social benefits.

Investment opportunities are context-dependent. Some financial mechanisms apply better to agricultural landscapes and others are more useful for large-scale conservation. Different funders can be attracted to different funding mechanisms. Novel funding approaches may bring in new investors who had previously not considered NCS as an investment.

Table 5 presents examples of financial mechanisms that can be used to finance NCS projects in the hotspots identified in Section 4. Appendix 3 provides an extended list of financial mechanisms.

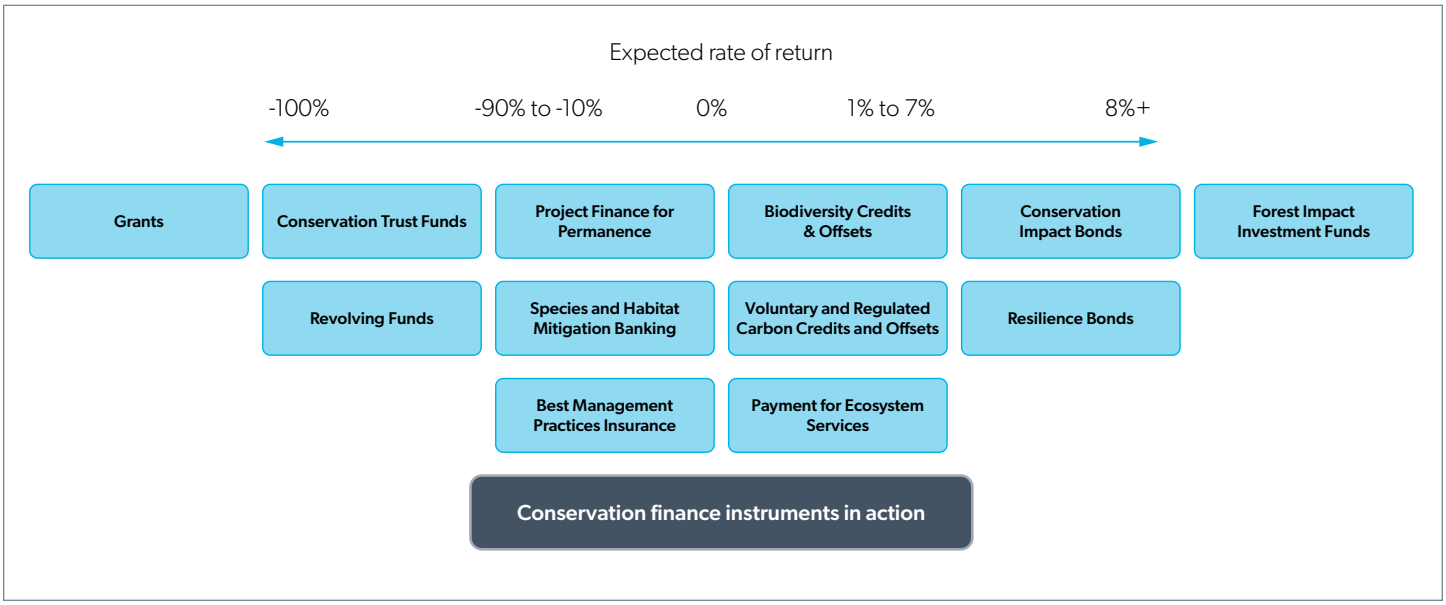
Box 5

Additional resources for business case developers

Selecting the right funding mechanism is one of the final steps in designing a successful NCS business case. But many project developers need guidance to better understand what types of mechanisms are best suited to their unique context.

To help individuals and organizations get started, the Nature Investment Hub has created a brief explainer: "Where Do I Start? The First Step in Determining Whether Conservation Finance Can Work For You".[68] The Hub also hosts an online library of curated resources from a range of sources across the country and beyond to help decision-makers and project developers navigate the growing field of conservation finance.

Figure 5. Investment spectrum



Conservation finance mechanisms along a spectrum of potential financial returns to demonstrate variety. Specific values can vary from project to project.
Source: Nature Investment Hub[69]

Table 5. Potential funding mechanisms for NCS projects

Funding tool	Description	Participants/investors	Revenue stream
Revolving fund	A large pool of assets that allocate upfront capital to projects meeting specific criteria (such as coastal restoration) as a loan, to be paid back via cost savings over time	NGOs, private sector, municipalities, other levels of government to create and house fund	Loan repayment from cost savings and/or property sales, project revenues
Project finance for permanence	A specific type of public-private partnership focused on long-term financial support for conservation initiatives where government or other financial inputs are mobilized as the initial funding is consumed	Large-scale public and philanthropic funders, potential for more engagement of private investment	Can be an endowment fund in which proceeds are spent, can also include revenue generating businesses
Insurance product	Insurance programs compensate landowners (e.g., farmers) for reduced yields or profits resulting from the adoption of specific NCS	Insurer, industry associations, individuals or organizations, with assets at risk (public and private landowners)	Estimated cost savings to insurer (remediation), and estimated cost savings to client (lower premiums)
Credits and offsets (nature)	Credits and offsets are generated through conservation and restoration activities that improve biodiversity above the baseline. Credits are used to enhance protection, whereas offsets compensate for damage elsewhere.	Governments, assessing and auditing bodies, project developers, landowners, NGOs, consulting organizations as intermediaries, organizations with net-zero commitments	Revenue to landowner and project developer from sale of credits
Credits and offsets (carbon)	Credits and offsets are generated from additional (i.e., in addition to business as usual) carbon sequestration. Credits are typically sold to voluntary buyers, whereas offsets are purchased to compensate for emissions above regulated levels.	Governments, assessing and auditing bodies, project developers, landowners, NGOs, consulting organizations as intermediaries, organizations with net-zero commitments	Selling of carbon offsets or premium contracts for Scope 3 emissions reductions
Resilience bond	Resilience bonds are a specific bond type where the payout is by beneficiaries of restoration and conservation activities that enhance resilience	Municipalities, energy utilities, insurance companies, property owners who bear the cost of damage from climate related events and natural disasters such as floods and fires	Outcome buyers who are willing to pay for ecosystem services delivered

Section 2: Unlocking the value of NCS in Canada

Strategies that advance resilient economies across Canada highlight a clear connection between climate mitigation, nature conservation and long-term socio-economic growth.

The importance of healthy, dynamic ecosystems is represented by the recent exponential growth in public investments targeting the nexus of Canada's national strategies on climate, nature and the economy. Growing interest and innovation in the private sector can further emphasize the value of NCS for long-term economic growth (Box 6).

The growing focus on NCS across the public and private sectors is a clear signal that now is the time to capitalize on the momentum building around NCS to advance a national investment strategy in Canada.

To build a compelling case for scaling investment, it is necessary to understand:

1. What types of benefits and values are unique to NCS
2. How these are being being measured
3. How NCS projects stack up against non-NCS projects (i.e., their competitiveness)
4. How policies and programs influence decision-making.

Box 6

Nutrien's Canadian Sustainable Nitrogen Outcomes program is a first in Canada

In 2021, Nutrien launched the Canadian Sustainable Nitrogen Outcomes program to incentivize and support growers in implementing 4R nutrient management practices in exchange for carbon payments. Modeled on Alberta's Nitrous Oxide Emissions Reduction Protocol, the program uses field-level data to measure emissions reductions from improved nitrogen fertilizer application practices. It verifies the GHG impacts through SustainCERT, a globally recognized climate impact verifier. In 2023, the program was certified by SustainCERT, a globally recognized climate impact verifier, becoming the first certified GHG removal program for grain crops in Canada. Across Canada and the U.S. the program has so far generated verified credits for the removal of 1,500 tonnes of CO_2e — the equivalent of planting close to 25,000 new trees.[70]

Broken down by the "pathways" identified in Drever et al., (2021) the following sections highlight the current investment conditions for NCS in Canada by

1. **Summarizing the state and extent of each landscape type in Canada**
2. **Identifying the key drivers impacting changes in these landscapes**, e.g., threats of conversion or degradation
3. **Analyzing the diversity of cost, benefits and value** expressions reported across the 24 NCS pathways in Canada, and globally
4. **Advancing a practical discussion of key ecosystem services** that, when accounted for, highlight NCS as a competitive, cost-effective approach to address the nexus of climate-nature-economy issues in Canada.

Box 7

A note on regionality and diverse engagement

This report assesses costs and benefits on regional and national scales. However, practitioners are encouraged to conduct their analyses to evaluate NCS within the context of their intended project.

The valuation of ecosystem services and economic benefits vary depending on regional differences (e.g., environmental, market and policy conditions) and regional actor priorities. Because of these context-specific influences, region- and project-specific assessments are critical to identifying NCS feasibility. Practitioners must also consider opportunities for Indigenous or underserved group engagement within their projects. Additionally, they must understand how local stakeholder priorities and barriers may influence NCS investment.

Both regional influences and more diverse engagement are key focus areas of the next iteration of this research such as the hotspots identified in Section 4.

State of Canadian grasslands

Canada is home to an estimated 11–14 million hectares of intact, temperate grasslands, of which 99% are in Alberta (45%), Saskatchewan (34%), Manitoba (9.5%), British Columbia (8.8%) and Ontario (2%).[71] Consisting primarily of grasses, sedges and wildflowers, with very few trees, Canadian grasslands can be categorized as[72]:

1. **Native:** Areas that have never been tilled or have been re-established as grassland for such a length of time that native conditions have been restored
2. **Naturalized:** Areas previously under cultivation or seeded for forage and subsequently restored
3. **Tame (or seeded)[73]:** Areas that have, in most cases, been intentionally modified and seeded or planted with an introduced grass species.

Canadian grasslands are being lost at a rate of 0.1 to 0.25 million hectares a year. Over the last five years, an estimated 1 million hectares of grasslands have disappeared — the equivalent of 1 million football fields.[74] Grasslands are one of the most threatened and degraded ecosystems in Canada, a trend that is consistent across the globe.

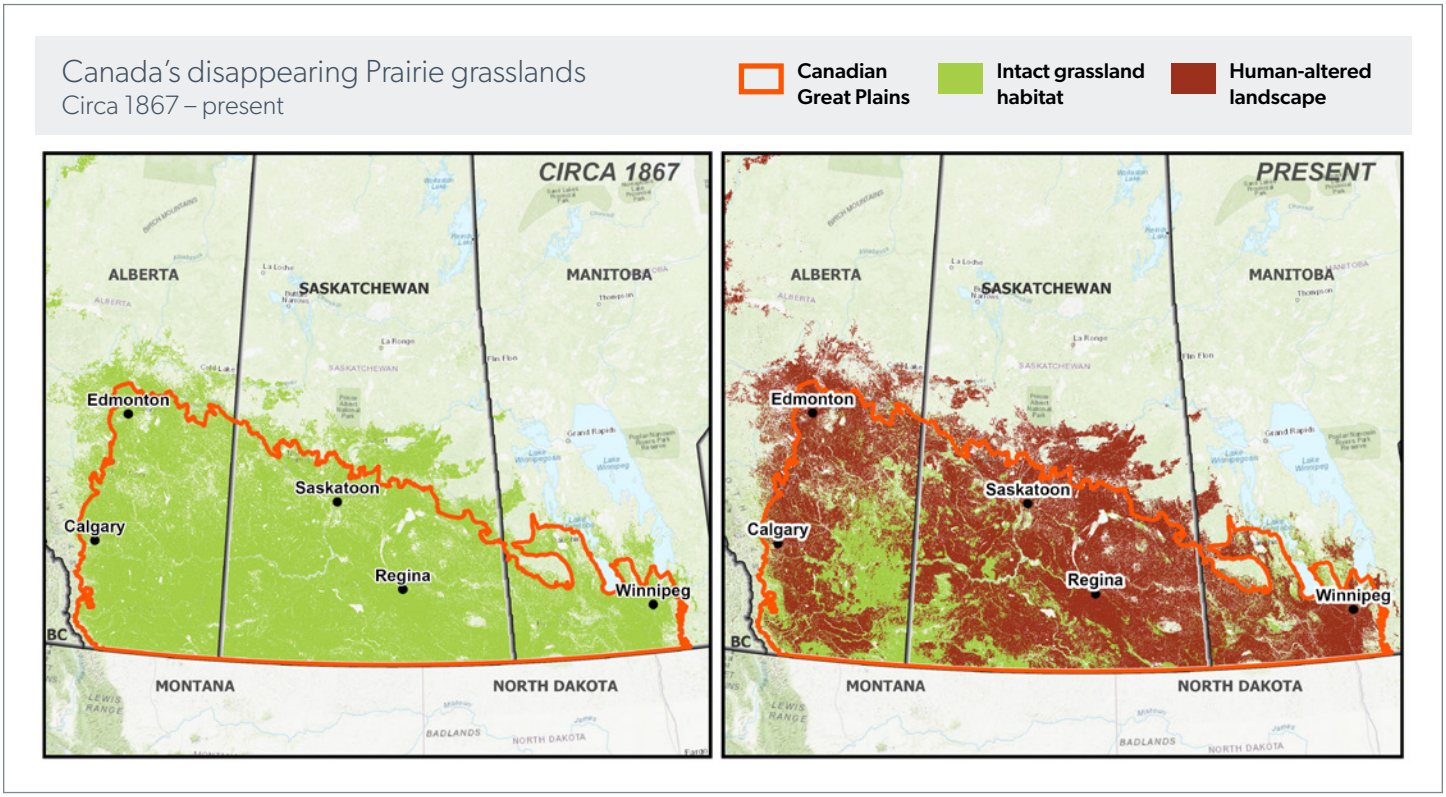
Threats to Canadian grasslands are primarily the result of economic pressures to convert grasslands to croplands, and a lesser extent, urban developments.

Since 2000, more than 10 million hectares of Prairie grasslands are estimated to have been converted from a combination of cropland conversion and increasing urbanization, with total losses reaching up to 80% since 1867 (Figure 6).

In both cases, land managers can generate more revenue from conversion to alternative land uses compared to maintaining grassland ecosystems, although the economics can vary by district. For example:

- **Southern Prairies:** Home to most of Canada's remaining grasslands, variable crop prices and declining farm profitability are providing a simple economic incentive to convert grasslands into more lucrative row crops. Row crop revenues are more profitable than grass-based production systems. This dynamic is increasingly compounded by developments of commercial crop varieties that can be grown in marginal soils and extreme climates, reducing the barriers of converting to more lucrative row crops.[75]
- **British Columbia:** In the southern interior, including the Okanagan Valley, grassland ecosystems are under threat from a mix of urban growth, vineyard expansion and recreational development.

Figure 6. Historical conversion of Prairie grasslands



Source: Nature Conservancy of Canada[76]

Table 6. Costs of grassland NCS implementation in the Canadian Prairies[77]

Pathway	Mitigation potential[78] (Mt CO_2e/year)		Cost ($/ha/year)	Type of costs
	10-year	30-year		
Avoided conversion	12.7	4.1	$69–**$5,996**	Forgone revenues, management
Riparian restoration	0.68	0.4	Up to $352	Restoration costs, forgone revenue, management

*Bolded value includes opportunity costs of forgoing alternative land uses

Costs

The costs to avoid grassland conversion and restoration are high (Table 6). However, **the benefits and value that Canadian grasslands provide are essential to the environmental and productive resilience of Canadian farms**, the conservation of unique grassland biodiversity and their role in sequestering and storing carbon. Accounting for these benefits can provide the foundation for a compelling business case to further invest in efforts to halt and reverse the loss of Canadian grasslands.

Typical costs to consider in building a business case include[79]:

- **Opportunity costs** from foregone revenues from maintaining grasslands in lieu of other types of land uses
- **Management costs** to ensure proper conservation or restoration outcomes, (i.e., conservation without management is not considered "good stewardship")[80]
- **Input costs** to initiate and verify intended outcomes (e.g., seeding for restoration).

The recurring nature of these costs is a barrier for private landowners to fund conservation and restoration efforts. **While limited or time-bound incentives may encourage an initial practice change, these types of incentives alone are unlikely to create a** strong enough value proposition to incentivize grassland conservation.

Accounting for the diversity of vital ecosystem services generated by Canadian grasslands is essential for making a clear business case for investing in these ecosystems.

Ecosystem services

Long considered prime land for development, Canadian grasslands are increasingly being recognized for their ability to store and sequester carbon, support perennial forage production and host a diversity of unique plant and animal species with considerable value in terms of their generic resource materials.[81] Grasslands are also considered stable repositories for carbon compared to other landscapes such as forests, which have increased emission risk through wildfires.

As an example, the value of Prairie grassland ecosystem services is estimated between $651 and $1,001 per hectare per year.[82] While substantial data gaps mean Prairie grasslands are likely undervalued,[83] this figure can help decision-makers understand exactly what is at stake: **continued grassland conversion is costing regional economies in the Prairies between $65 to $250 million in lost ecosystem services every year.**[84]

These values include:

- **Provisioning services:** unconverted grasslands are estimated to provide $278 per hectare per year of agricultural productivity in the form of forage production such as hay and silage.[85]
- **Regulating services** in the form of soil retention, nitrogen-fixing and carbon sequestration. The prevention of soil loss from wind, runoff and other processes is valued at $17 per hectare. The addition of soil nitrogen from legumes and other perennial forages contributes $101 per hectare in soil health benefits.[86] Studies on carbon sequestration in grasslands value the carbon stored in grasslands at $271–$617 per hectare, with an additional annual sequestration of $40 per hectare.[87]
- **Supporting services:** Grasslands are cornerstone habitats for many species, now considered threatened or species at risk due to habitat loss, including the swift fox, pronghorn antelope, and sharp-tailed grouse.[88] Grasslands are also vital for nutrient cycling, improving waste treatment through recovery of mobile nutrients and removal or breakdown of excess nutrients and compounds, with an estimated value of $7 per hectare per year.[89]
- **Cultural services** provided by grasslands such as recreation activities (e.g., wildlife hunting and wildlife viewing) are becoming increasingly valuable and have been estimated at $22 per hectare per year.[90] Indigenous spiritual and cultural connections to this landscape are also critical. Grasslands remain a cornerstone landscape for foodways, stewardship and governance.

Advancing NCS pathways in Canadian grasslands

Avoiding the conversion of Canadian grasslands and restoring degraded grassland ecosystems can provide immediate mitigation benefits. It is urgently needed for the conservation of unique grassland biodiversity and crucial ecosystem services that support Canadian farmers.

Halting the conversion of Canadian grasslands could generate a net sequestration benefit of 12.7 megatonnes of CO_2e per year over the next 10 years.[91] In contrast, the loss of 1 million hectares over the last five years has generated an additional 2.8 megatonnes of CO_2e.[92] While the mitigation benefits of grassland conservation are clear, **the costs of grassland conservation could range from $69 million to $1.5 billion a year**.[93] Thus, accounting for the value of the breadth of ecosystem services provided by Canadian grasslands are key to developing a competitive business case for their conservation.

State of Canadian forests

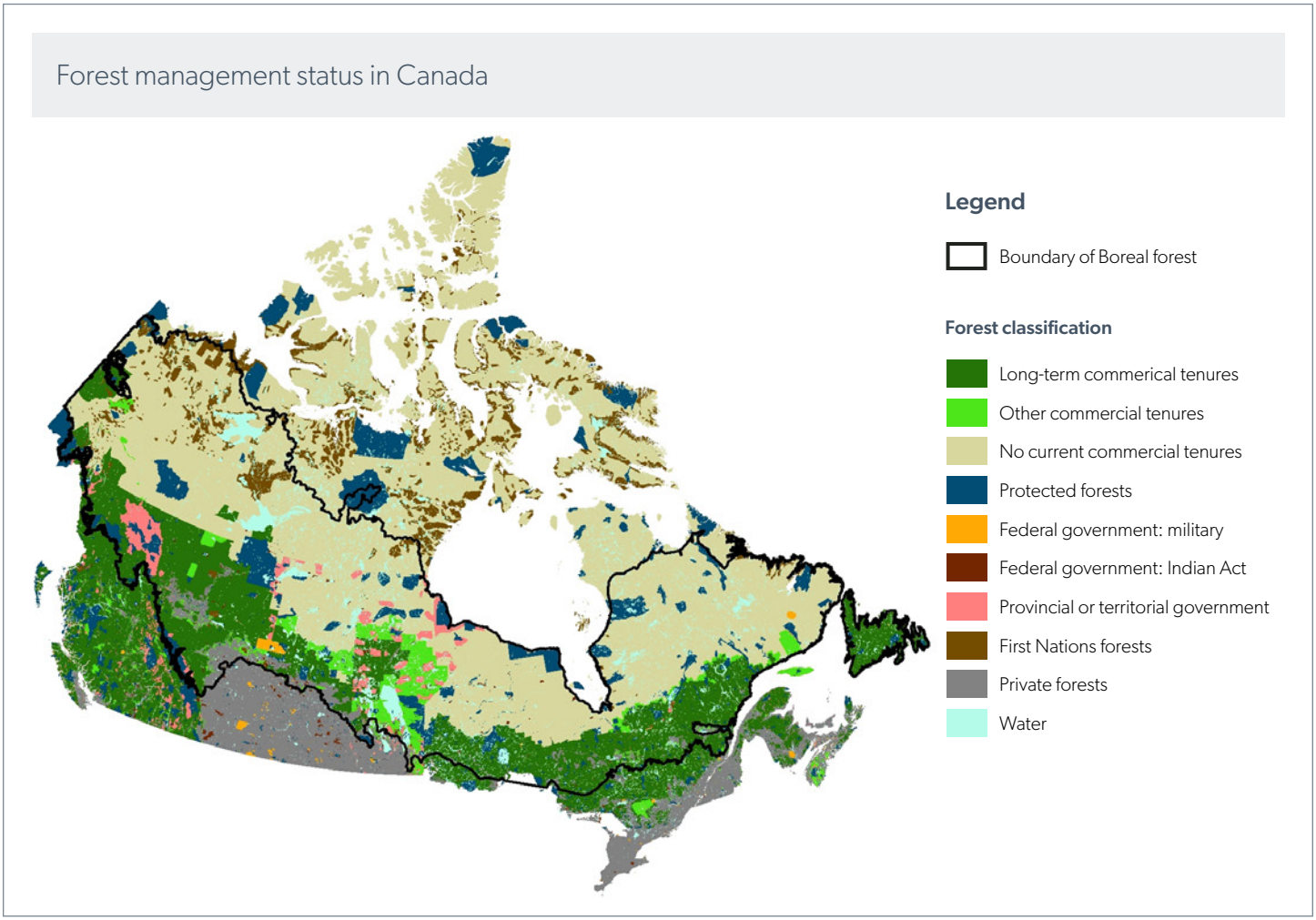
Canada has nine percent of the world's forests and 25% of the world's boreal forest, which together store 208 gigatonnes of carbon.[94] While Quebec (73 million hectares), Ontario (71 million hectares) and B.C. (60 million hectares) have the largest forests, the Canadian boreal forest extends more than 4,000 km from the Yukon/Alaska border to Newfoundland and Labrador.[95] Canadian forests play a key role as a significant global carbon sink but are increasingly becoming a significant source of carbon emissions with increasing wildfires and other natural disturbances.[96]

Canadian forests are primarily owned by provincial (75.4%) and territorial (13%) governments, with the remaining forested lands being divided among private (6.7%), federal (4%), municipal (0.3%) and others. Figure 7 illustrates the different classifications of forested lands by tenure and ownership type. Most of the managed forest area in Canada is public land. Commercial harvesting is determined by the provincial logging allowances. The map shows private forest lands and long- and short-term commercial tenures within public lands, as well as protected areas and other public forest lands.

Forestry operations are a key contributor to Canada's economy and can represent an opportunity for catalytic economic growth in remote communities. Indigenous-led forest management initiatives, such as the Central Chilcotin Rehabilitation Ltd., have similarly emerged as a driver of resilient, socio-economic growth and community development.[97]

In 2022, the forestry sector supported livelihoods in more than 300 communities, employed about 212,660 people and contributed $33.4 billion in GDP (i.e., 1.2% in nominal terms). The latest available data (i.e., 2020) shows that the sector can generate about $2.3 billion in annual revenues for provincial and territorial governments.[98]

Figure 7. Forest tenures and ownerships



Source: Government of Canada, 2020

Private forests are disproportionately responsible for Canada's timber supply with 10% of total production coming from private lands.[99] These forests are owned by forestry companies, small family businesses and private woodlot owners in New Brunswick, Nova Scotia, Ontario, Quebec and B.C. Forest activities, including nursery operations, tree planting, timber cruising and logging, account for about 25% of forestry sector employment.[100]

In 2020, 49,352 hectares of forests were converted to other land uses. The top three drivers of conversion were agriculture (45%), mining, oil and gas (31%), and urban expansion (20%).[101] Within the forestry industry, most of the logging takes place in forest tenures held by forestry companies and in primary forests.

Natural disturbances, including wildfires and insect outbreaks, are increasing in both their severity and frequency. Record-breaking wildfires in 2023 affected almost every community across Canada, leading to poor air quality and large-scale carbon emissions, estimated at 2,200 megatonnes of CO_2e.[102] From 2000 to 2023, 35.9 million hectares of forests were lost due to wildfires, accounting for 62% of all tree cover loss in Canada.[103] From a carbon accounting perspective, emissions from natural disturbances such as wildfires are calculated but not included in Canada's National Inventory Report because they are not considered caused by human activity.

Costs and benefits

The different costs and benefits of advancing NCS in Canadian forests can vary significantly within and across different studies, and are often region-, or case-specific. Most of the studies reviewed for this report focus on the direct use values of forests, such as the market value of timber (measured as a GDP value), and other economic benefits such as job creation, impacts on income and government revenue.

IFM and old-growth conservation are cost-effective. Forty-two percent of the total mitigation of 7.92 megatonnes of CO_2e per year after 10 years of implementation can be achieved at less than $50 per ton of CO_2e — the equivalent of removing 1.7 million passenger cars from Canadian roads. Conserving old-growth forests in B.C., Alberta and Quebec represents half of the improved forest management opportunity in 10 years.[104]

Comparatively, forest restoration projects are considered cost-intensive with limited mitigation potential in a 10-year period but can represent a cost-effective NCS over 30 years (e.g., 24.9 megatonnes of CO_2e per year after three decades of tree growth). Urban canopy cover has low sequestration potential and mid-range costs in both the short and long term. However, community proximity would result in greater cost-effectiveness for achieving other benefits, e.g., improved air quality.

Applying this approach to forest conservation, or avoided forest conversion, typically results in negative economic returns given the dynamics of high opportunity costs being compared to a discounted or uncounted range of benefits unique to NCS. Similarly, some IFM strategies such as restricting harvest may generate negative impacts on production.[105]

When seeking to optimize the cost-effectiveness of NCS potential in Canadian forests, hybrid approaches (e.g., longer-lived wood products with harvest residue for local bioenergy production) can often achieve higher mitigation and socio-economic benefits at a lower cost.[106] For example, coupling forest conservation with incentives that promote longer-lived wood products and local bioenergy production from harvest residues can help incentivize ***higher utilization rates***,[107] i.e., a higher proportion of logged timber ends up in a mill or in wood products.

Table 7 presents the ranges of the economic costs and benefits, and the type of the costs and benefits of each forest NCS pathway.

Table 7 shows that the calculated **costs per hectare of IFM and restoration of forest cover is comparable**. Estimates for the economic benefits of urban canopy cover and avoided conversion are either not available or go mostly beyond direct-use values to include ecosystem services, which are often not translated into financial returns. Efforts to account for these benefits are already underway across Canada. Standardizing project-level approaches that can translate across different cases and regional contexts will unlock NCS pathways that otherwise would not be feasible.

Box 8

Indigenous leadership in sustainable forest management

Coastal First Nations (CFN) is an alliance of nine First Nations in B.C. that exercise the right to self-determination. The Nations work together to protect their landscapes and natural resources, and advance innovative conservation-based economies. Through CFN, the Great Bear Initiative seeks to develop opportunities for non-timber forest products. These products are a sustainable alternative to commercial timber harvesting, one that continues to generate revenues for the member communities by partnering with local companies to harvest and craft wild forest products.

These partnerships create meaningful local jobs and diversify local economies, while also investing in the conservation of vital forests ecosystems. This is in line with the Indigenous-led vision of CFN's membership in prioritizing sustainable, long-term economic development.[108]

Table 7. Costs and benefits by forest NCS pathways

Pathway	Mitigation potential[109] (Mt CO_2e/year)		Cost (t CO_2e/year)	Type of costs	Benefits	Type of benefits
	10-year	30-year				
Improved forest management	7.9	27.9	$47–$96[110]	Industrial wood cost, harvest residue cost, harvested wood products costs, hog fuel cost, power price	Total GDP impact: -$114 to $732 million/year.[111]	Government revenues, industry GDP
Avoided conversion	3.8	1.1	<$50[112]	Opportunity costs (foregone production)	No data	Revenue from continued supply of timber
Restoration of forest cover	< 0.1	24.9	$99[113] $3.30 per tree[114]	Site preparation, planting after harvest/fire, fertilization	$6.50 in GDP for every tree planted (Southern ON).[115]	Industry GDP, returns to capital, government revenue
Urban canopy[116]	0.2	1.7	No data	Planting, maintenance	No data	Property values

Investments in urban canopy cover are increasingly emerging as a proven strategy to generate crucial benefits, which have driven recent increases in public and private investment.[117] While these investments may be a cost-effective approach for improving social, environmental and economic conditions in Canadian communities, their potential as part of a broader national climate mitigation strategy are limited due to their low mitigation potential.

Three provinces make up more than half the total mitigation potential from NCS pathways in Canadian forests. British Columbia, Quebec and Alberta represent more than half of the mitigation potential from IFM and old-growth conservation to 2030, and the largest annual cumulative mitigation potential to 2050. These regions warrant further consideration to develop regional strategies to advance IFM and old-growth conservation efforts.[118]

In B.C., adopting IFM practices is estimated to contribute close to $400 million to the provincial economy a year.[119]

Ecosystem services

The benefits of sustainable forest practices go beyond climate (i.e., carbon storage and sequestration), timber and food provisioning. Forests provide diverse ecosystem services, including cleaner air and water, recreation opportunities and meaningful changes for socio-cultural and economic reconciliation.[120] Accounting for the full value of ecosystem services from Canadian forests can position NCS as a cost-effective way to grow the economy and meet community needs.

For instance, **a global meta-analysis identifies a median value of $2,554 per hectare per year of ecosystem services** provided by forests.[121]

These values include:

- **Provisioning services**, with values ranging from $43 per hectare per year for food provisioning, to $238 per hectare per year for water supply.[122] These services have a quantifiable market value and represent the material or energy outputs from a forest ecosystem.
- **Regulating services**, with values ranging from $104 per hectare per year for carbon storage and sequestration to $571 per hectare per year for forest life cycle maintenance, and $1,177 per hectare per year for airflow regulation.
- **Supporting services**, these services are essential to ecological functioning but are harder to quantify compared to provisioning services. The value of soil formation and soil cycle regulation are estimated at $207 per hectare per year, and water cycle regulation at $733 per hectare per year.
- **Cultural services**, with values ranging from $217 per hectare per year for non-extractive recreation and $734 per hectare per year for information and knowledge.[123] [124]

Available Canadian case studies are regionally specific and use a variety of methods to identify a range of ecosystem service values:

- **Boreal forest ecosystems** are estimated at $1,237 per hectare per year, including carbon storage, non-timber commercial value and biodiversity conservation.[125]
- **Urban canopy cover** ranges from $300 to $2,200 per hectare per year in major Canadian cities (Halifax, Montreal, Vancouver, Toronto). The ecosystem services generated include energy savings, air quality, wet-weather flow, carbon sequestration, recreation/tourism and the investment return is estimated at $1.3–$12.7 of benefits for every dollar spent.[126]
- **Afforestation in Southern Ontario** was conservatively estimated at $97.5 million a year with a ROI of 11:1 when accounting for the total value of ecosystem services. Most of these benefits were generated by pollination services and seed dispersal, recreation opportunities, aesthetic/amenity benefits and nutrient and waste regulation.[127]
- **Regulating, recreation and cultural values** in Ontario's Greenbelt region are estimated at $5,192 per hectare per year.[128] The considerable value reported for forest-based ecosystem services in this region is primarily attributed to the proximity of these services to Canada's largest and most densely populated region, the Greater Toronto Hamilton Region.
- **Carbon storage, disturbance regulation and air purification values** in B.C.'s forests are estimated to be on average $952–$3,515, $902–$2,203, and $728 per hectare per year.[129]

While the value of Canadian forest ecosystems is becoming increasingly clear, **limited data at the right scale, inconsistent benefit accounting and different valuation methods mean many of these values are either discounted or simply left out.**

Where data does exist and benefits are properly accounted for, the range and type of identified benefits and their corresponding ecosystem service values depend on what type of valuation methodology is being used and how close these ecosystems are to population centers. Given the lack of a standard approach to account and value ecosystem services, there is a risk of double-counting potential project benefits.

Advancing NCS pathways in Canadian forests

Of the Canadian case studies reviewed for this report, about **half of the value of forest ecosystem services comes from carbon sequestration and storage benefits (both above and below ground).**[130]

The other half of the values identified in these studies are drawn from ecosystem services that provide clean air and water. These values do not consider recreation, biodiversity and wildlife habitat conservation, cultural services and shading and cooling impacts, each of which can independently provide a strong value proposition for investment.

Forests also provide considerable socio-economic, cultural and spiritual values for Indigenous communities. Building the capacity to identify, measure and express these values is new and vitally important to understand the long-term socio-economic value of NCS investments. These values are a challenge to quantify under standard economic accounting systems and are typically irreplaceable.

Unlike other NCS pathways, a major benefit in this case is job opportunities that are additional and stable:

- Forests Ontario's tree planting efforts in Southern Ontario are estimated to have created 104 full-time-equivalent jobs.[131]
- In B.C., adopting IFM practices can create an additional 2,776 full-time jobs.[132] Of these, the use of residues for bio-energy, despite being one of the costliest NCS pathways, could also have the highest impact on total employment until 2050 with 1,862 in full-time-equivalent jobs.

Accurate data on the full value of forest ecosystem services is a challenge in Canada. The studies analyzed for this report suggest a net-positive return for investing in NCS in forest ecosystems is possible when accounting for impacts on GDP, job opportunities and valuable ecosystem services.

To realize this emerging opportunity, clear guidance can help equip decision-makers with the right tools to develop business models that account for the full suite of values generated by forest ecosystems. This approach has the potential to unlock pathways that would otherwise not be feasible when simply considering economic costs and benefits. It could also **incentivize innovations that increase use rates that are both profitable and decarbonizing.**

State of Canadian wetlands

Canada is home to 129 million ha of wetlands, a quarter of the remaining global wetland cover. Canadian wetlands include a diversity of different ecologies, all of which are carbon-rich and in decline across the country.[133] [134] [135] These ecosystems are concentrated in the Boreal Shield (25%), the Hudson Plains (21%) and Boreal Plains (18%). They are crucial to meeting the global climate and biodiversity targets.[136]

Wetlands store more carbon per hectare than forest and grassland soils.[137] In northern wetlands, low temperatures slow decomposition rates and allow for greater carbon stocks to accumulate.[138] [139] For instance, Canada's boreal peatlands hold 25% of the global peatland carbon stock (or about 150 billion tonnes).[140] Globally, peatlands store 30% of the earth's total soil carbon stock,[141] despite only making up three percent of the surface area.[142]

Figure 8 illustrates the distribution of wetlands across Canada, including wetlands designated as internationally significant under the Ramsar Convention on Wetlands due to their rarity or uniqueness and/or due to their importance in conserving biological diversity.[143]

Estimates point to a loss of about 665,000 hectares of freshwater mineral wetlands across Canada since the 1950s, with another **440,023 hectares of freshwater mineral wetlands currently at risk of conversion** due to development pressures ranging from agricultural expansion to urbanization and infrastructure development.[144] [145]

Canada's extensive coastline is also home to 813,835 hectares of seagrass beds. Of this area, **close to 25,000 hectares are in decline due to human encroachment**.[146]

Salt marshes are estimated to occupy about nine percent of Canada's coastlines. Conversion pressures include agricultural expansion, especially on the shores of the Bay of Fundy in New Brunswick and Nova Scotia, as well as in the St. Lawrence estuary and the coast of B.C. **An estimated 44,130 hectares of salt marshes could be reflooded to restore this landscape**.[147]

The integrity of coastal wetlands is vital for flood mitigation, storm protection and increasing resilience to climate impacts in an era of rising sea levels and surging occurrences of extreme weather events.[148] Decision-makers across Canada are increasingly recognizing the importance of wetland ecosystems to mitigate damage from natural disasters. **In 2013, the Calgary floods cost an estimated $5 billion in damages and prompted the city to consider the protection and restoration of wetlands as cost-effective urban flood management infrastructure**.[149]

Costs

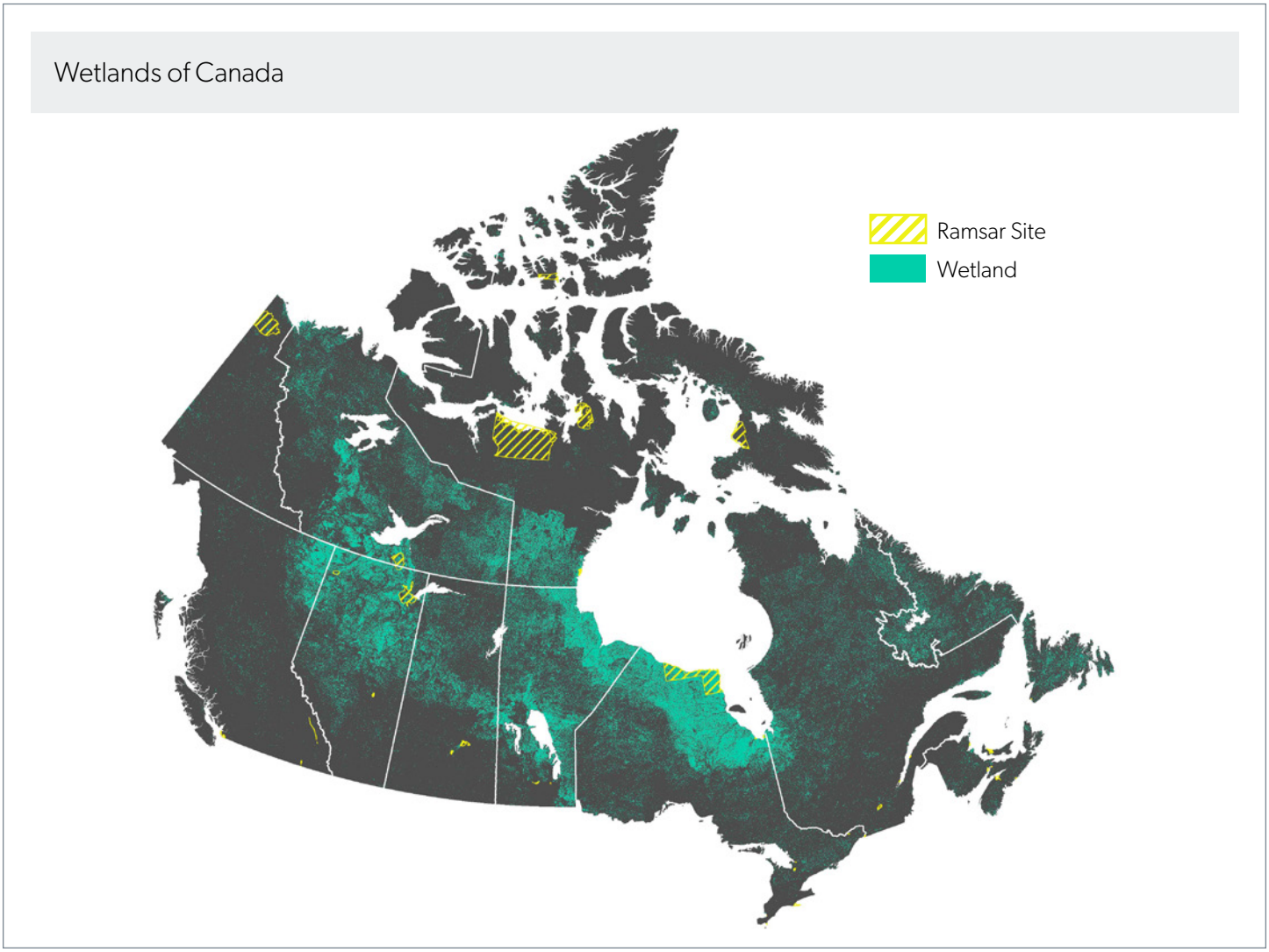
While the threats to Canadian wetlands are well understood, how the costs of investing in wetland conservation and restoration translate into a compelling business case for public and private investors is new in Canada. A study in the Prairies identified an annual per-hectare cost of $161 to restore wetlands in agricultural-producing areas.[150]

Project benefits are typically weighed against three types of investment costs outlined in this study:

- **Opportunity costs** of $111 per ha per yr for forgone returns from crop production cycles
- **Site management** costs of $391 per hectare per year
- **Implementation costs**, including one-time engineering costs of $473 per hectare per year, and **ongoing nuisance costs**[151] resulting in a change in production systems of $2.8 per hectare per year.

Table 8 presents the ranges of the economic costs and benefits, and a description of the main costs and benefits of each wetland NCS pathway. The ranges of these calculations vary significantly within and across different studies and are often regionally specific.

Figure 8. Internationally significant wetlands in Canada as identified under the Ramsar Convention



Source: Nature Conservancy of Canada

Table 8. Costs and benefits of wetland NCS pathways

Pathway		Mitigation potential[152] ($Mt CO_2e$/year)		Costs	Description of costs
		10-year	30-year		
Avoided conversion	**Peatlands**	10.1	3.7	**Southern Ontario:** $8,040/hectare/year to maintain a wetland [153]	Interest on capital investment, operation and maintenance, annual depreciation, loss of crop yield
	Freshwater wetlands	3.1	0.0		
	Seagrass	0.1	<0.1	No data	
Restoration	**Peatlands**	0.2	0.2	**Prairies**: $25–$509/hectare/year, with an average cost of $161/hectare/year [154]	Opportunity costs, administration, engineering, nuisance, interest on capital investment, operation and maintenance, annual depreciation
	Freshwater wetlands	0.4	0.4		
	Seagrass	<0.1	0.1	No data	
	Salt marsh	1.5	1.2	No data	

Ecosystem services

Intact wetlands generate a lot of ecosystem services that are valuable to economies, investors and societies. **The annual value of Canadian wetlands is estimated at $32.7 billion.**[155]

These include:

- **Provisioning services**, supporting recreational and commercial fisheries as well as hunting activities.[156] According to the 2012 Canadian Nature Survey, the **expenditures related to hunting and trapping alone were $1.8 billion**, including $327 million for hunting waterfowl.[157]

  Seagrass beds are also critical for fisheries, providing habitats and nurseries for species such as the Atlantic cod, that contribute to exports valued at **$122 million in 2021**.[158] [159]

  These services can also generate ancillary socio-economic benefits, such as job creation, business development and tourism opportunities. For example, the Randle Reef project in Hamilton, Ontario is anticipating $168 million in terms of job creation, business growth and tourism.[160]

- **Regulating services**, such as carbon storage and sequestration, enhanced disaster risk reduction and vital nutrient management functions that can improve water quality while reducing costs for water treatment.[161] A study in Saskatchewan identified the **flood mitigation and nutrient management value of local wetlands at more than $11 million a year**.[162]

  Studies in Alberta value the shoreline protection services of provincial wetlands between $31 and $66 billion annually.[163]

  Wetlands in Southern Ontario generate $5.1 billion per year in sediment and phosphorus removal. This favourably compares to the cost to offset excess phosphorus from the loss of all wetlands in Southern Ontario by way of constructed wetlands identified as $3.5 billion (±1.5) per year.[164]

- **Supporting services**, such as habitat provisioning that supports biodiversity. Even though they only cover around six percent of the Earth's land, **40% of plant and animal species** live or breed in wetlands.[165] Wetlands are also critical for **provisioning services.**

- **Cultural services**, such as wildlife viewing and conserving culturally significant plants and animals are key considerations in Canadian wetlands. These landscapes are home to several endangered and at-risk species, such as the woodland caribou and the maritime ringlet butterfly in seagrass beds.[166]

Indigenous peoples also have important cultural ties to wetlands.[167] They support vital cultural activities such as hunting, fishing, herding and gathering.[168] For example, wild rice, which only grows in wetlands, is an important staple in the diet of many Indigenous communities.[169] As stewards of the land and knowledge holders, Indigenous peoples have long recognized the interconnectivity of wetlands in ecosystems. In the Hudson Bay Lowlands, the Cree call them "Yehewin Aski": the breathing land.[170] Wetlands also support unique biodiversity that is intrinsic and inextricable from many Indigenous identifies.[171]

Advancing NCS pathways in Canadian wetlands

Strategies to invest in the greater conservation and restoration of Canadian wetlands need to account for the full value of the benefits of the investments. For example, the sizable ecosystem values of wetlands in Southern Ontario, as well as their proximity to urban centers, make the region especially attractive for investments in freshwater wetland restoration.

While the competing development pressures may make the cost-effectiveness of advancing NCS in these landscapes more of a challenge, factoring key ecosystem service and economic opportunity benefits, e.g., recreation can make these types of projects more attractive.

State of Canadian agricultural landscapes

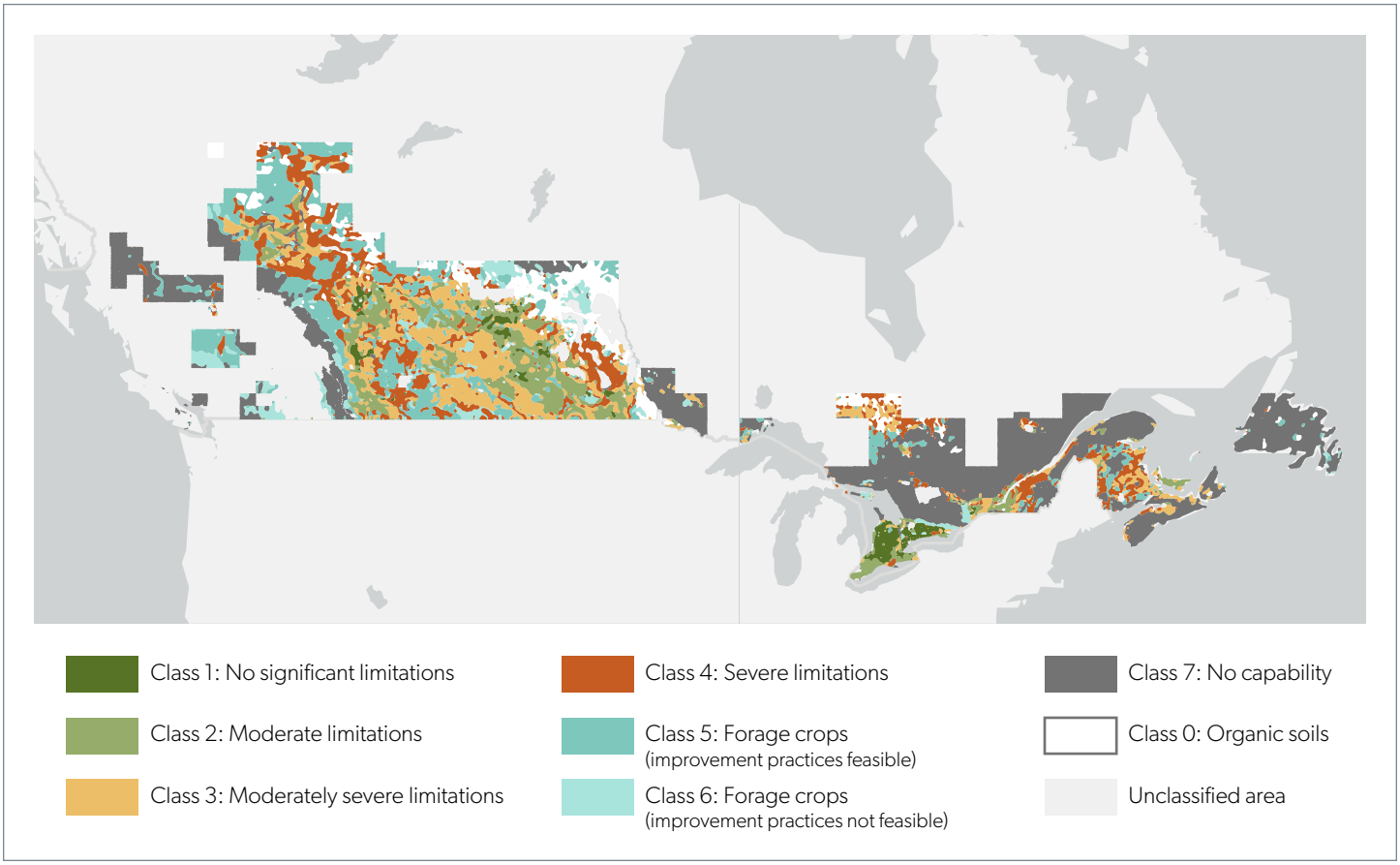
Agricultural lands cover 62 million hectares, or six percent of Canada's total land area, representing 189,874 farms concentrated in the Prairies, Southern Quebec and Ontario.[172]

Most agricultural lands are privately owned. They consist of different landscape types, including wetlands, treed areas and grasslands. Canadian farmers and ranchers are crucial to national and global food security. **Canada is the fifth largest agri-food and seafood exporter in the world.** These landscapes remain a domestic driver of rural community health and livelihoods by supporting local economies and foodways.[173]

Agricultural lands are classified using the Canada Land Inventory (CLI) and the set of agri-environmental indicators (AEIs) developed by Agriculture and Agri-Food Canada (AAFC). The CLI is based on extensive mapping and data collection conducted between the 1960s and 1980s, which divides agricultural lands into eight classes. Class 1 lands have the highest capacity for supporting agricultural production and Class 7 lands the lowest. Organic soils are reported separately as Class 0. Figure 9 summarizes the distribution and classification of agricultural lands across Canada, identifying lands with key limitations to agricultural productivity.

AEIs measure critical environmental indicators such as soil health, biodiversity, water and air quality, many of which are relevant to advance NCS projects.[174] The risk of soil erosion has largely declined across Canada since the 1980s due to the widespread adoption of conservation tillage practices in the Prairies. However, increased soil erosion risks and decreased soil organic matter are apparent in Southern Ontario, Quebec and Atlantic Canada.[175]

Figure 9: Agricultural land classification and capabilities across Canada



Source: Agriculture and Agri-Food Canada[176]

The AEIs also find that the risk of soil salinization in the Prairies decreased from 1981–2016, attributed largely to a reduction in summer fallow.[177] While these data points illustrate historical trends, the most recent indicators are a decade old, and this leaves questions when it comes to more recent trends in the status of Canadian agricultural landscapes.

Agricultural lands are commonly lost due to urban expansion. Ontario alone has lost more than 1.13 million hectares of farmland (18%) in the past 35 years.[178] Crop and livestock practices have also unevenly influenced the health of agricultural ecosystems depending on regional adoption of NCS with outcomes such as:

- **Continuous cropping, continuous grazing and strip-tillage** degrading soil health
- **Inefficient management of fertilizer, inputs and storage of manure** contaminating waterways and increasing nitrous oxide or methane emissions
- **A reduction of trees on agricultural lands, threatening biodiversity** and increasing the risk of soil erosion and nutrient leaching.

Costs and benefits

The potential to invest in NCS on agricultural lands has garnered significant attention from public- and private-sector actors. There are several policy incentives available to promote resilient food systems and many value-chain initiatives supporting NCS adoption in exchange for ESG reporting benefits and market access.

Each of the agricultural NCS pathways has different cost and benefit considerations, which are further distinguished by their impact on different regions and production systems. These costs and benefits describe the capital required to implement agricultural NCS pathways, such as labour, maintenance, seeds and equipment and increases in on-farm net revenues.

Production management NCS pathways

Table 9 presents the ranges of the economic costs and benefits, as well as a description of the main costs and benefits for each agricultural NCS pathway. The ranges of these calculations vary significantly within and across different studies and are often region- or case-specific. **Mitigation potential for all pathways, except for reduced tillage, is the same after a 10- and 30-year implementation period.**

Table 9. Costs and benefits of production management agricultural NCS

Pathway	Mitigation potential[179] (Mt CO_2e/year)		Cost		Type of costs	On-farm benefits[180] ($/hectare/year)
	10-year	30-year	Implementation ($/hectare/year)	Mitigation ($/tonne of CO_2e)		
Reduced tillage	0.9	0.6	$70–$231[181]	No data	Equipment, lower productivity	$0.56–$101[182]
Nutrient management	6.3		$61–$197[183]	$9–$72[184]	Equipment, lower productivity, labour, input costs	Up to $153[185]
Cover crops	9.78		$83–$344[186]	$88[187]	Seeds, equipment, labor	Up to $1,815[188]
Legume in pasture	0.22		No data	$1[189]	Seeds, equipment, labour, lost production	Up to $208[190]
Increased legume crop	2.6		$10–$770 per hectare[191]	No data	Lost production, seeds, equipment	$18–$674[192]
Manure management	3.0		$112–$1,158/ $69–$92 per head[193]	$4–$2,194	Lost production, equipment, labour	$0.54–$32 / $15 per head[194]
Crop residue (biochar)	9.82		$25–**$16,936**[195]	No data	Transportation, infrastructure, labour	$1,005 –$2,413[196]

*Bolded value denotes value chain establishment cost

Adopting any type of NCS on agricultural lands requires shifts in production management systems. Consequently, developing compelling business cases to incent sustained adoption will need to be deeply rooted in regional and operational specifics. For instance, decreases in annual on-farm net returns from reduced tillage range from $4–$27 per hectare in Ontario and Saskatchewan,[197] and up to $81 per hectare in the northern clay soils of Quebec.[198]

For cover crops, nutrient management and increased legume crops, losses in productivity and net-farm revenues are listed as economic costs in certain regions and production systems (e.g., efficient N-fertilizer application for canola-wheat operations in the Prairies). In other regions and production systems it can increase net-farm revenues (e.g., efficient N-fertilizer application for corn operations in Southern Ontario).

Regional growing conditions, commodity prices, scale of implementation and differences in production systems all affect how a project baseline is measured against outcomes.

For instance, a grain farmer in Saskatchewan who incorporates legumes into their rotation may see a decrease in their net revenue due to higher grain prices, however, their fertilizer requirements may also decrease, providing cost savings. **For these pathways, cost-effectiveness will depend on the context (i.e., region and production system), and the flexibility of financial incentives to accommodate different farm-level baselines.**

For other pathways, such as crop residues and manure management, implementation costs far exceed any observed economic benefits. Making these pathways more cost-effective will help stimulate adoption, but this will require considerable incentives and a strong set of enabling conditions that can support long-term adoption.

Table 10. Costs of tree management agricultural NCS

Pathway	Mitigation potential[199 200] (Mt CO_2e/year)	Cost		Description of costs
		Implementation ($/hectare/year)	Mitigation ($/tonne of CO_2e)	
Avoided conversion of shelterbelts	0.2	**$3,245**[201]	$20–$40[202]	Lost revenue, maintenance
Tree intercropping	3.9	$106–$421[203]	$20[204]	Labour, maintenance, cost of seedlings, lost revenue
Riparian tree planting	0.7	$215–**$3,225**[205]	$25[206]	Labour, maintenance, cost of seedlings, lost revenue
Silvopasture	2.8	$15–$187[207]	$22[208]	Labour, maintenance, cost of seedlings, lost revenue

* Bolded values denote opportunity cost of pathway implementation

Tree management NCS pathways

Like production management pathways, the costs associated with tree management agricultural NCS differ depending on regional and operational contexts (Table 10).[209]

For instance, tree intercropping in Ontario is estimated to reduce annual net revenue by $106–$421 per hectare.[210] Avoided conversion of shelterbelts in the Prairies is estimated to reduce net revenue by $3,245 per hectare per year.[211]

In each case, **producers are faced with a decrease in on-farm net revenues and few options to offset these costs**. In contrast, the benefits of adopting tree management practices are quantified as ecosystem services (see next section), which are often not considered in farm accounting guidelines or reflected in changes in net revenue.

Ecosystem services

Each agricultural NCS pathway can provide a range of ecosystem services that strengthen the overall business cases for adoption. These services are increasingly becoming of interest to a variety of investors, e.g., carbon sequestration and storage, food provisioning and water regulation. When accounted for, these services are central to advancing a compelling business case to adopt NCS on agricultural lands by illustrating what benefits can be compensated to help offset implementation costs:

- **Provisioning services,** primarily food production, generating **$36.3 billion or 1.8% of Canada's GDP in 2022**.[212] The benefits from provisioning services are already captured in on-farm net revenue estimates for production management NCS. Other sources of revenue from tree intercropping, e.g., wood, fuel, fibre and crop residue usage may only be partially or indirectly captured. These benefits can range from $179 per hectare for annual timber production associated with tree intercropping in Quebec to between $42 to $85 per tonne for crop residue used in the production of biofuels in the Prairies.[213]
- **Regulating services**, supplied by agricultural lands, include carbon sequestration, enhanced air quality, water purification and regulation, pollination, resilience to extreme weather events and erosion control. These services are enhanced using NCS, specifically those with crop and tree management components. For instance, cover crops provide disease and pest control, reduce nitrogen emissions and nutrient overloading in water supplies, sequester carbon,[214] and **provide erosion control valued at $1,777 per hectare per year** in Prince Edward Island.[215] Trees on agricultural lands provide similar benefits to erosion control, with **shelterbelts in the Prairies providing more than $128 million annually.**[216] **Intercropped trees in Alberta and Quebec contribute more than $3 billion per year and $2,151 per hectare annually, respectively**.[217]
- Other NCS that provide **regulating services in the form of emissions reductions**, such as nutrient management, are critical to minimize the impact agriculture has on the environment. A case study on an 800-hectare farm in Prince Edward Island found that nutrient management provides up to $1,142 per hectare in emissions reductions in the first year of implementation, and up to $618 per hectare in subsequent years.[218] Similarly, NCS like cover crops and trees on agricultural lands could also provide **critical global pollination services, which are estimated to contribute $217 billion to the world economy**.[219]

- **Supporting services**, such as nutrient cycling, soil formation and biodiversity are also critical outcomes of agricultural lands and NCS. For instance, **shelterbelts in the Prairies are estimated to have contributed more than $6.6 million of biodiversity provisioning over a 20-year period**.[220] Nutrient cycling can be supported through NCS such as manure management, crop residue, reduce tillage and cover crops that support the decomposition and cycling of plant and manure residues, supporting healthy soils.[221] NCS also support soil formation in the form of soil biomass and organic matter generation through the planting of cover crops, reduced tillage, crop residue and including trees in agricultural landscapes.[222]
- **Cultural services** in agricultural landscapes provide aesthetically pleasing and culturally significant landscapes that support recreational activities such as agritourism, hunting and birdwatching. A riparian planting project along 2.4 km of Alderson Creek in B.C. estimated that the establishment of the buffer provided **between $2,941 and $4,909 of outdoor recreation improvements annually** such as increased wildlife viewing and enjoyment of riparian areas.[223] Agricultural NCS have also been associated with health benefits. **For instance, nutrient management, riparian buffers and shelterbelts can reduce the spread of agri-chemicals associated with cancers and respiratory diseases and provide benefits to mental health.**[224]

Advancing NCS pathways in Canadian agricultural lands

Agricultural lands can mitigate between 28.5 to 48.1 megatonnes of CO2e annually after a 10-year implementation period. This is almost half of the mitigation potential of all NCS pathways included in the Drever et al. (2021).[225]

The bulk of this mitigation potential is made up of cover crops, nutrient management, crop residue and legumes in pasture, which align with recent policy attention to advance strategies to improve nutrient management and soil health.

Additionally, certain agricultural NCS pathways with relatively low costs to implement or the ability to save on operational costs over time represent a different type of investment opportunity. Reduced tillage and tree intercropping are the primary examples followed by higher but likely still manageable costs for cover crops and nutrient management.

Crop residue, avoided conversion of shelterbelts, tree intercropping and silvopasture have limited policy attention, which, coupled with high implementation costs, will continue to constrain on-farm investments in these practices.

Agricultural NCS that require changes in on-farm management practices are also constrained by adoption issues such as limited knowledge sharing and training opportunities, variabilities in production, socio-cultural stigmas and systemic issues such as rising farm debts and increasing production costs. Thus, **investments in agricultural NCS must incorporate farmer engagement to ensure NCS and production viability and vitality.**

Section 3: Assessing market readiness for NCS investments

Momentum around NCS is at an all-time high. **Eighty-four percent of Canadians support advancing more NCS projects.**[226] There is clear evidence that investing in NCS makes economic sense for public and private investors. Building a compelling business case is crucial; however, it remains only one piece of the puzzle.

Market conditions, regulatory environments and ground-level realities can limit even the most attractive NCS opportunities that address the nexus of climate, nature and equitable economic growth.

A better understanding of where there are current opportunities to increase action and where key improvements are needed will be crucial to building investor confidence and unlocking the full potential of NCS in Canada.

In this section, we assess the ***investment readiness***[227] of different NCS pathways in Canada by considering where there are current **opportunities to accelerate action** to help build investor confidence, increase the overall number of NCS opportunities and scale investments in nature in Canada.

Opportunities to accelerate action

Natural systems are multi-dimensional. Designing projects that can capture these dimensions and remain attractive to investors is a key consideration for advancing NCS projects in Canada. To unlock the economic potential of NCS in Canada, there are several practical solutions available to build confidence among public and private actors and demonstrate that **investing in nature makes economic sense**.

Enhance project-level support

Canada's roadmap for advancing a more resilient and inclusive national economy hinges on NCS being able to sequester and store a sizable portion of our national emissions. Ensuring key ecosystems can continue to drive long-term ecological and economic growth will require a fundamental shift in the way we value, account and consider nature in project-level decision-making. The following are a few of the ways we can start to better understand what is needed to advance more NCS projects in Canada:

Advance national NCS project-level support guidelines

Standard approaches that can be adapted to different contexts and resource conditions with confidence can enable a greater number of communities, projects and sectors to be better equipped to fully capture the benefits of NCS at the nexus of climate, nature and economic prosperity. In the absence of project-level support, NCS approaches continue to suffer from

persistent capacity constraints and high transaction costs to collaborate across sectors. In many cases, NCS projects are also being limited by narrow mandates.

Developing and implementing NCS, especially when adapting NCS to new locations or regions, requires substantial knowledge and resources. This lack of capacity is compounded by a lack of guidance on how to implement NCS projects, which adds a layer of difficulty for project leaders who are not familiar with implementing similar types of projects.

Enhance capacity for Indigenous-led projects

Indigenous communities are leaders in the NCS space. There is an increasing number of innovative Indigenous-led *conservation economy* models such as establishing Indigenous Guardians, that target climate and biodiversity while prioritizing community development objectives. A few additional examples include:

- **The Indigenous Forestry Initiative** provides funding to Indigenous-led projects and seeks to address Indigenous-identified issues and accelerate Indigenous awareness, influence, inclusion and leadership.[228]
- **Indigenous-led conservation and restoration initiatives and sustainable farming initiatives**. For instance, through Canada's Target 1 Challenge, seven IPCAs have been established or have received funding across Alberta, Saskatchewan and Manitoba.[229] These projects enhance Indigenous-led conservation, reconciliation and connectivity, in addition to benefiting from the ecosystem services derived from grassland NCS projects.
- **Indigenous-led sustainable farming initiatives.** The Manitoba Métis Federation received a $7.7 million investment in 2023 to support Métis farmers in adopting sustainable farming practices, including plans for peer-to-peer learning opportunities between Elders, Traditional Knowledge Holders and Red River Métis producers to help increase adoption.[230]
- **Aviqtuuq Inuit Protected and Conserved Area** spearheaded by the Taloyoak Umaruliriqigut Association in the Hamlet of Taloyoak, Nunavut has received more than $5 million to invest in a Guardians program and the Niqihaqut cut and wrap facility as pillars of a local conservation economy. The social return on investment for this project, which accounts for social, environmental and economic benefits, is estimated to contribute $8.3 million annually to the local economy.[231]

These investments signal the importance of continuing to fund innovative Indigenous-led projects. The continued success of these types of investments will depend on parallel investments in the capacity of interested Indigenous communities to design and implement NCS projects, while also being appropriately equipped to monitor success and share experiences with like-minded communities.

In line with the recent recommendations by the RAD Network, investing in support for training, knowledge translation and distribution, and practical project support in addition to ongoing financial investments will be important to grow the number of Indigenous-led NCS projects in Canada.[232] Improving capacity within and across different Indigenous-led projects can help better demonstrate the catalytic growth potential of these investments in providing meaningful and stable job opportunities to build long-term community prosperity.

To further accelerate this support, there is a need to consult, engage and develop meaningful partnerships with Indigenous leaders, businesses and communities to understand what types of support are needed.

Standardize environmental-economic benefit accounting

NCS projects provide a range of ecosystem services and benefits that are often not accounted for in the decision-making process. This leads to the economic benefits of NCS investments being routinely **undervalued, unaccounted for and uncompensated**. Benefit accounting methods that incorporate the full value of NCS projects are available. Applying these methods to NCS projects in Canada will be fundamental to making better and more competitive business cases. Training and guidelines on how to use more appropriate benefit accounting methods for NCS, along with clear examples of their successful use, would considerably increase the pursuit of more NCS projects across Canada. Examples of what the proper benefit accounting methods can help address include:

1. Avoided conversion is measured and evaluated by comparative opportunity costs, e.g., unrealized revenues by not converting to croplands. For producers, accounting for project benefits using this type of approach causes most landscape conservation efforts to be discounted. Avoided conversion in wetland ecosystems and forests are similarly valued using an opportunity costs approach.
2. When the ecological and climate benefits of Canadian ecosystems for governments, landowners and private industry are included and properly compensated, **the economic benefits of conservation far outweigh the costs.**
3. Tree management on agricultural lands faces similarly high opportunity costs as land is taken out of production to implement the change in practice. Though some of this land may be marginal or considered less productive, high opportunity costs are prohibitive for many producers to consider implementation. Sparse supporting data on how the incorporation of trees on agricultural lands can support productivity and provide other on-farm benefits compounds the undervaluation of these NCS opportunities.
4. **Accurately measuring project outcomes and broader economic impacts of NCS**, such as jobs, GDP and ancillary services.

Invest in a national restoration economy

Investing in landscape restoration is one of the most cost-effective ways to create jobs and improve resilience to climate change while also moving away from one-and-done models of economic growth (Figure 10). Increasing investments in ecosystem restoration efforts across Canada are estimated to be able to **generate up to $30 of economic returns for every $1 of investment** by creating more jobs, restoring economic value to degraded landscapes and incentivizing greater efficiency in the use of natural resources. Restoration projects have an easier time of addressing concerns of "additionality" for offset and credit markets, and their longer time horizons can be used as a way for public and private investors to hedge their NCS portfolios.

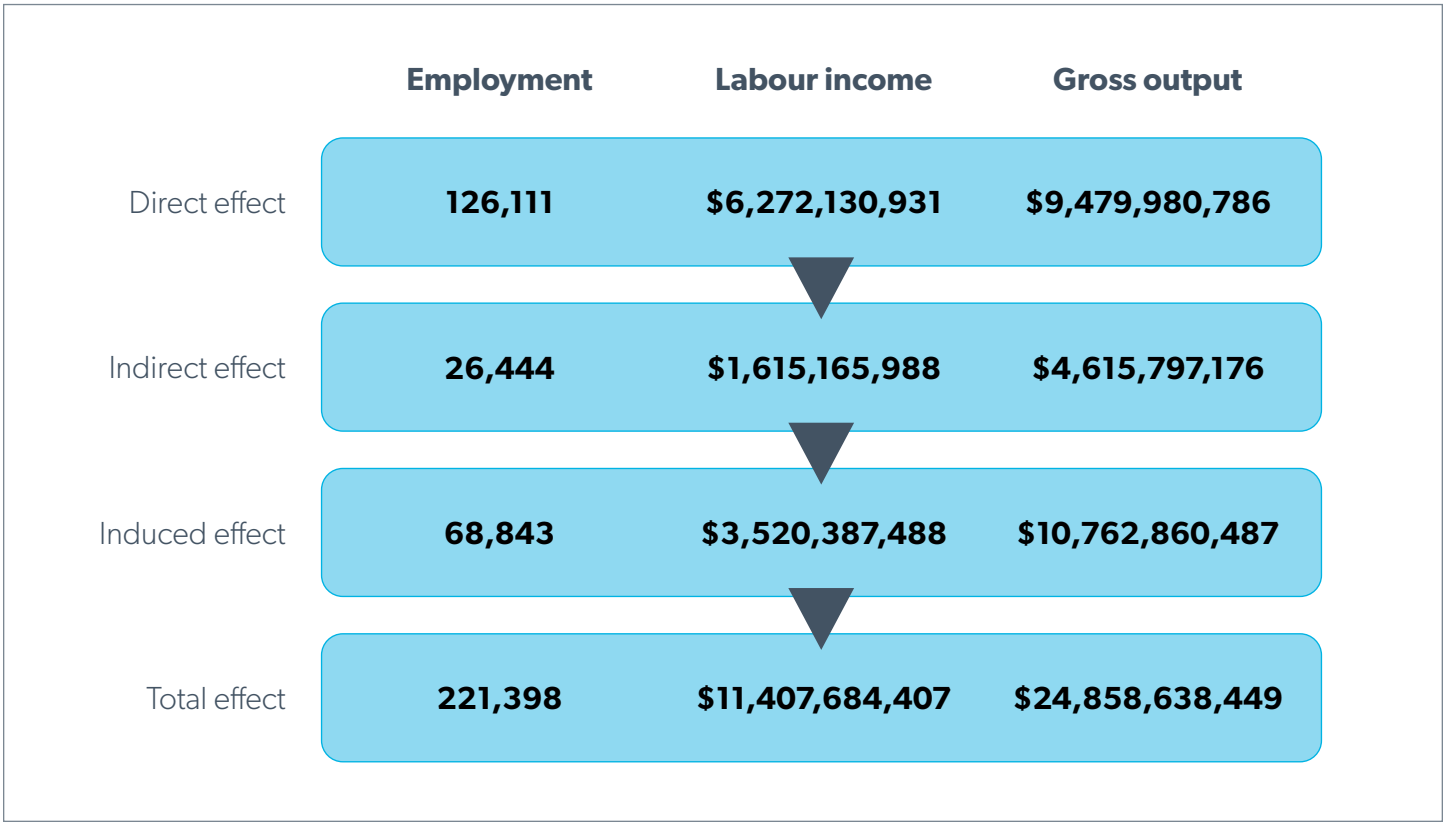
Canada's renewed commitment to forest restoration, driving better forest management practices and improving the efficient use of forest products is an example of the emerging economic opportunity to invest in restoration projects. With recent commitments to restore 19Mha by 2030 as part of the Bonn Challenge, and more than $3 billion of government investment in forest restoration (2 Billion Trees), we are starting to see the outline of a national *restoration economy* where investing in ecosystem restoration can act as a catalyst, rather than a limiter in growing Canada's economy.

Prioritize nature-forward policies and regulations

Incentivize and prioritize the conservation of carbon-rich peatlands. These ecosystems are among those most at threat from competing land-use pressures and inconsistent emissions accounting.[234] Current environmental regulations require any disturbances to be offset by restoring or protecting a wetland of equal value, or to reclaim the disturbed areas following the conclusion of the project. However, the scale of emissions from these disturbances is often greater than those being calculated (e.g., disturbances from resource exploration are uncounted) and inconsistent with the timescale needed to offset through restoration (50–100 years).[235]

While Canada's critical mineral reserves remain crucial for any transition to a low-carbon national economy, limiting disturbances in carbon-rich peatland ecosystems should be considered an equal priority among policymakers to avoid unnecessary carbon emissions, most of which would be considered *irrecoverable*. **Developing a comprehensive national protocol to limit disturbances in carbon-rich peatlands,** in line with leading international jurisdictions, could help unlock the mitigation potential of "climate crucial" ecosystems.

Figure 10: Total annual contributions of ecological restoration to the U.S. economy



Source: Everglades Foundation, 2024[233]

Extend no-net loss policies as a baseline for land-use decision-making. Grasslands continue to be lost at an alarming rate. Many of the privately owned grasslands face disproportionate conservation pressures from not having the same protections as other landscape types. Grasslands on private lands can be protected through a mix of public and private funding that incentivizes conservation to achieve multiple goals. But who benefits from these actions, and by how much, needs to be more clearly accounted for and compensated, i.e., making sure landowners are compensated for securing habitats for species at risk, bolstering climate resilience by storing carbon, contributing to national targets, (e.g., 30 by 30), and supporting more sustainable value chains (e.g., cattle ranching).

In 2023, the 6,100-hectare Bunchgrass Hills Conservation Area established south of Kamloops, became one of the largest private grassland conservation projects in B.C. with funding support provided by the provincial and federal governments, in addition to private-sector investments and the participation of private landowners.[236]

Public funding programs, such as the Permanent Cover Program to restore 445,000 hectares of grassland cover in Alberta, Saskatchewan and Manitoba, illustrate the potential for public-sector programs to create the right market conditions for future public and private NCS investments.

Forests are also increasingly threatened by conversion to croplands and urban expansion. Dual threats of urban sprawl into agricultural lands and agricultural expansion into forested areas are the primary driving mechanisms of forest conversion. More than 225,000 hectares of forests have been converted between 2010 and 2015, which represents half of all forest cover lost from human-induced land-use change.[237]

Prime agricultural lands are also among those most at threat of conversion. While areas have been established to protect prime production areas, including the Greenbelt in Ontario and Agricultural Land Reserve in B.C., additional policy measures are needed to protect existing farmlands and avoid the conversion of other natural landscapes.[238]

Improve clarity and consistency in offset and credit markets

Develop dynamic protocols and best practices that can support rapidly evolving nature-based investment markets while addressing complex issues, such as additionality, permanence, and project-level reporting. While emerging nature-based markets come with some risks, they can also be used as a tool for catalyzing investment and continuing to grow the potential of these types of market instruments:

1. **The IFM protocol on private land** *(version 1.0)* establishes conservative baseline rules, project boundary and leakage rates generally aligned with the Voluntary Carbon Standards.[239] While private lands represent less than seven percent of forest lands in Canada, applying the protocol represents an opportunity to test its effectiveness before scaling out.
2. **B.C.'s forest carbon offset protocol 2.0** (FCOP 2.0) has a broader scope than its federal counterpart. It is more conducive to NCS projects like avoided conversion, afforestation, reforestation, conservation and IFM projects. In addition, the newly designed B.C. Output-Based Pricing System (B.C. OBPS) allows the usage of offset credits to achieve compliance, creating significant future demand for forest offsets in the province.[240] The B.C OPBS is a carbon pricing system that is mandatory (as of April 2024) for industrial emitters whose operations emit more than 10,000 tons of CO_2e per year. The system incentivizes industrial GHG emissions reduction and supports B.C.'s carbon market by facilitating the buying and selling of B.C.-verified offset units generated under the new B.C. forest carbon offset protocol. Opportunities like the ones presented by the B.C. OBPS will be crucial to emulate in other jurisdictions to stimulate private investment in NCS.
3. **The voluntary Canada Grassland Protocol** offers an avenue to create financial benefits for the avoided conversation and restoration of Canadian grasslands.[241] Grasslands are not currently addressed under the Canadian Greenhouse Gas Offset Credit System. Their inclusion could help address persistent issues of additionality, permanence and low investor confidence by regulating transactions in a compliance market.

Carbon markets are high-risk, high-reward opportunities. Current demand in voluntary carbon and offset markets is low and inconsistent. This **means the price per ton of carbon is typically lower than the estimated break-even carbon price** that would make a forest carbon project economically viable.

Canada's average break-even carbon price — the price at which forest carbon projects become feasible — is estimated at $6.9 per ton of CO_2e for forest conservation. This is more than double the current price of carbon in voluntary markets. In contrast, the break-even price for carbon capture and storage in Canada ranges from $89 to $117 per ton of carbon, illustrating the relative cost-effectiveness of advancing an NCS strategy.[242]

Clarity around carbon rights can be improved under existing forest tenure systems. Most of the managed forest area in Canada is provincial Crown land (i.e., public land). Wood harvesting rates are determined by the provincial logging allowances. Forest tenures on Crown land typically grant the right and conditions under which timber is harvested. Harvesting licenses range from 20–25 years. Except in B.C., these systems do not currently address carbon rights, meaning there is little incentive for tenure holders to explore the potential of forest carbon projects on Crown land. This creates a barrier for to forest climate mitigation and nature investments.[243]

Access to voluntary agricultural carbon markets can be improved to meet growing demand for these markets as an additional revenue stream for many producers. Currently, Canadian farmers face a lot of barriers to reaping the benefits of carbon markets. These include the costs associated with soil sampling and verification, the burden of aggregating and

reporting historical farm data, the uncertainty of carbon credit payouts and scaled returns favoring large agricultural operations. Limited coherent data governance surrounding MRV activities presents additional concerns surrounding data privacy, credit ownership and the aggregation of farm data.

Advancing novel ecological goods and services (EG&S) markets can help unlock the full value of Canadian grasslands. Like voluntary carbon markets, emerging voluntary or compliance EG&S markets can provide several pathways to incentivize and certify biodiversity-friendly production systems. Currently, the value of EG&S is excluded from land assessments and the market value of farmlands, inputs or products, creating a perverse financial incentive to convert grasslands to high-value cropland. To shift the imbalance between revenues generated by cash crops and grasslands, EG&S need to be transformed from externality to important economic output. This can be achieved through financial incentives that reward nature-positive land management and supply chains.[244]

For example, the Grasslands Conservation Initiative is a proposed program led by the Canadian Cattle Association (CCA) in partnership with conservation organizations like Ducks Unlimited Canada and the Nature Conservancy of Canada. It would provide financial incentives to ranchers for stewardship practices that maintain critical habitat and ecosystem services on native prairie grasslands. CCA is seeking to partner with AAFC, ECCC and other industry, private and philanthropic investors and livestock producers to create a five-year pilot project.[245]

Encourage innovative data collection and measurement solutions

Investing in greater data availability, accessibility and interoperability can help reduce the up-front data collection costs for those seeking to advance NCS projects. Investments in greater data collection capacity are emerging as a key priority among private investors. While there remain several different methods, tools and approaches to collect ecological and economic data capable of catalyzing further NCS investments, the development of a standard, accessible approach remains a priority among public and private investments. The closer we can get to developing national, high-frequency and publicly available ecological data, the closer we will be to unlocking the economic potential of NCS in Canada. To realize this objective, the following actions are needed:

Standardize the collection, reporting and sharing of key ecological data

Ecological data is fundamental to creating better NCS business cases. It allows for the accounting of the additional benefits that NCS can provide. Investing in **national, standardized, high-frequency and publicly available data** could significantly reduce the cost to design, measure and report on NCS projects across Canada.

Grasslands: Baseline data for Canada's remaining grasslands are being improved. There is a steep uphill battle to simultaneously collect the right data and develop a clear business case to invest in Grassland conservation and restoration.[246] Advancing clear and comprehensive baseline measures of the state and extent of Canadian grasslands should be considered a national priority as these ecosystems support primary producers, Indigenous peoples and several communities across Canada.

Forests: More frequent on-site physical measurements of carbon in forests are needed to ensure better data inputs for more accurate models for forest carbon flows. Physical measurements at hundreds of sites are present in Canada's National Forest Inventory, but measurements are too infrequent.[247]

Wetlands: A complete inventory of wetlands in Canada is underway. More granularity is needed to provide a clearer picture of their extent and thus facilitate investment projects. Under these conditions, small wetlands (under two hectares) are particularly vulnerable to conversion pressure. Coarse data resolutions and out-of-date inventories often exacerbate these pressures. These types of wetlands are often entirely missed in provincial inventories.[248]

Agricultural lands: Data on the historical status of agricultural lands is available, yet recent data on the health of these landscapes is needed. AEIs, representing national data on the environmental conditions and risks on agricultural lands such as soil organic matter, soil erosion and soil salinity, have not been reported since 2016.[249] Furthermore, the classification of agricultural lands, based on the Canada Land Inventory, has not been updated since the 1990s.[250]

Data availability and accessibility remain a considerable constraint for scaling NCS projects in Canada. Gaps in baseline data and the lack of interoperable data sets create a high-cost barrier for project design and implementation. These costs can significantly reduce the incentive to pursue any type of NCS strategy at scale without substantial upfront investment. The result is a lack of national, standardized, high-frequency and publicly available data that is necessary to drive investment.

- **Research on tree management agricultural pathways is limited.** Clear data on how these NCS can provide on-farm economic benefits is needed.
- **Legume crop and manure management pathways have potential, but a lack of evidence showing cost-effectiveness at the farm level are limiting adoption.**
- These data gaps also extended to studies examining broader economic impacts, such as jobs, GDP and ancillary services. This **emphasizes the need for not only integrated assessment guidelines but also a general expansion of the scope of agriculture research.**

Invest in the development and implementation of new technologies

New technologies can support research on the knowledge gaps persistent in NCS business cases, providing investors with a breadth of accessible data points for analysis. Additionally, technologies will also help projects conduct MRV activities to track the impact of investments.

For example, **high-resolution satellite data and modeling are increasingly being applied to research and MRV protocols to understand the impacts of NCS**. They show promise in providing lower-cost data collection on NCS outcomes such as carbon sequestration, maintaining ground cover and restoration progress. While these technologies offer opportunities for extensive data collection and analysis, in many cases ground-level sample collection is still required and cutting-edge technologies (e.g., LiDAR) have not been fully deployed in Canada.

Technologies deployed in agriculture also present opportunities to streamline the collection and reporting of production management NCS. Tools such as farm management software and monitors installed on farm machinery can collect data in real-time to help producers understand the impacts of applied NCS as well as support data-driven decision-making. The development of data governance systems and policies surrounding farm data privacy, ownership and use can support the use of farm data for reporting and research purposes, ensuring producer interests are protected. Participation in voluntary certification such as Ag Data Transparent (ADT), developing voluntary codes of practice amongst technology firms, investment in farmer-led data cooperatives and increasing data transparency can also abate concerns of novel technology applications.

Expanding field testing of novel, high-mitigation pathways. Research on tree management agricultural pathways is limited and clear data on how these NCS can provide on-farm economic benefits is lacking. Similarly, research is limited to the cost-effectiveness of farm-level production management pathways, such as legume intercropping and manure management pathways. In both cases, a lack of applied data continues to be one of the main drivers limiting the adoption of these practices.

Evaluate the cost-effectiveness of MRV to balance accuracy and ease of application. Activities occur over lengthy five-to-10-year periods, and efforts to measure the ecosystem services of NCS are not always coordinated. Certain MRV tools, like process-based models, are streamlining MRV activities and reducing the administration burden and costs of these efforts in novel applications in agricultural lands, but ground-truthing is typically required to establish baselines and sufficiently measure ecosystem changes.[251]

To address inconsistent data collection methods and metrics, recent programs have attempted to standardize and coordinate how data is collected. For example, the Forest Inventory and Analysis program in the U.S. provides necessary data on the extent and condition of forest resources.[252] These programs provide publicly available data that can be used to estimate project-level costs and mitigation potential to build better NCS business cases while reducing project costs related to data collection.

Adopt best practices on data and disclosures

Consistent data collection and reporting methods can close knowledge gaps by increasing the interoperability of key ecological and economic datasets. Undefined standards on what outcomes should be measured, appropriate methodologies for measurement, timelines for data collection and analysis, and justification for applied approaches diminish the impact NCS data has on attracting investors. The interoperability of datasets, standardized data management and access to NCS-related data are pivotal to understanding beneficial outcomes and risks of investments in NCS. Additionally, new coordinated systems for streamlining the collection and reporting of data could reduce the cost of entry for an individual project by reducing upfront costs for data collection.

Advance best practices around data rights, including access, ownership and use. Leadership in data governance and management best practices are needed to support data-driven investments in NCS. There remain uncertainties surrounding best practices of data governance in the advancement of data collection, MRV platforms and applications of artificial intelligence, limiting data sharing and interoperability. In the context of agriculture, where data is collected through existing technologies on farm machinery, clarity surrounding ownership of farm data, transparency of usage by third parties, privacy of personal information and trade secrets and interoperability between different data collection tools are pressing concerns. Participation in certifications such as Ag Data Transparent, increased interest in data cooperatives and investments in digital literacy from interest groups such as EMILI are growing solutions to these concerns.

Several measurement and financial disclosure frameworks are already being adopted across the public and private sectors. Recent recommendations from the TNFD identify key metrics to, in part, disclose an organization's nature-related impacts.[253] Similar standards exist in various formats from other organizations and initiatives, such as Task Force on Climate-related Financial Disclosures, Science Based Targets initiative, and the International Sustainability Standards Board.[254]

To ensure consistency across NCS projects, identifying pathways to standardize measurements and reporting obligations in line with relevant standards bodies can help foster greater clarity on how public- and private-sector actors can work together to increase investments in nature. Potential pathways to standardization can include mandating disclosures, as has been done across the European Union.[255]

Similar mandates could be upcoming in the Canadian context, with the Canadian Securities Administrators indicating they

could adapt, after consultation, climate-related aspects of the upcoming standards from the Canada Sustainability Standards Board into a mandatory standard.[256]

Invest in skills and transitional supports

NCS projects require specific expertise and skills to be successfully implemented. This can include experience planning and managing NCS projects or providing operational support, as well as ecological knowledge or technical expertise tailored to the project's requirements. To facilitate adoption, training for these NCS-specific skills is needed along with the ability for project leaders to be able to access professional networks to use workers with these skill sets.

To help advance more Indigenous-led NCS projects across Canada, it will be necessary to **partner with Indigenous leadership and community organizations. These partnerships would identify investment opportunities to improve access to training and transitional support.** Among these opportunities, Guardians are increasingly being recognized among Indigenous leaders as a cost-effective way to invest in their communities. Guardian programs create jobs capable of addressing community needs, stimulate further socio-economic development and attract future investment opportunities. Investing in Indigenous Guardians can generate a return on investment ranging from $2.5 to $20 for every $1 invested.

Driving NCS in agricultural lands requires advancements in human capital and resources to support producer entry into NCS projects. Investments in transitional services such as training agronomists with NCS approaches, soil health experts, farm planners and NCS peer networks can ease producer adoption of NCS practices. Transitional services can provide technical expertise on NCS implementation, such as land-use planning to account for the diversity of landscapes included in agricultural lands, nutrient and input prescriptions and crop management and build technical capacity of farmers in NCS projects.

To ease the transition for more farmers to adopt NCS in Canada, investments in agricultural extension services are needed. These services can provide farmers access to the necessary technical support and certified crop advisors.[257] The Trusted Advisor Partnership (TAP) is a recent example of a science-driven initiative that supports Canadian farmers in on-farm transitions. The TAP is a public-private partnership that aims to train more than 225 agronomists by 2029.[258]

Consultations for the Sustainable Agriculture Strategy highlighted peer-to-peer networks as a clear opportunity for fostering mentorship and helping new or younger farmers learn about new practices more quickly.[259]

Beyond agriculture, similar programs can help fill gaps needed for NCS projects across Canada. For example, the Growing Canada's Community Canopies initiative, through the Green Municipal Fund, directs funding to help address barriers that local governments and communities face when undertaking tree canopy expansion projects, such as insufficient staff capacity and gaps in knowledge and financing.[260]

Enable greater cross-sector collaboration

Natural systems do not abide by political or sector-based boundaries. Investing in NCS to reduce emissions and grow Canada's economy will require an expansion of both resources and mandates that go beyond these boundaries to **create action-oriented coalitions capable of accelerating NCS opportunities and investments**. The success of these coalitions will hinge on being able to include, organize and act on a diversity of perspectives from across sectors and scales of government, Indigenous leadership, farming organizations and environmental non-profits.

The following represents how we can start to think differently about working together to advance action on NCS in Canada:

Align funding to target the nexus of climate, nature and economic prosperity

Policies and programs need to financially promote NCS investment at a project-level, while also ensuring that appropriate supports are available during implementation. Currently, finding sufficient funding for an NCS project can require receiving incentives from different financial programs and sources with the potential that a project still will not receive sufficient compensation. This fragmented funding disincentivizes the adoption of NCS. It can be addressed by aligning and streamlining funding to ensure project leaders can easily access enough funding.

Specifically for agriculture NCS, current financial incentives offered at the provincial and federal levels result in fragmented NCS adoption by landowners. Some programs offer less-than-viable subsidization rates that do not compensate sufficiently for the range of ecosystem services provided by the landowner. Additionally, several of these programs do little to address the persistent risks landowners face when changing management practices, resulting in low adoption rates for some key NCS pathways.

Leverage record levels of public investments in nature

Public investments in nature have more than doubled in the last five years, growing from $5 to more than $11 billion. Meeting Canada's targets will require another $20 billion of annual investment for biodiversity alone.[261] While interest among the public and private sectors remains at an all-time high, understanding how investors can share the financial risks by working more closely together will be one of the keys to transforming recent momentum into a national strategy for resilient economic growth.

Finding ways to successfully blend and leverage sources of public and private finance can help reduce several of the growing pains surrounding nature-based markets, including mitigating higher levels of risk and uncertainty. In areas where public investments are set to continue through the end of the decade, stabilizing market conditions can help identify what types of innovative finance tools might be useful for scaling NCS investments.

Investments of immediate interest include:

More than $5 billion was committed as part of the Natural Climate Solutions Fund to stem the loss of, restore or better manage forests, wetlands, peatlands and grasslands.[262] Provinces and local governments are leveraging these commitments into longer-term conservation and restoration funding. Governments in B.C., Alberta, Manitoba, Ontario and Quebec have invested more than $172 million in wetland conservation and restoration projects.[263]

In the agriculture sector, $3.5 billion has been committed through the Sustainable Canadian Agricultural Partnership (SCAP),[264] to enhance competitiveness, innovation and resiliency in the agri-food sector. While most of this funding is intended to support sector-based growth, targeted nature-based commitments are also being made under SCAP through cost-shared beneficial management practice programs, such as **$250 million invested under the Resilient Agriculture Landscapes Programs.**

In addition, the **Agricultural Climate Solutions Fund**, part of the Natural Climate Solutions Fund, invests $885 million through two sub-programs, the Living Labs Initiative and the On-Farm Climate Action Fund (OFCAF). OFCAF funding enables the adoption of certain key on-farm NCS, including cover cropping, nutrient management, rotational grazing and legume intercropping (except in Ontario). These types of programs demonstrate the growing alignment between the federal and provincial governments in providing direct support to producers. Understanding how these programs might intersect with private-sector investors could result in a **substantial opportunity to invest in NCS in certain agricultural producing "hotspots"**, such as the Southern Prairie Region and Southern Ontario (See Section 4).

Leveraging these investments with new sources of private and blended finance will be necessary to scale NCS initiatives across Canada. Understanding how public programs are performing, and how they interact with broader market-based systems can help inform where interests are aligning and what type of future investment opportunities make the most economic sense.

Diversify and de-risk NCS investments

Increasing investments and action around NCS in Canada will carry a unique set of considerations and potential risks for different types of project proponents. Designing support programs that **broaden eligibility and provide a way to share the financial risk of adoption** will be essential to encourage the development of more NCS projects. For instance, programs with flexible or incremental eligibility requirements that also accommodate a diversity of land uses can lead to more sustained uptake. Providing ecologic or agrologic specialists to support program objectives can also improve uptake by reducing uncertainty during transition.

In the agriculture sector, programs that champion early adopters, support innovation and encourage peer-to-peer learning are a proven approach to improve and sustain uptake. Production insurance could also be amended to reward, rather than penalize, farmers in trialing and adopting NCS to reduce the high risk and opportunity costs associated with localized outcomes. The use of insurance programs that cover losses during transitional periods of NCS implementation could be effective in de-risking investment for producers and could be considered for other sectors.[265]

In the forestry sector, public-private partnerships aimed at reducing emissions, while improving profitability are emerging to address the risk of transition. These partnerships explore long-lived and recycled wood products and represent opportunities to substitute energy-intensive materials like cement or steel with wood products. These are consistent with ongoing efforts in the forestry sector toward decarbonization, as well as an opportunity for skills development and job creation.

Three successful examples of these partnerships include:

- **Federal Investments in Forest Industry Transformation** provide funding to projects in the forestry sector with a focus on innovative, low-carbon projects that result in new or diversified revenue streams
- **Federal Green Construction Through Wood Program** provides funding to construction projects that use innovative wood-based building technologies
- **Forest Enhancement Society of BC (FESBC)**, supported by the B.C. government, is a public-private initiative that fosters IFM. The support from FESBC aims to ensure that value is generated from residual forest waste while mitigating risks like wildfires, improving wildlife habitat and generating economic activity. FESBC supports projects undertaken by forestry companies that enhance forest operations while contributing to emissions reductions and forest resilience.

Local community and municipal decision-makers need to be empowered with expanded mandates to undertake NCS projects in their communities. As NCS are often a shift away from previous behaviour, this requires substantial knowledge on what implementation would entail, how to build a successful business case for investing in an NCS and a thorough understanding of how an NCS approach can address community priorities. Designing local programs that support decision-makers to undertake NCS projects and learn from experiences across different departments can greatly increase the rate of success and likelihood of future NCS investments.

Build on successful public-private partnerships

Neither the public sector nor the private sector should be held responsible for transforming the way we think, understand and invest in nature. Where cross-sector goals and objectives have been identified, the development of public-private partnerships can harness the stability of public programs and the innovation drive of private capital.

In certain cases, these types of partnerships can be designed to support the transition of market systems that fully account for the value of natural systems, e.g., payment for ecosystem services programs that support transitions in on-farm production systems. In these cases, the public-private partnership model can be essential to initiate transitions through public funding, while working toward attracting eventual private investment through off-take agreements.

Examples of successful models include:

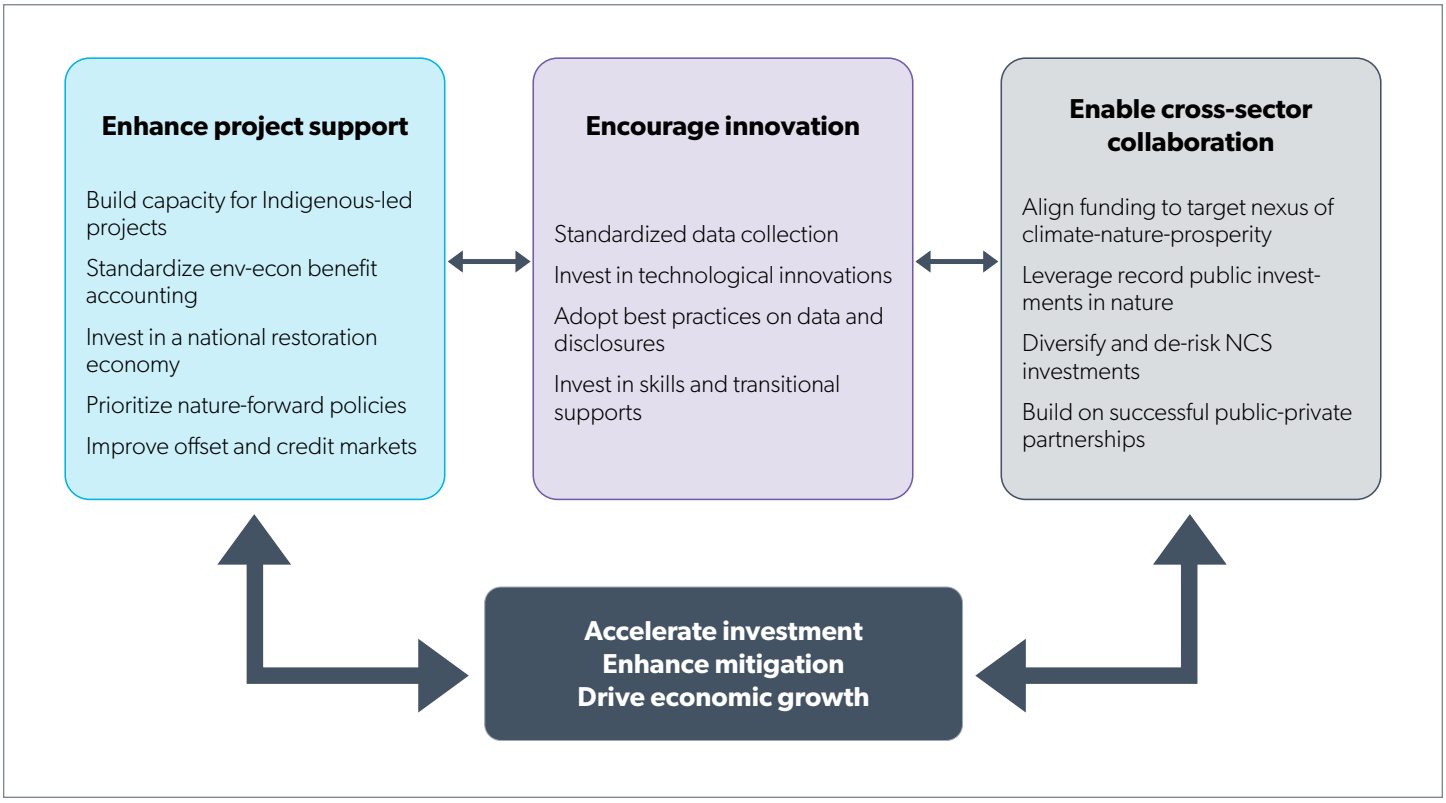
Alternative Land Use Services (ALUS) works with farmers, governments and corporate partners to advance NCS investments in agricultural lands. ALUS' Growing Roots program was launched with a $3-million investment from General Mills to advance the adoption of regenerative agriculture in Canada. The ALUS model provides funding to help farmers and ranchers plan, organize and establish new projects (e.g., cleaner water, wildlife habitat and support for pollinators), while also offering important knowledge and community building like the Partnership Advisory Committees (PAC) and coaches. The PACs are made up of local farmers, ranchers and environmental experts who understand the needs of their community and its surrounding environment.

Canadian Forage and Grassland Association is working on a similar approach to engage corporate partners to implement the Canada Grassland Protocol with the Climate Action Reserve.[266] The protocol is designed to support producers in generating high-quality, verifiable carbon credits that can be sold to corporate buyers looking to reduce emissions and meet their commitments. With the backing of producers, governments and corporate actors the protocol embodies the success of an emerging public-private partnership in creating a novel market for public and private investors to invest in the conservation of Canadian grasslands.

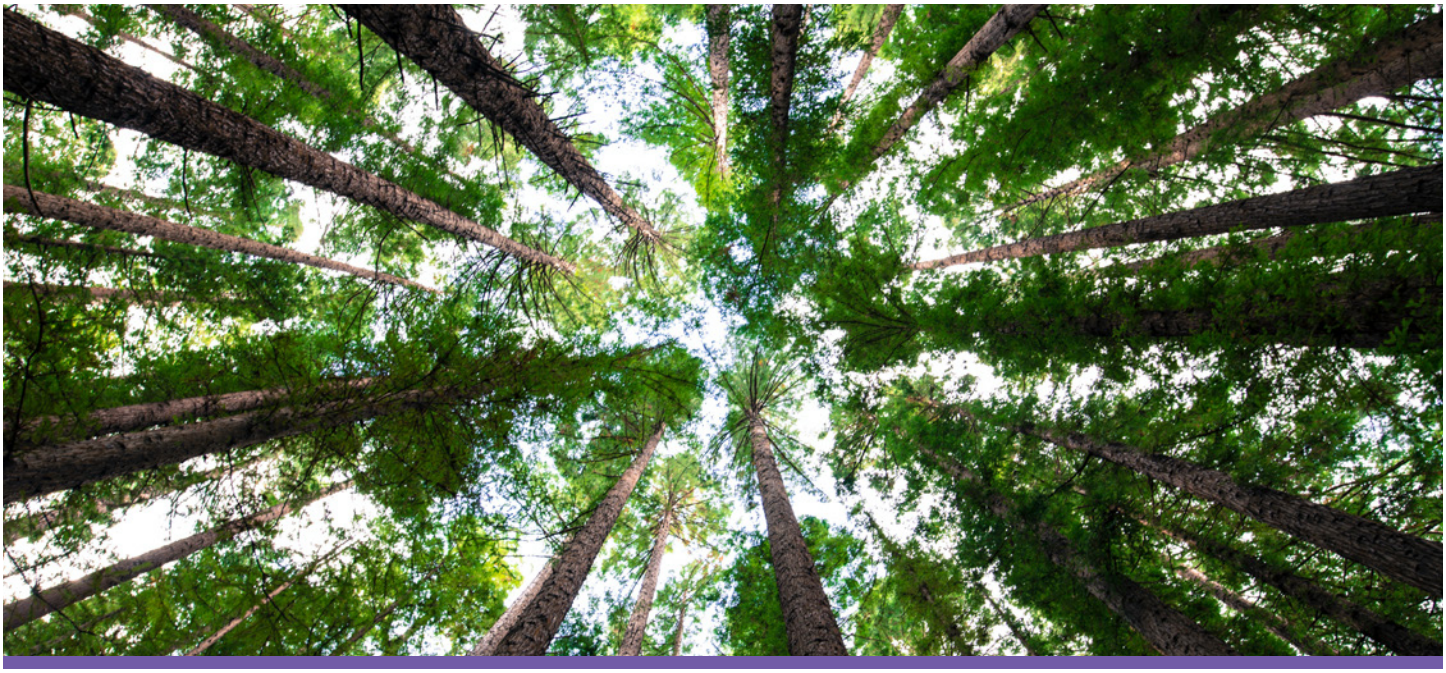
The Manitoba Species at Risk on Agricultural Lands is delivered in collaboration with Manitoba Beef Producers and the Manitoba Habitat Heritage Corporation. The program targets providing both information and incentives to cattle producers who use native grassland for grazing cattle to improve grass quality and maintain a healthy habitat for different species at risk.

Tripartite Framework Agreement on Nature Conservation between the federal government, the province of B.C., and the First Nations Leadership Council carries a public investment of $150 million to the Old Growth Nature Fund to work with First Nations to conserve up to 1.3 million hectares of priority old-growth forests. This agreement provides an exciting framework for understanding how to align multiple levels of government, Indigenous communities and private-sector actors to enhance conservation and restoration efforts, while also growing private investment opportunities (e.g., provincial offset and credit markets).

Figure 11. Practical solutions to accelerate the adoption of NCS in Canada



Source adapted from: Islam, 2024 [forthcoming][267]



Section 4: Hotspots for NCS investments in Canada

With the knowledge of how to design an effective business case in hand, this section turns its focus to application. It also looks at the potential to design Canadian business cases that attract multi-actor investments and blended finance to NCS projects that integrate multiple NCS interventions across a given landscape. By using examples from several different Canadian regions, this section illustrates how a strong business case can be developed and tailored to NCS investments in Canada.

Areas chosen as hotspots for investments in NCS were selected based on six criteria:

1. Contains at least two different landscape types or can support multiple NCS pathways
2. Experiences significant land-conversion pressures or historical loss
3. Contributes substantial socio-economic opportunities
4. Provides a breadth of ecosystem services that enhance socio-economic outcomes
5. Demonstrates a supportive policy environment or recent NCS innovations
6. Provides opportunities to attract multi-actor investments into the NCS project.

Based on these criteria, this report examines several examples of potential hotspots for NCS projects in Canada: (1) the Southern Prairies Region; (2) Southern Ontario; (3) B.C.; and a few Indigenous-led conservation economies across the country that are investment hotspots. **Each hotspot's unique set of features is examined at a high level, with the intention of developing more context-specific and comprehensive business cases in future iterations of this research.**

4.1 Southern Prairies Region

For this report, the Southern Prairies Region (SPR) is defined as a complex of natural systems encompassing 46.7 million hectares in Southern Alberta, Manitoba and Saskatchewan.[268] This region is rich in important natural landscapes, including native grasslands, agricultural lands and wetlands — specifically shallow freshwater wetland potholes that occupy more than 30 million hectares during wet years.[269]

The lands in the SPR are home to critical agricultural production. They have significant economic value stemming from grain, oilseed, beef and pork production on mostly Class 2 and 3 (prime and marginal) agricultural lands. Alberta, Saskatchewan and Manitoba agricultural production contributed $10.2 billion in 2022,[270] $6.3 billion in 2023[271] and $4.9 billion in 2022[272] to the national GDP, respectively. Across the three provinces, agriculture is responsible for the employment of more than 132,000 individuals and is a pillar for many rural communities.[273]

Agricultural production in the SPR is also key to global food markets and security, exporting vast proportions of grains, oilseeds and beef internationally. Alberta and Manitoba exported primary agriculture products valued at $7.3 billion in 2022[274] and $4.75 billion in 2023,[275] respectively. Saskatchewan's agricultural exports exceeded $20 billion in 2023.[276] Exports from this region are growing. Saskatchewan has seen a 74% rise in exports since 2013,[277] and Manitoba's exports have increased 61% since 2019.[278]

Though agricultural production and the natural landscapes it relies on are critical to SPR local economies, national GDP and global food production and security, natural landscapes are being degraded or are under threat from:

- **Climate change and extreme weather events** such as flooding, heat waves and extended droughts. These undermine production and landscape health, and increase the prevalence of invasive pests, driving the urgency for more resilient systems.[279]
- **Conversion to cropland and urban sprawl** are the main drivers of grassland, forest, wetland and agricultural land conversion in the area, leading to the loss of up to 40% of the wetlands in the region[280] and more than 60,000 hectares of grasslands disappearing each year in the Prairies.[281]

Combined with national trends toward the increasing use of pesticides, chemical fertilizers and intensification, these threats are drivers for cascading biodiversity loss and environmental destabilization. Degradation and conversion of wetlands and grasslands in this area diminish critical ecosystem services such as flood and drought protection, water filtration and biodiversity provisioning for more than 600 species of plants and animals, including 50 at-risk species.[282] **The implementation of NCS across these landscapes is instrumental to regional resiliency and the protection of agricultural productivity.**

With such a diversity of landscapes, there are many different avenues for driving NCS investment into the region. This can be done in a way that builds on the emerging coalition of stakeholders such as governments, farmers and corporations who are actively working to grow the regional economy through a combination of effective land-use and conservation. For instance, government investment into avoided wetland and grassland conversion could be used to meet their land protection targets. Corporate or farmer investments into grazed grasslands that support animal productivity, carbon sequestration and other ecosystem services could support increased NCS implementation in the region.

Table 11 summarizes key investment features associated with NCS potential in the Southern Prairies Region.

Table 11. Hotspot profile: Southern Prairies Region

Hotspot overview	Region rich in freshwater wetlands, native grasslands and agricultural production; critical habitat for key species, significant landscape for carbon sequestration, flood, and drought mitigation and biodiversity
Example NCS	Avoided grassland conversion, avoided freshwater wetland conversion, regenerative agricultural practices like legumes in pasture or increased use of legumes in crop rotations
Example ecosystem services	Carbon sequestration, flood and drought regulation, biodiversity, nutrient and water cycling, soil erosion reduction, aesthetics, cultural ties, recreation, health benefits
Enabling investment conditions	High mitigation potential, diverse and profound ecosystem services, growing policy support, strong priority for regional actors, opportunity for Indigenous engagement and reconciliation, large area of privately owned lands that ease participation in emerging markets, existing agricultural supply chains with investors motivated to reduce risk
Constraining investment Conditions	Implementation costs, data availability and accessibility, cultural and perspective shifts, short implementation timeline
Example investors and priorities	Governments (nature and climate targets, food security, risk, ecological corridors), Indigenous communities (IPCAs), farmers (on-farm NCS practices), corporations (ESG investments, supply chain sustainability)
Funding instruments	Resilience bonds, insurance products, carbon or ecosystem service credits

Agricultural production has historically been a driver of wetland drainage and conversion of grasslands in this region.[283] This means that investments or incentives targeted towards avoided conversion will need to have a strong value proposition for agricultural producers and land managers.

Avoided grassland conversion is the most significant NCS opportunity in Canada. It has the potential to mitigate 2.9, 1.3 and 3.4 megatonnes of CO_2e annually after a 10-year implementation period in Alberta, Manitoba and Saskatchewan, respectively.[284] Limiting more conversion to agricultural land and other developments will help ensure that the SPR can act as an ecological corridor that provides critical habitat for wildlife and waterfowl while providing crucial flood protection, drought mitigation and water filtration for Prairie watersheds.[285]

In addition to limiting land-use change, there is also an opportunity to advance the responsible implementation of agricultural NCS within the SPR through:

1. Greater public and private investments that improve the sustainability, emissions profiles and resilience of agricultural value chains
2. Prioritizing the growth and participation of Indigenous-led farms and ranching operations
3. Tailoring support programs and financial incentives to de-risk the on-farm adoption of NCS practices that can address farm profitability and progress on Canada's climate targets.

Opportunities for meaningful Indigenous engagement and IPCA development should also be considered in the SPR, as well as research into innovative co-governance models for NCS implementation that support thriving Indigenous communities.

Overall, opportunities for mixing regenerative agriculture alongside wetland and grassland conservation is a key opportunity to advance NCS to promote thriving and economically diverse rural communities that can continue to depend on the critical ecosystem services that this region provided for generations.

The potential of NCS in the SPR is increasingly being supported by a growing number of policies and programs across government and the private sector, which further contributes to this region being an investment hotspot:

- **Nationally**, the Nature Smart Climate Solutions Fund funds organizations such as Ducks Unlimited Canada (DUC) and the Nature Conservancy of Canada (NCC) to promote grassland and wetland conservation in these regions.[286]
- **Provincially**, policies in Alberta and Manitoba supporting a no-net loss in wetlands place regulations around wetland conversion and draining.[287]
- **Ecosystem-based**, grassland and rangeland conservation agreements are also being developed through partnerships with ALUS and DUC to promote grassland conservation and wildlife protection.[288]
- **Sector-based**, OFCAF incentivizes farmers to increase legume planting as crops and forage and promotes the adoption of rotational grazing within this region.[289]

Box 9

Case study — Alberta Revolving Land Conservation Program

Ducks Unlimited Canada's Revolving Land Program in Alberta highlights the growing potential for NCS investments supporting a transition to more sustainable, resilient and profitable agricultural production systems. In partnership with ATB Financial, DUC invests in the purchase of at-risk lands to restore or protect the wetlands and grasslands upon them. Once the natural assets have been restored, DUC sells the land back to agricultural producers with a conservation easement to ensure permanent protection.

The agreement allows producers to continue certain sustainable management practices, such as haying and grazing, to generate revenues while ensuring the integrity of these habitats for future generations.[290]

Since 2017, the program has leveraged an initial $5 million loan from ATB to undertake 42 conservation projects on 5,134 hectares, reducing emissions by 323,000 tonnes of CO_2e over the life of the program.[291] This is a cost of $974 per hectare, or $15 per tonne CO_2e. Program revenues are then re-invested to advance more restoration and conservation projects. Lands enrolled in the program also provide an added 67,000 kg/year of nitrogen and 7,000 kg/year of phosphorous filtration and store almost 2.3 million cubic meters of water annually.[292]

An economic case for conservation economies: Identifying Indigenous-led hotspots

Natural systems such as forests, waters and the creatures within them are intertwined with the wellbeing of many Indigenous communities. These systems are also central to their wellbeing. The connections between nature and Indigenous communities drive prosperity through meaningful job creation, access to nutritious food and vital connections to language, culture and heritage. For generations, Indigenous stewardship of territorial land and waters has formed the backbone of conservation economies. These are economies that balance the use and conservation of nature to create thriving communities.

We see Indigenous-led conservation economies as investment hotspots in Canada.

With commitments to reduce emissions and protect 30% of land and waters by 2030, more attention is being paid to Indigenous leadership in the design of local economic systems that work for people and the planet. Since 2018, Canada has invested more than $1.35 billion to advance Indigenous-led projects that prioritize nature conservation, emissions reductions and community development.

Globally, conservation economies are creating 15 to 40 jobs for every US$ 1 million of investment.[293] This more than five times those created by similar investments in industrial-led growth. Of these, 7% are considered "additional" to current job creation trends, representing the competitive advantage of NCS-led economic growth. For many Indigenous peoples in Canada, these types of opportunities show the potential for cultural stewardship principles and practices to drive socio-economic growth. For the Łutsël K'é Dene in the Northwest Territories, this potential has translated into returns of $2.50 for every $1 of investment in the community and the Decho Guardians programs.

Meeting of Aqviqtuuq Guardians
Photo: Talha Awan, Smart Prosperity Institute

There are a range of Indigenous-led approaches driving socio-economic growth and meaningful reconciliation while capitalizing on a broader transition to a net-zero and nature-forward economy. The success of these and future approaches will depend on allied organizations supporting Indigenous communities in the development of priorities and partnerships that can meet community needs. While the path to success will change from community-to-community and from project-to-project, we can draw inspiration from recent success stories to better understand what allied organizations can do to support Indigenous-led NCS projects in Canada:

1. **Wahkahtowin Development GP Inc.** is a social enterprise advancing the needs of the Chapleau Cree, Missanabie Cree and Brunswick House First Nations. The enterprise adopts an innovative, reconciliation-based approach to community economic development. It creates partnerships and advances projects that prioritize sustainable natural resource management, cultural revitalization and community engagement.
2. **Aqviqtuuq Inuit Protected and Conserved Area** is an initiative spearheaded by the Taloyoak Umaruliriqu Association to build a local conservation economy that prioritizes the protection of traditional hunting and fishing grounds while also investing in the Niqihaqut country food processing center.
3. **Kitaskino Nuwenëné Wildland Park** is a 161,880-hectare provincial park in Alberta that was negotiated by the Mikisew Cree First Nation, the provincial government, Teck Resources Ltd., Cenovus Energy and Imperial Oil Ltd. The Indigenous-led conservation project has received more than $5.3 million to protect key bison and caribou habitats, develop backcountry recreation opportunities, and support further economic growth opportunities to meet community needs.

With the right partnerships, consultation and engagement between Indigenous leadership and non-Indigenous allies, the impact of increasing NCS investments in Canada could result in catalytic socio-economic transformations. The Smart Prosperity Institute and Nature United are committed to working with Indigenous leadership and communities in building meaningful partnerships to advance more Indigenous-led NCS projects.

4.2 Southern Ontario

Southern Ontario is one of Canada's economic engines. The intersection of regional innovation, population growth and vital natural systems all point to a potential hotspot to scale NCS investments. This region, encompassing almost 1.3 million hectares, is home to a significant amount of Canada's Class 1 agricultural lands — highly productive soils with few limitations — as well as several significant wetlands and watersheds.[294]

Currently, half of these soils are being used as cropland, equivalent to 3.5 million hectares. Total agricultural land use in Southern Ontario is 4.6 million hectares. This includes pasturelands, managed woodlands and wetlands and on-farm diversified land use. The region is one of Canada's most important agricultural-producing zones and has more operational farms than any other province (49,600). It generates more than a third of the national sector GDP from primary production ($37 billion),[295] and it is a key sector for the Ontario economy, employing one in eight Ontarians (807,000) and accounting for 25% of total national farm income.[296]

A recent, rapid expansion of agri-food businesses in Southern Ontario — $42 billion in annual revenues and the 3rd largest market in North America — means land use for agriculture and agri-food operations is a socio-economic imperative. Diversification and innovation in regional production systems is a consistent driver of sector growth. Close to 70% of Canada's greenhouse vegetables are produced in Southern Ontario, with agri-food systems generating more than 10% of the provincial GDP ($79 billion).

Despite their clear economic importance, agricultural lands in Southern Ontario are under significant threat of conversion and degradation due to a combination of increasing pressures from:

1. **Urban encroachment and conversion for development:** Twenty percent of regional farmland has been converted to non-agricultural use in the last 50 years.[297]
2. **Intensification in regional production** is causing degradation and erosion of key agricultural soils.[298] More than 70% of farmland in Southern Ontario has a high or very high risk of soil erosion.[299]
3. **Hidden costs of ill-defined agricultural land tenure:** Thirty percent of all farmlands in Southern Ontario are rented or crop-shared. Agricultural lands slated for future development, for example, 45,000 hectares in Ontario's "Whitebelt" on the inner edge of the protected Greenbelt are the most vulnerable to conversion and extractive production systems despite their high value for primary production.[300]

Since 2000, more than 1.5 million hectares of agricultural land have been lost in Southern Ontario. This places further downstream pressures on the region's remaining wetland, grassland and forest ecosystems. Of Ontario's remaining 35 million hectares of wetlands, 10% are in urban areas or agricultural growing regions in the Greater Toronto Hamilton Area.[301] [302]

Trends of soil erosion and degradation, conversion pressures and a rapidly growing regional agri-food economy signify the importance of advancing the business case for scaling NCS investments. These investments would promote the conservation of high-producing agricultural landscapes that also help regional wetlands and forest ecosystems.

Table 12 summarizes key investment features associated with NCS in Southern Ontario.

Table 12. Southern Ontario hotspot assessment

Hotspot overview	Prime agricultural lands, wetlands and unique ecosystems generate considerable revenues for the regional economy, but are under threat from development and degradation
Example NCS	Avoided wetland conversion, wetland restoration, tree intercropping, nutrient management, crop rotation
Example ecosystem services	Flood control and mitigation, nutrient cycling, water filtration, emissions reduction, biodiversity, recreation
Enabling investment conditions	High mitigation potential, significant ecosystem services that will have cascading impacts on dense population, growing programming, urgency for avoided conversion from development
Constraining investment conditions	Tensions with rapid development outlook, limited policy support, high costs, lengthy timeline for mitigation potential, support for natural asset accounting
Example investors and priorities	Farmers (productivity, revenue), municipal government and insurance (flood risk), provincial government (food security), corporations (ESG investments, supply chain sustainability)
Funding instruments	Resilience bond, revolving fund, insurance product

Southern Ontario is ripe for NCS investments in freshwater wetland restoration, especially given their potential proximity to urban developments. Wetlands provide significant and tangible flood mitigation services, in addition to positive, measurable impacts on water quality (e.g., filtration) to surrounding communities.[303] The reduction in flood risk, or avoided future costs, from natural disasters are a priority for various levels of government, as well as insurance providers, homeowners, local industry and commercial businesses.

Southern Ontario has several enabling conditions that promote investments in tree intercropping and other relevant NCS pathways. Compared to the Prairies, trees are the naturally dominant vegetation in Southern Ontario. This makes all the tree-based agricultural NCS ecologically appropriate.[304] In recent years, agroforestry has also received more program attention. New provincial policies such as the Nature Smart Climate Readiness Program and Species at Risk Programs incentivize tree planting and wetland protection on agricultural lands.[305] NGOs have also shown interest in agroforestry in Ontario. The Ontario Woodlot Association launched its Agroforestry Network in 2022[306] and ALUS established the Peel Pilot to incentivize on-farm stewardship practices.[307]

In addition to agroforestry, better nutrient management and the diversification of crop rotations represent other prime agricultural NCS for this region given their relevance to common Ontario crops like corn, soy and wheat. The variety of NCS applicable to Southern Ontario is likely to attract a variety of investments, including the potential for:

1. Land managers to invest in NCS, like nutrient management, which drives profitability
2. Land managers to invest in agroforestry to diversify revenue streams into the production of timber or fruit trees
3. Corporations to invest in value-chain sustainability efforts
4. Governments to invest in these landscapes to preserve food security to offset past and ongoing land conversion.

Southern Ontario will continue to grow. The proximity of key farm and wetland ecosystems to Canada's most densely populated and economically productive region highlights the urgency and potential to invest in NCS that maximize farm productivity while keeping critical ecosystem services that are of immediate interest to public and private investors.

Box 10

Case study — Glenorchy Conservation Area

The Glenorchy Conservation Area is a 401-hectare conservation and restoration project encompassing wetlands, grasslands, forests and riparian areas in Oakville, Ontario. Established in 2008, this area has restored more than 35 hectares of forest, six hectares of wetlands and 50 hectares of grasslands to support the connectivity of natural heritage systems, biodiversity and resiliency, especially to flood control and water contamination.

This joint habitat enhancement project was completed in partnership with the Métis Nation of Ontario, Hydro One and Conservation Halton. It emphasized traditional Métis values and knowledge being incorporated into forest restoration and planting of ceremonial and medicinal vegetation.[308] Funding for this project flows from cost-sharing agreements with public and private partners such as the federal, provincial and municipal governments, Forests Ontario, Hydro One, Shell Canada and DUC.

The project received a first investment of $10 million over 12 years, with an added $4 million given for annual maintenance, estimated at $100,000 per year. The first investment is conservatively estimated to have generated $816,000 in annual ecosystem services from improved water regulation and filtration, flood control, waste treatment and habitat provisioning for species at risk such as Eastern Milk snakes, Silver Shiner minnows and Butternut trees.[309] Based on these values, the project is forecasted to breakeven after fourteen years and will start generating a net annual return of $1,790 per hectare over the second half of the project lifecycle — an estimated total of $11.4 million over 16 years.[310]

4.3 British Columbia

British Columbia (B.C.) is home to a variety of NCS opportunities, including 60 million hectares of forest cover — 11.1 million hectares being old-growth forests.[311] The province also has one of the most diverse agricultural sectors in the country.[312]

In 2022, forest products were B.C.'s number two export category, representing 24% of all merchandise exports by value (just behind energy products). Metal and minerals came in third (12%), and agriculture and food products in fifth (9%).[313] While Canada is a global leader in the export of softwood lumber, B.C. produces the country's highest share of both softwood lumber, nearing 50% of the supply every year, and of the total wood supply (33% in 2020).[314] The forestry sector contributes $17.4 billion annually to B.C.'s GDP, provides $6.6 billion in government revenues, and creates around 100,000 jobs directly and indirectly.[315]

In addition to these opportunities, the Declaration on the Rights of Indigenous Peoples Act (2019) by the province and the recent Tripartite Nature Conservation guidelines have helped build momentum among a growing number of Indigenous-led initiatives seeking investment in the management, conservation and restoration of their traditional territories to drive economic growth and development.[316]

Despite the importance of forestry to B.C.'s economy, since 2019, harvest levels in B.C. have declined owing to several factors, including changing land-use policies, natural disturbances such as wildfires and pests and the escalating cost of operations. Because jobs and harvest levels are highly correlated, the industry has lost more than 20,000 jobs from 2019 to 2023.[317] Additionally, the total area of old growth in B.C. has declined by nearly half in the last 20 years.[318]

To make forest management practices more sustainable, in 2023, the B.C. government announced new measures to protect old-growth forests, which included increases in logging deferral areas and implementing alternatives for clear-cut logging.[319] Some argue that the government is still not protecting old growth while making the environment uncertain for investments. An alternative point of view sees B.C. forests as being exhausted by decades of over-harvesting, to the point where the industry is unable to sustain itself.[320]

Notwithstanding controversies around the new policies and the risks faced by the forestry industry and all industries it directly and indirectly supports, B.C.'s policy environment is broadly supportive of nature-based investments. That includes large-scale investments in IFM, conservation of key forested areas including old-growth forests, advancing new management practices on existing agricultural landscapes through various programs delivered by the Investment Agriculture Foundation BC, and prioritizing the social, cultural and economic well-being of Indigenous communities across the province.

Investments into NCS that improve forest management and develop long-term strategies for managing harvest within forest areas can advance B.C.'s ongoing efforts to modernize forest policy. It can mitigate up to 6.4 megatonnes of emissions annually by 2030, and drive interest from land managers and the value chain due to their involvement in the responsible management of these assets.[321]

Several regions where planned improvements in forest management, old growth conservation and agricultural innovation are underway: Kootenay, Cariboo-Chilcotin Coast, and Omineca-Skeena.[322] Landmark Indigenous-led conservation efforts in Great Bear Rainforest and Clayoquot Sound are inspiring similar efforts by nations across the province. Initiatives in Southern B.C. are underway to protect an added 1.5 million hectares of lands and waters that prioritize NCS as being synonymous with the local Indigenous-led vision of reciprocity, intergenerational equity, community health and well-being and sovereignty.

Table 13 summarizes key features that make the B.C. provincial economy a hotspot for NCS investments.

The diversity of landscapes, sectors and goals makes these regions well-placed for attracting investment across several different public and private actors. For instance, old-growth forests at risk from logging activities can benefit from government efforts to incentivize IFM approaches that help meet climate and biodiversity targets.

These types of public investments can also serve as a bridge linking Indigenous-led forest stewardship models with private investors who are both seeking a similar objective, e.g., mitigate the impacts of wildfires.[323] In addition, B.C. is the only province with an established agreement on carbon benefit-sharing rights to First Nations,[324] which allows Indigenous communities to reap the benefits of forest carbon revenues in the province.

Alignment with targets, or community and government priorities will be essential to advance the value proposition for investing in these regions. It will need to be considered alongside all the important ecosystem services and economic benefits that forest NCS can provide. Many of these regions also overlap with several iconic species at risk, or under threat, including grizzly bears, barn owls, and pacific salmon, which could attract more investments from governments, research institutions or international conservation organizations.

Table 13. Hotspot assessment: British Columbia

Hotspot overview	Wealth of forested areas, some of which are threatened by logging or need improved management strategies, and a diverse agriculture sector that supports mixed land use
Example NCS	Improved forest management, conservation of old-growth forests, silvopasture
Example ecosystem services	Carbon storage, timber provisioning
Enabling investment conditions	Urgent policy priority, supportive policy environment, Indigenous community engagement, high mitigation potential and several associated ecosystem services, high collaboration potential, usage of forest offset credits to meet compliance obligations
Constraining investment conditions	Cultural and perspective shifts, data gaps, implementation costs, uncertainty due to changing policy environment, natural disturbances
Example investors and priorities	Governments (protected areas, wildlife corridor), Indigenous communities (IPCAs, cultural significance, economic development), farmers and loggers (improved management, productivity), corporates (ESG investments, supply chain sustainability)
Funding instruments	Forest carbon offsets, Project Finance for Permanence

Another opportunity in these regions could be the potential for mixed land-use NCS investments like silvopasture. Silvopasture has a significantly smaller mitigation potential in B.C. (e.g., 0.12 megatonnes of CO_2e), but offers a host of other productive and environmental benefits.[325] The Cariboo-Chilcotin Coast region is ripe for this type of investment. Some of the government-owned timber land is already being used as forage and grazing land for cattle.[326] A strong value proposition for grazing farm animals within forested timber land could put farmers and loggers in a mutually beneficial NCS relationship, which could also be reinforced by corporate investment into value chain sustainability efforts. The inclusion of Indigenous communities' knowledge and respect for their rights will be critical to the successful implementation of these NCS (e.g., in the Nechako region where some Indigenous communities are already involved in ranching activities).[327]

Box 11

Case study — The Mount Broadwood Conservation Area

The Mount Broadwood Conservation Area covers nine hectares near Fernie, B.C. The land was donated to The Nature Conservancy of Canada (NCC) by Shell in 1992 and is connected to the broader Elk Valley Heritage Conservation Area. The area offers valuable corridors for wildlife and provides high-quality habitat to native populations of cutthroat and bull trout, both of which are listed as species of "special concern" by the Committee on the Status of Endangered Wildlife in Canada (COSEWIC) in this region.[328]

Over a 15-year period, operating costs totaled $265,585 at an average annual value of $17,705. During this time, the conservation area was estimated to have generated between $500 million and $1.7 billion in carbon storage and sequestration benefits. Additional returns from tourism activities were partially valued at $714,000 in yearly revenue, with many key recreational fishing and tourism activities not being tracked or reported. Economic growth contributions to the local economy were estimated at $37,181 ($2478.79/year) and 3.5 full-time equivalent jobs created.[329] Accounting only for the average annual return of partially valued recreation activities in the conservation area, the estimated annual rate of return from operating expenditures is $2.60 for every $1.

Recommendations

To date, NCS approaches in Canada continue to be broadly **undervalued, unaccounted for and uncompensated.** While there remains substantial potential to increase uptake and investment in NCS that provide benefits to people and industries across Canada, a collective and consistent effort to mobilize action across industry, Indigenous leadership and government policymakers will be necessary to unlock the full potential of NCS in Canada. Strategies and recommendations to incentivize necessary actions will continue to evolve as novel approaches and opportunities continue to emerge across Canada.

To ensure we are prepared to take full advantage of rapidly emerging opportunities around NCS in Canada, we offer the following recommendations as a way of starting to think about nature differently in strategic planning and project development:

Fully value

Recommendation 1: Partner and consult with Indigenous leaders, businesses and communities to better incorporate Indigenous values, knowledge and storytelling to inform project-level decision-making

The full value of nature goes beyond purely monetary values and involves accounting for the ecosystem's intangible benefits. Engaging with Indigenous communities and other stakeholders may help us get closer to understanding nature's worth.

Recommendation 2: Amplify investment to coordinate, standardize and improve the collection of necessary ecological data to abate project entry barriers

Substantial knowledge and data gaps exist that persistently limit the quality of NCS business cases, leading to: (1) lower uptake; and (2) higher costs for MRV. Implementing existing and new technologies for data collection requires substantial investments. Coordination and standardization of this implementation will lead to consistent metrics to measure outputs, which can be easily applied across contexts and inform future investment and data collection efforts.

Fully account

Recommendation 1: Adapt state-of-the-art environmental economic accounting methods to build NCS business cases that can capture the interest of public and private investors

Many economic accounting methods that fully capture the value of nature provide a wealth of information to draw from. These methods need to be adapted to NCS projects in Canada and to the needs of NCS decision-makers, as well as to fill in gaps around how to incorporate non-monetary and qualitative data into the valuation and decision-making process.

Recommendation 2: Identify the necessary pathways to standardize measurement and reporting obligations across the public and private sectors, in line with international and Canadian standards

Ensuring that consistent metrics and methodologies are used when organizations are disclosing nature-related information will help in identifying and quantifying different NCS project costs and benefits in a unified manner to show their competitive advantage. Developing a consistent standard that is in line with existing approaches, such as the TNFD, should be a priority.

Recommendation 3: Develop consistent data governance policies to support data management, data equity and best practices and drive data-driven investments in NCS

Data management standards ensure high quality in data collection, storing and processing, supporting data-driven investments in NCS. These standards also support interoperability between data sets allowing for comparison and use of multiple quantification approaches with an emphasis on data transparency. Policies surrounding data ownership, transparency, privacy and best practices of use should be developed to support equitable and informed data sharing.

Fully compensate

Recommendation 1: Leverage successful projects to build momentum for investment at scale

Existing NCS projects, often involving partnerships across the private and public sectors, should be leveraged to develop new projects, ensuring consistent funding sources and forging new partnerships to increase adoption.

Recommendation 2: Enhance guidance, training and resources to build cross-sector capacity to mainstream NCS approaches across Canada

Technical skills are needed to support transitions to NCS projects and drive nature-positive economic systems across sectors in Canada. Elevating capacity in these areas can reduce barriers to NCS investment and adoption, equipping practitioners, producers and land stewards with expert support in advancing NCS projects.

Recommendation 3: Advance innovative solutions to de-risk transitions in value chains, economic accounting systems and business models toward more nature-positive economic systems

Supporting the formation of public-private partnerships, project and outcome-oriented coalitions and championing Indigenous leadership will be vital to catalyzing NCS investment. Exploring opportunities in emerging markets and valuations for ecosystem services and supporting accessibility and trialing of novel technologies can create channels for NCS investment and adoption.

Next steps

Globally, natural climate solutions are a proven, cost-effective strategy for reducing emissions while stimulating economic growth and supporting community development. In Canada, unlocking the investment necessary to realize the full potential of scaling these opportunities will require a clear and consistent approach to account and communicate the diverse values that come with investing in the protection, management and restoration of natural systems.

The steps outlined in this report are intended to support project developers and decision-makers in creating compelling business cases that are capable of attracting interest among public and private investors. While this type of support can build on existing resources to help the design and implementation of NCS in Canada, these steps alone are not enough.

Our report outlines several opportunities to accelerate action. It also includes key recommendations to transform the way we think about and value the benefits of nature to accelerate the level of investment needed to unlock the transformative power of NCS. Of these, we identify three immediate next steps to accelerate opportunities for NCS investment in Canada:

Step 1: Diversify funding and investment opportunities, where possible, to build increasingly complex and sophisticated nature-based economies

Engaging public and private actors to co-fund projects, using blended finance and innovative financial instruments for conservation and restoration, and diversifying public funding opportunities for nature are some of the strategies that can help reach an optimal allocation of funds for NCS. The public sector should ensure that market conditions and regulatory frameworks are in place to attract investments from the private sector while reducing risks and uncertainties.

Step 2: Map funding flows to better understand where there are immediate opportunities to leverage additional investment to maximize NCS impacts

A better understanding of where opportunities for NCS investments lie involves consensus building around better data practices and better methodologies, and tools for sharing the outcomes of successful projects for knowledge creation and synthesis. This requires coalition building that goes beyond ensuring funding sources and should involve not only the public and private sector but also NGOs, research institutes and Indigenous leadership. Project developers and decision-makers must recognize the importance of coalition building to identify NCS opportunities and take steps to make it a reality.

Step 3: Accelerate efforts and investment around NCS hotspots identified: B.C, Prairies, S. Ontario, and Indigenous-led NCS projects

The hotspots identified present a positive confluence of factors that put us closer to fully valuing, accounting and compensating for NCS. These hotspots are low-hanging fruits for investments and innovations that could further be studied, evaluated and scaled nationally. Given the potential for these hotspots, project developers in these regions and Indigenous leadership have the momentum to urge decision-makers to break down the barriers that still prevent resources from flowing toward these hotspots.

While a persistent lack of ecological and economic data remains an underlying challenge for accelerating NCS investments across Canada, working to advance these opportunities, in parallel with efforts to close key data gaps, can help balance the urgency of action with the necessary pace of innovation and advancement.

From the project to policy level, we must rethink how we measure and account for the benefits of nature. This is necessary to highlight the socio-economic and resilience-building values of investing in NCS in Canada. These changes, supported by the right tools, can help formulate a growing number of compelling business cases for investment.

Appendix 1: Survey description and methodology

A national survey was conducted by Abacus Data in partnership with Nature United. The survey had a sample size of 1,500 adult Canadians and was fielded from June 12 to 19, 2024. The data was weighted by age, gender, education and region. Totals may not add up to 100 due to rounding. Four questions from the survey were referenced in this report.

Question 1: *And to what extent do you support or oppose Canadian businesses and corporations changing their business practices to address/mitigate climate change? This means investing in more sustainable approaches for producing food, fuel and building materials.*

- Responses: Strongly support (40%); Somewhat support (41%); Are indifferent about (10%); Somewhat oppose (6%); Strongly oppose (3%)

Respondents were provided a description of Natural Climate Solutions prior to Question 2.

Question 2: *"Is Canada pursuing more Natural Climate Solutions something you…"*

- Responses: Strongly support (43%); Somewhat support (41%); Are indifferent about (9%); Somewhat oppose (5%); Strongly oppose (1%)

Question 3: *And to what extent do you support or oppose the federal government helping businesses to transition their operations to adopt Natural Climate Solution practices to….*

1. *conserve more of Canada's natural ecosystems.*

- Responses: Strongly support (47%); Somewhat support (39%); Are indifferent about (7%); Somewhat oppose (5%); Strongly oppose (2%)

2. *to mitigate climate change.*

- Responses: Strongly support (36%); Somewhat support (41%); Are indifferent about (10%); Somewhat oppose (9%); Strongly oppose (4%)

Question 4: *And to what extent do you support or oppose the provincial government helping businesses to transition their operations to adopt Natural Climate Solution practices to…*

1. *conserve more of Canada's natural ecosystems.*

- Responses: Strongly support (46%); Somewhat support (39%); Are indifferent about (7%); Somewhat oppose (6%); Strongly oppose (2%)

2. *to mitigate climate change.*

- Responses: Strongly support (40%); Somewhat support (38%); Are indifferent about (10%); Somewhat oppose (8%); Strongly oppose (4%)

Appendix 2: Guideline scoring and evaluation criteria

The scoring system had three categories, which were scored as follows:

Applicability:

- 5 points if the guidelines were NCS-focused specifically in a Canadian context
- 4 points if the guidelines were NCS-focused in a global context
- 3 points if the guidelines were focused on the Canadian context, but were not specific to NCS
- 1 point if the guidelines had a global focus and were not specific to NCS
- 0 points if the guidelines were focused solely on a district outside of Canada and not specific to NCS.

Comprehensiveness:

- Guidelines received one point for each of the following criteria they met:
    - Incorporates Indigenous perspectives
    - Incorporates qualitative data
    - Incorporates non-monetary data
    - Incorporates socio-economic indicators
    - Incorporates all types of natural systems.

Practicality:

- Guidelines received one point for each of the following criteria they met:
    - Provides specific guidance on how to engage with Indigenous communities and incorporate Indigenous perspectives
    - Provides specific metrics or case studies
    - Provides specific guidance on the decision-making process (i.e., how to weigh different types of inputs)
- Guidelines received two points for providing step-by-step instructions to implement their guidelines.

Appendix 3: Potential funding mechanisms for NCS projects

Funding tool	Description	Participants/investors	Revenue stream
Conservation trust funds	Large-scale funding vehicles to provide sustained funding and support for conservation goals in a specific landscape	Public and private sources can contribute to the initial capital, public funds have leveraged private contributions in past examples	Interest and returns from the invested principal
Project finance for permanence	A specific type of public-private partnership focused on long-term financial support for conservation initiatives where government or other financial inputs are mobilized as the initial funding is consumed	Large-scale public and philanthropic funders, potential for more engagement of private investment	Can be an endowment fund in which proceeds are spent, can also include revenue generating businesses
Revolving fund	A large pool of assets that allocate upfront capital to projects meeting specific criteria (such as coastal restoration) as a loan, to be paid back via cost savings over time	NGOs, private sector, municipalities, other levels of government to create and house fund	Loan repayment from cost savings and/or property sales
Insurance product	Insurance programs compensate landowners (e.g., farmers) for reduced yields or profits resulting from the adoption of specific NCS practices	Insurer, industry associations, individuals or organizations, with assets at risk (public and private landowners)	Estimated cost savings to insurer (remediation), and estimated cost savings to client (lower premiums)
Credits and offsets (nature)	Biodiversity credits and offsets are generated through conservation and restoration activities that result in enhanced biodiversity outcomes relative to a baseline. The difference is that credits are for enhanced protection, whereas offsets are purchased to compensate for damage elsewhere.	Governments, assessing and auditing bodies, project developers, landowners, NGOs, consulting organizations as intermediaries, organizations with net-zero commitments	Revenue to landowner and project developer from sale of credits
Credits and offsets (carbon)	Credits are generated from additional (i.e., in addition to business as usual) carbon sequestration, including reforestation, avoided deforestation, soil management practices, and others. Credits are sold to voluntary buyers, rather than buyers seeking to meet legal requirements. Parties whose emissions are restricted by policy can purchase carbon offsets to compensate for excess emissions.	Governments, assessing and auditing bodies, project developers, landowners, NGOs, consulting organizations as intermediaries, organizations with net-zero commitments	Selling of carbon offsets or premium contracts for Scope 3 emissions reductions
Impact bonds	Impact bonds are privately financed performance bonds in which a payout only occurs if the conservation project achieves its predefined goals	High net-worth individuals, "deep green" investors, Indigenous communities, financial institutions to issue the bond and NGOs	Outcome buyers who are willing to pay for ecosystem services delivered, which repay initial capital outlay for activities from investors
Resilience bond	Resilience bonds are a specific bond type where the payout is by beneficiaries of restoration and conservation activities that enhance resilience	Municipalities, energy utilities, insurance companies, property owners who bear the cost of damage from climate-related events and natural disasters such as floods and fires	Outcome buyers who are willing to pay for ecosystem services delivered
Impact funds	Funds are in place to direct investment to businesses demonstrating positive environmental impact	Asset managers, institutional investors, high net-worth individuals	Businesses generating revenue, e.g., sustainable forest management, sustainable agriculture businesses, real estate transactions

Glossary

Analysis of alternatives: The business case process of choosing a few candidate interventions and comparing their costs and benefits against one another to select the best path forward.

Avoided conversion: The decision to keep a landscape in its current state and prevent its transition to other forms of land use.

Baseline: A scenario representing the business-as-usual or "no intervention' case.

Benefit: For this report, benefits are defined and assessed as a project-level accounting measure used to evaluate and compare different project outcomes.

Benefit accounting of nature-based solutions for watersheds: An initiative developing a standardized method, guidance and tool to identify, account for, and value the stacked water, carbon, biodiversity, and socio-economic benefits of nature-based solutions in watersheds.

Business-as-usual: normal execution of standard functional operations within an organization; the state of continuing the usual way.

Business case: Provides the justification for investing in or implementing a selected project.

Carbon inset: An investment or change in practices made to reduce, avoid or sequester CO_2e within the value chain of a company.

Carbon offset: A certificate with a monetary value representing one tonne of CO_2e reduced, avoided, or sequestered.

Cost-benefit analysis: A standard evaluation method for projects that can be used to measure the monetary value of a variety of impacts from conservation and restoration projects. More recently, CBAs have been adapted to evaluate natural infrastructure and NBS projects supporting community and ecological well-being.

Cost-effectiveness analysis: measures the efficiency and efficacy of a proposed solution for achieving desired outcomes. To achieve these goals, CEAs typically use "natural units" when evaluating different project options.

Cover crops: Cultivation of crops to provide added soil cover before, during or after cultivation of commodity crops with the intention of managing soil fertility, erosion and quality, amongst other agroecological beneficial outcomes.

Crop residue (biochar and bioethanol): The use of crop residue to produce more products such as biochar and bioethanol. Biochar can be used as a soil amendment to increase the sequestration of CO_2, and bioethanol can be substituted for gasoline, providing more emissions reductions.

Data sovereignty: The right to own one's data and manage how it is used, stored, or shared.

Ecosystem services: Benefits that communities receive from the natural environment. These benefits can be direct or indirect and are typically divided between provision (e.g., direct product), regulating ecological functions (e.g., water filtration), cultural (e.g., the impact of human lifestyles) and supporting (e.g., habitat health) ecosystem services.

Ecosystem services toolkit: A technical guide to ecosystem services assessment and analysis that offers practical, step-by-step guidance for governments at all levels, as well as for consultants and researchers.

Final ecosystem services: A beneficiary-centric approach to measure the economic value of ecosystem services as "ecosystem products and processes that are directly used, enjoyed, or appreciated by people.

Freshwater mineral wetland: a wetland is land that is saturated with water long enough to promote the formation of water-altered soils, growth of water-tolerant vegetation, and various kinds of biological activity that are adapted to wet environments. Freshwater mineral wetlands are characterized by mineral soils and/or organic soils that have either no accumulation of peat or a peat layer of less than 40 cm deep.

Hotspot: For this report, hotspots represent regions with multiple different landscape types and NCS opportunities, land conversion pressures, a supportive policy environment, high potential to deliver economic benefits and ecosystem services, and can attract multi-actor investments (see Section 3 for more detail).

Improved forest management (IFM): an activity that involves forest management practices that increase CO_2 storage in forests or harvested wood products beyond a business-as-usual (BAU) scenario. These activities include set-asides of old-growth forests, enhanced forest regeneration in postharvest stands, use of harvest residues, and increased use of saw logs for long-lived wood products.

Indigenous Protected and Conserved Areas: Places identified by Indigenous communities for conservation and stewardship.

Project input and equipment costs: For this report, typically initial costs associated with an NCS project (e.g., seeding, equipment, etc.)

Insurance product: Instruments that can reduce the risks associated with natural disasters, such as floods, or protect natural assets themselves.

Investor: In finance arenas and capital markets, investors seek a competitive economic return on their investments, while investors in natural capital are often seeking economic returns ranging from market rate to no-net loss, in addition to measurable improvements to target ecosystem services.

Investment: The contribution of both monetary and non-monetary support to a project in exchange for a variety of potential returns.

Legumes (increased crop and in-pasture context): The increased incorporation of legumes in crop rotations or pastures, either in replacement of grain crops (increased legume crop) or tame grasses (in-pasture planting) to reduce nitrogen requirements for grazed and cultivated fields.

Lifecycle costing: Evaluates projects based on upfront costs, as well as costs associated with ongoing asset management and maintenance.

Management and maintenance costs: For this report, these refer to ongoing NCS project costs of stewardship or upkeep over time.

Manure management: Management of manure production through practices such as acidification of manure, installation of synthetic floating covers, installation of manure digesters, separation of liquid and solid manure and on-field management of manure spreading (injection, spreading, composting, and timing and placement of manure).

Measurable ecological processes: Otherwise known as the intermediary services approach, targets the ecological outcomes of intermediary ecosystem services that are explicit and quantifiable. For example, evaluating the economic value of nutrient cycling in terrestrial or freshwater ecosystems.

Measurement, Reporting and Verification: Also known as Measuring, Monitoring, Reporting and Verification, refers to a set of tools that can be used to measure a desired set of outcomes, track and store relevant data, and enable the verification of the data later.

Mitigation: Reducing or cutting emissions and environmental harm.

Multi-criteria assessment: A semi-quantitative approach to rank project alternatives based on their performance according to multiple, pre-set project criteria.

Natural Climate Solutions: A set of interventions defined according to five key principles (Ellis et al., 2024): (1) nature-based; (2) sustainable; (3) climate-additional; (4) measurable; and (5) equitable (See Section 1 for more details).

National Standard for Natural Asset Accounting: Developed by the CSA Group, this standard defines minimum requirements for the development and reporting of a natural asset inventory.

Nutrient management: Practices related to the application of nutrient inputs on crops, otherwise referred to as 4R (right source, right rate, right time, and right place) management. This can include the use of enhanced efficiency fertilizers, the elimination of fall application and precision application of nutrients.

Opportunity cost: Foregone benefits occurring from changing land use.

Output-based pricing system: A system that ensures there is a price incentive for industrial emitters to reduce their greenhouse gas emissions and spur innovation while keeping competitiveness and protecting against "carbon leakage" (i.e., the risk of industrial facilities moving from one region to another to avoid paying a price on carbon pollution).

Parametric insurance: A type of insurance product designed to mitigate the risk of a specific event and where indemnity payments can be targeted toward the rehabilitation of the insured natural asset.

Peatland: a wetland with more than 40 cm of accumulated peat; includes bogs and fens and some swamps. Peatlands have large amounts of dead organic material and are carbon-dense.

Quadruple bottom line accounting: An expansion of the triple bottom line accounting approach (e.g., environmental, social, and economic) to include a fourth pillar that is commonly operationalized as "purpose," "governance," or "culture" depending on the proponent.

Reduced tillage: Reducing or cutting the intensity and depth of soil disturbance in cultivated areas.

Reconciliation: Development of a renewed nation-to-nation relationship with Indigenous Peoples based on the recognition of rights, respect, cooperation and partnership.

Recreation bond: A bond typically designed using pay-for-performance measures, which are like the structure of Resilience Bonds, but financing is based on capital revenues generated by the project.

Regionality: Localized or affecting a particular region.

Resilience bond: A bond that links insurance premiums to resilience projects to monetize avoided losses through a rebate structure. It is designed to fund risk reduction projects and turns avoided losses into a revenue stream.

Restoration of forest cover: Activities, including reforestation and afforestation, that help return a forest to a healthy state. Additional CO_2 sequestration from such activities can be achieved through restoration with locally adapted native tree species in areas where forests historically occurred but do not currently exist because of past conversion to another land use.

Revolving fund: A fund or account that stays available to finance an organization's continuing operations without any fiscal year limitation.

Riparian restoration: The replanting of trees or native grasses in areas bordering water bodies. In agriculture, these areas lie between cultivated or grazed lands and waterways.

Salt marsh: Salt marshes are a type of tidal wetland along coastlines that are alternately flooded and drained by tidal action. They are typically found in the upper intertidal zone between mean sea level and high tide, where salt- and flood-tolerant vegetation, such as graminoids, can grow.

Scope 3 Emissions: Emissions that are the result of activities from assets not owned or controlled by the reporting organization, but that the organization indirectly affects in its value chain.[330]

Seagrass (wetlands context): Seagrass beds are underwater meadows found in sandy or muddy coastal areas and characterized by green ribbon-like grass.

Shelterbelt: A planted area of trees or shrubs surrounding or between cultivated, grazed or operational areas, acting as a barrier to wind, snow and surrounding areas and creating habitat for biodiversity.

Silvopasture: The integration of trees into grazed areas.

Site preparation cost: Costs to prepare a project site for the development of a project. It includes expenses essential to ensure the site is suitable for development.

Socio-economic: Interaction of social and economic factors, and how one shapes the other.

Taskforce on Nature-related Financial Disclosures: Set of disclosure recommendations that guide businesses and finance to integrate nature into decision making through assessing, reporting and acting on nature-related dependencies, impacts, risks and opportunities.

Tree intercropping: The inclusion of trees, typically dispersed in widely spaced rows, in crop or hay fields.

Urban canopy cover: Layer of tree leaves, branches and stems that cover the ground when viewed from above, and that increases CO_2 sequestration by increasing the average tree canopy cover in urban areas.

Value: Value is defined and assessed throughout this report strictly as an accounting measure to assess the worth that various collections of benefits, including financial, social, and ecosystem services, can have for different population groups and sub-groups.

Value chain: Full range of activities that are needed to bring a product or services from conception through production, delivery, and final disposal.

Value proposition: Statement that summarizes why an interested party (customer, private investor, government, beneficiaries) would choose a certain project or option.

Endnotes

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18 For this report, decision-makers refers to any party able to initiate or support an NCS project and can include individual landowners, Indigenous communities, all levels of government and private investors, among others.

19 *Benefits* are defined and assessed throughout this report as a project-level accounting measure used to evaluate and compare different project outcomes. Benefits are useful to consider in the development of a compelling business case; however, the way these benefits are distributed (or consumed) by target population groups is what determines their overall value.

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