CCLM KNOWLEDGE NETWORK | Canadian Conservation and Land Management

2024 YEAR IN REVIEW STORYMAP

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HOW TO NAVIGATE THIS STORYMAP

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1. Hover over the sidebar icons to browse individual chapter titles and highlight associated sections of the storymap.

2. Navigate to the chapter page to explore the topic in more detail.

Note: Some pages have additional summaries, dropdowns and external content that can be selected.

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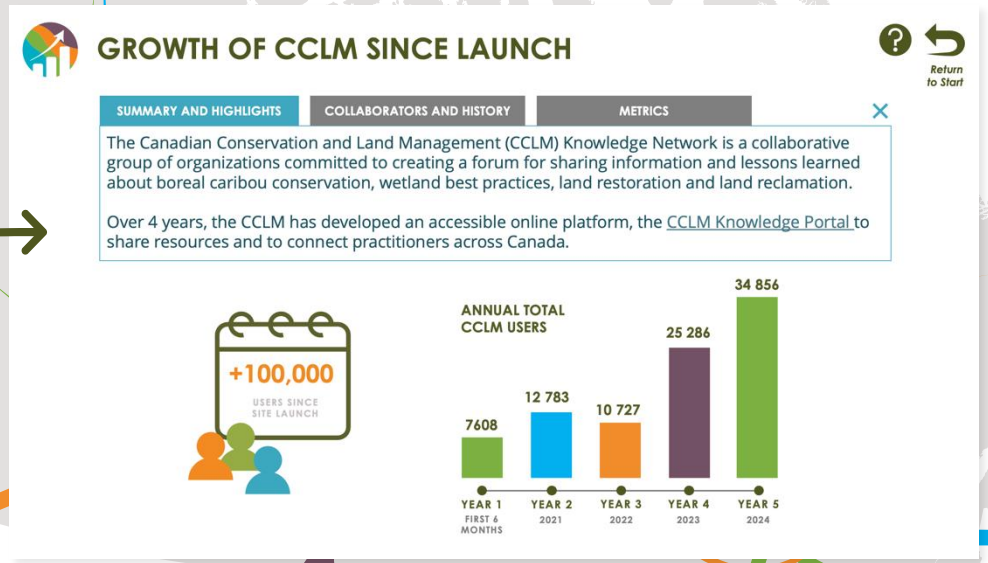

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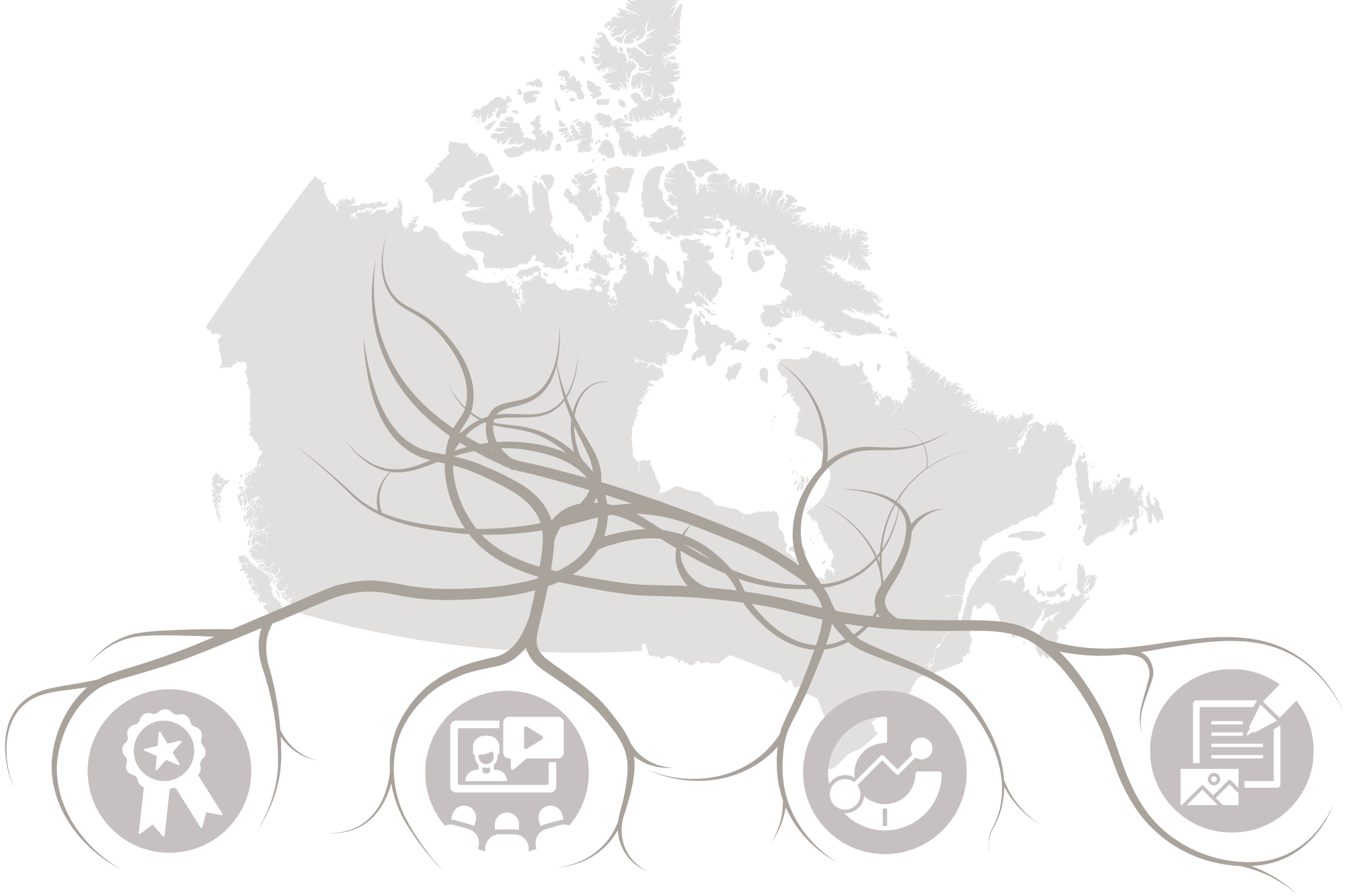
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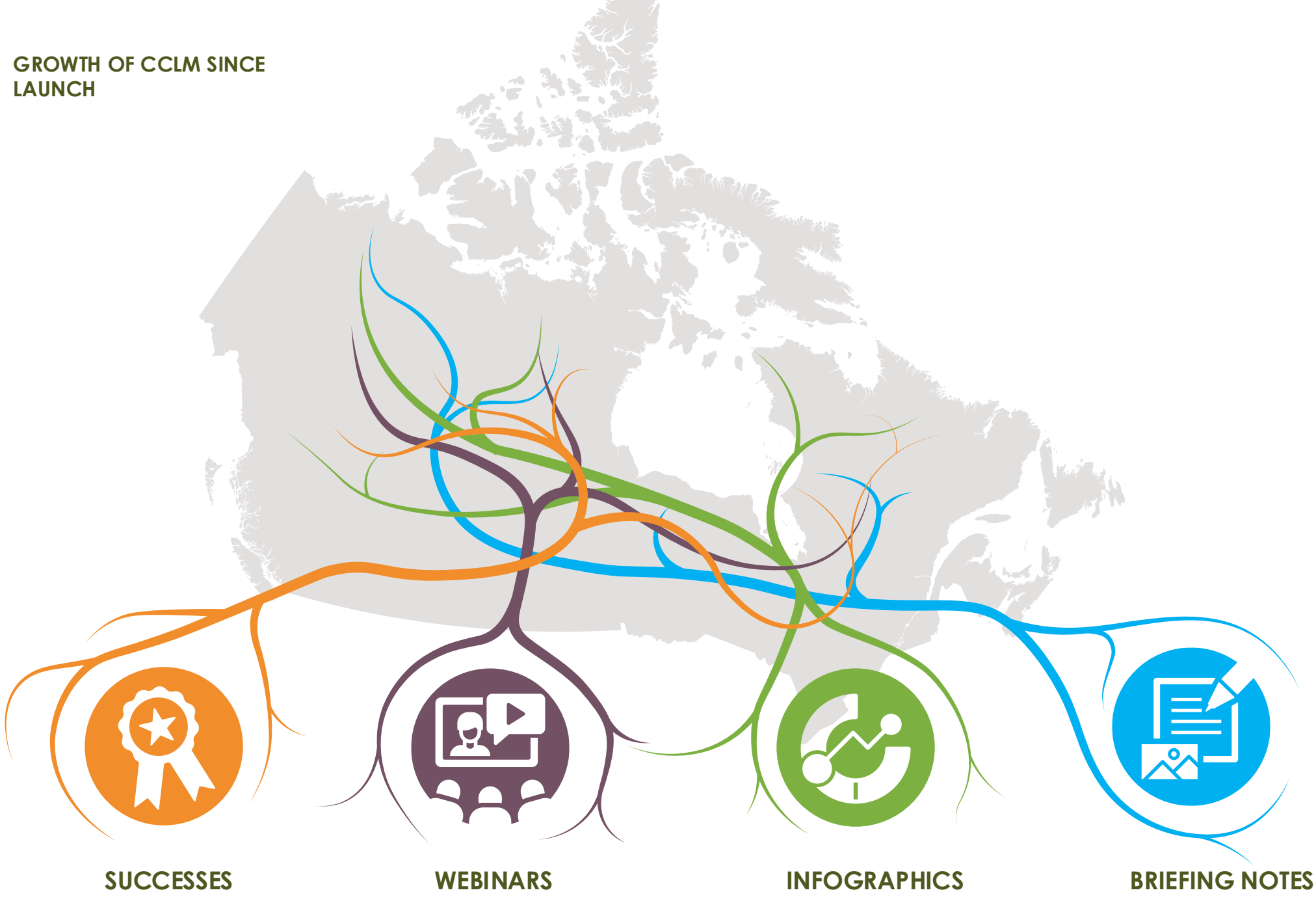

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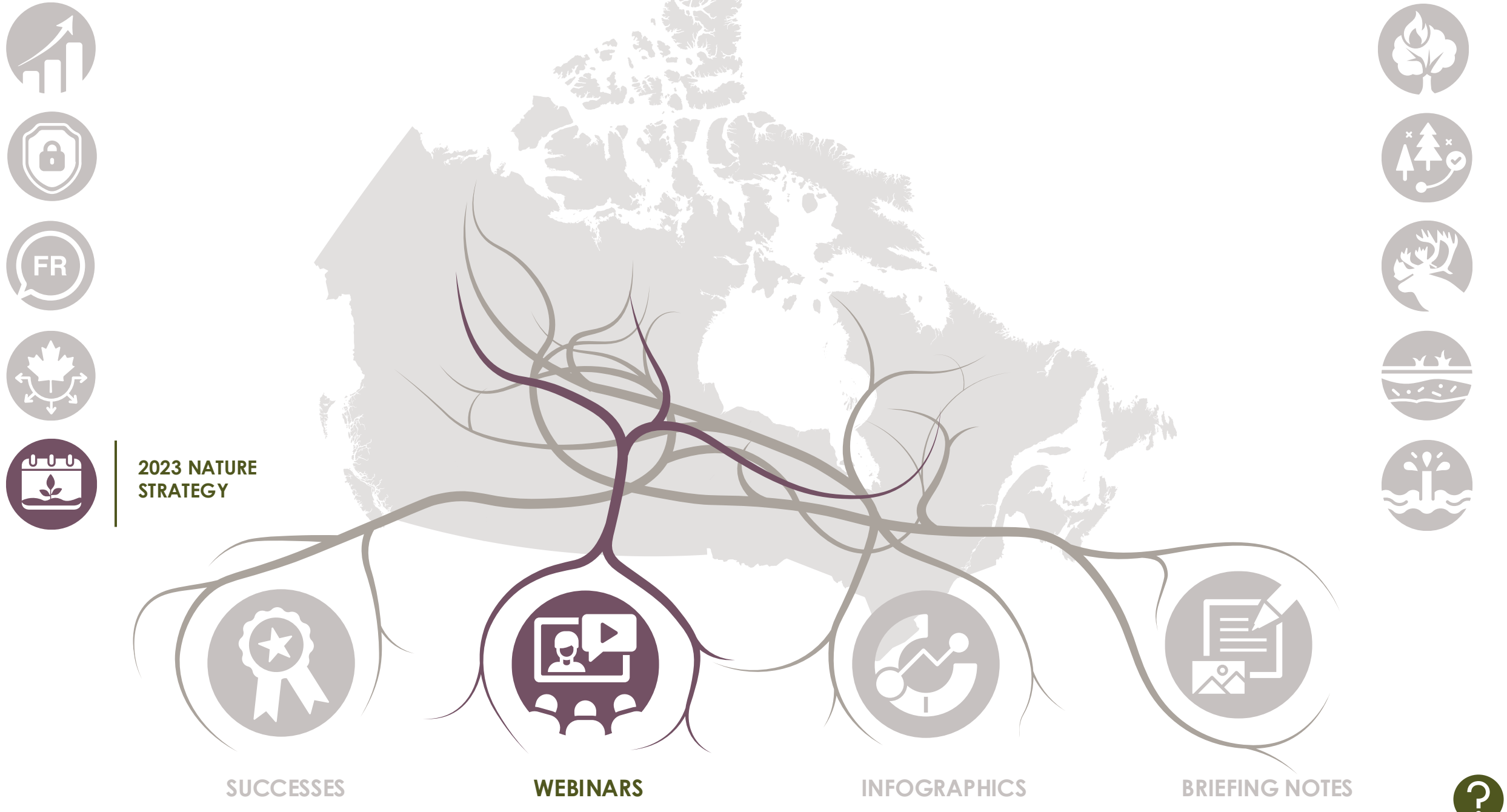
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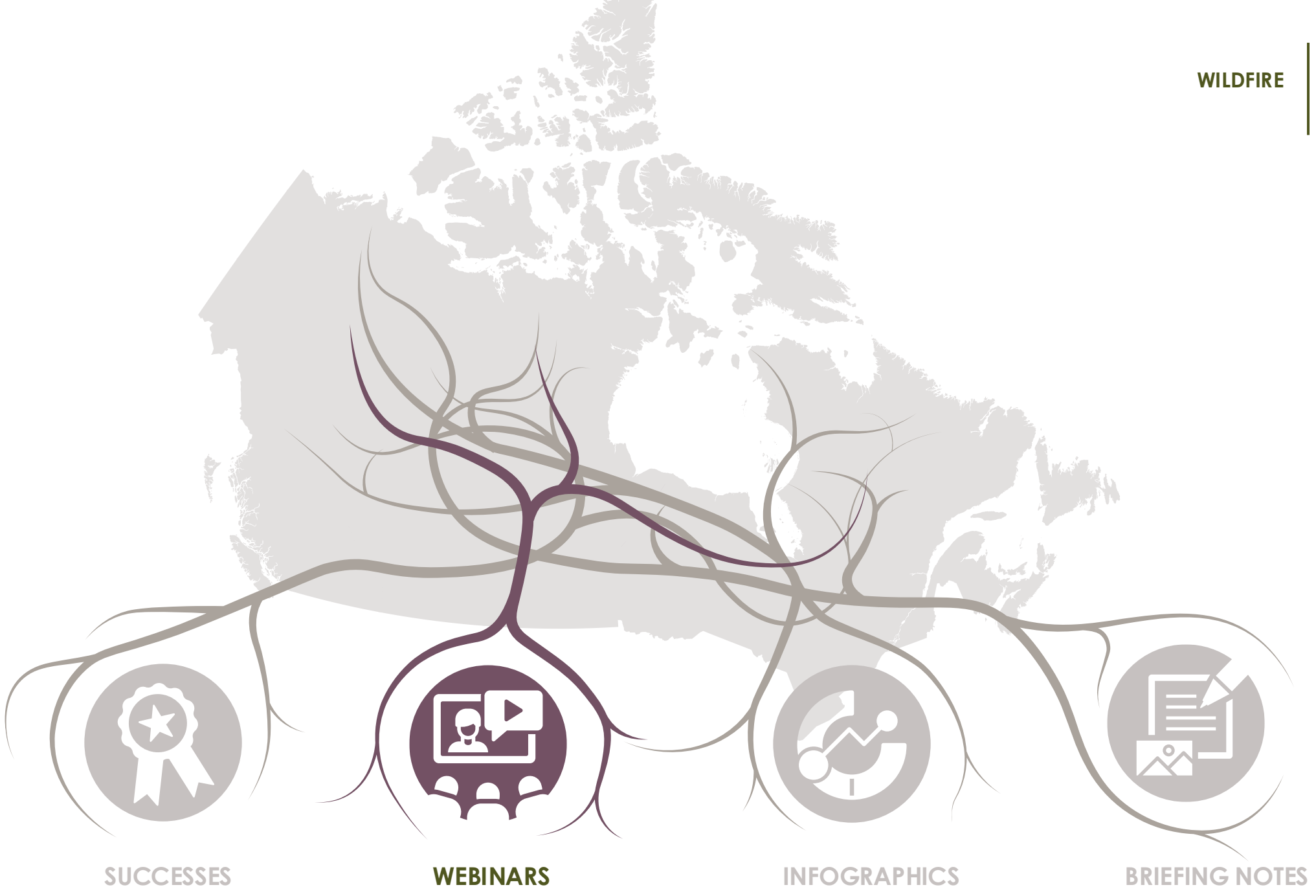
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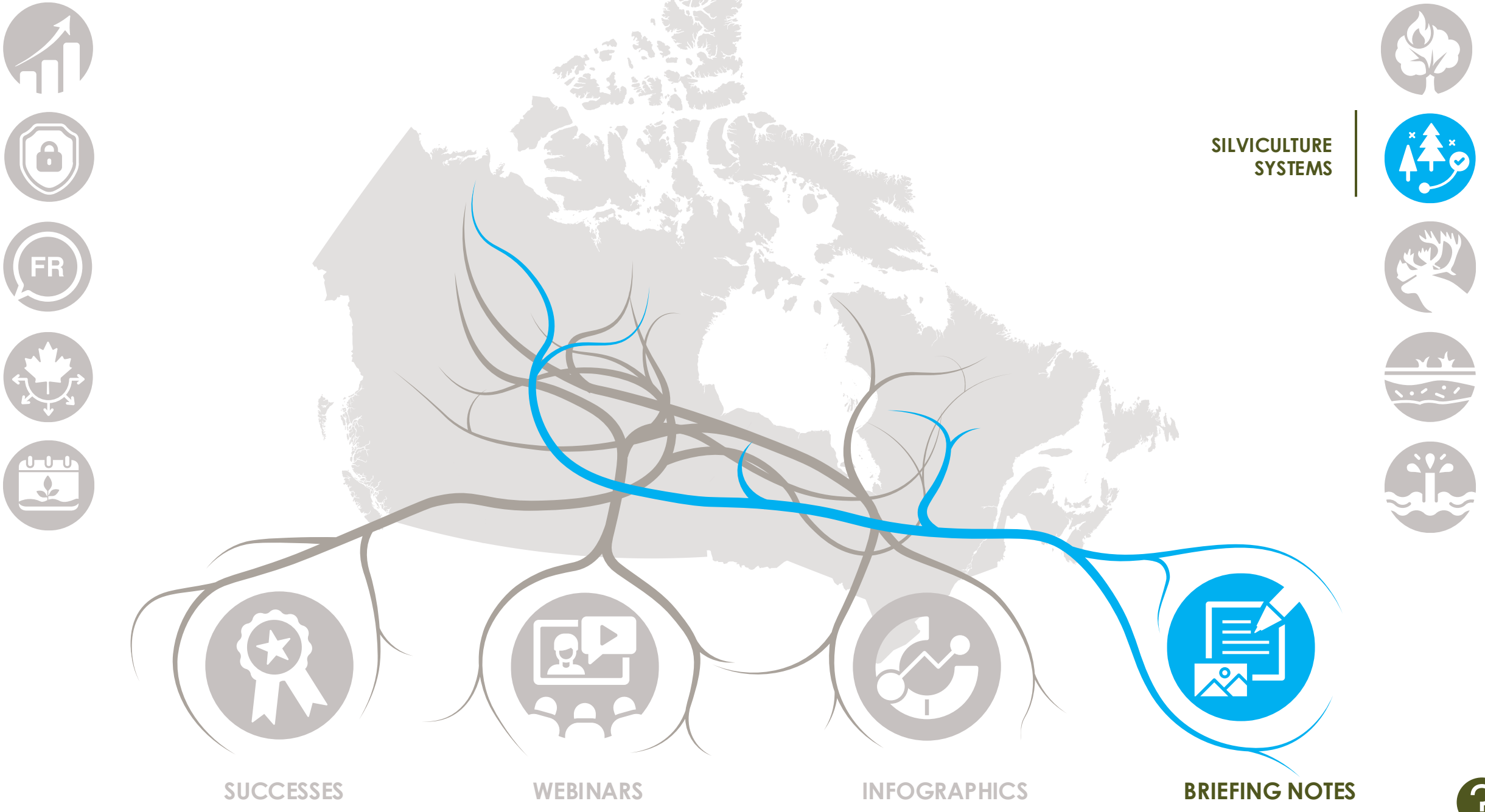
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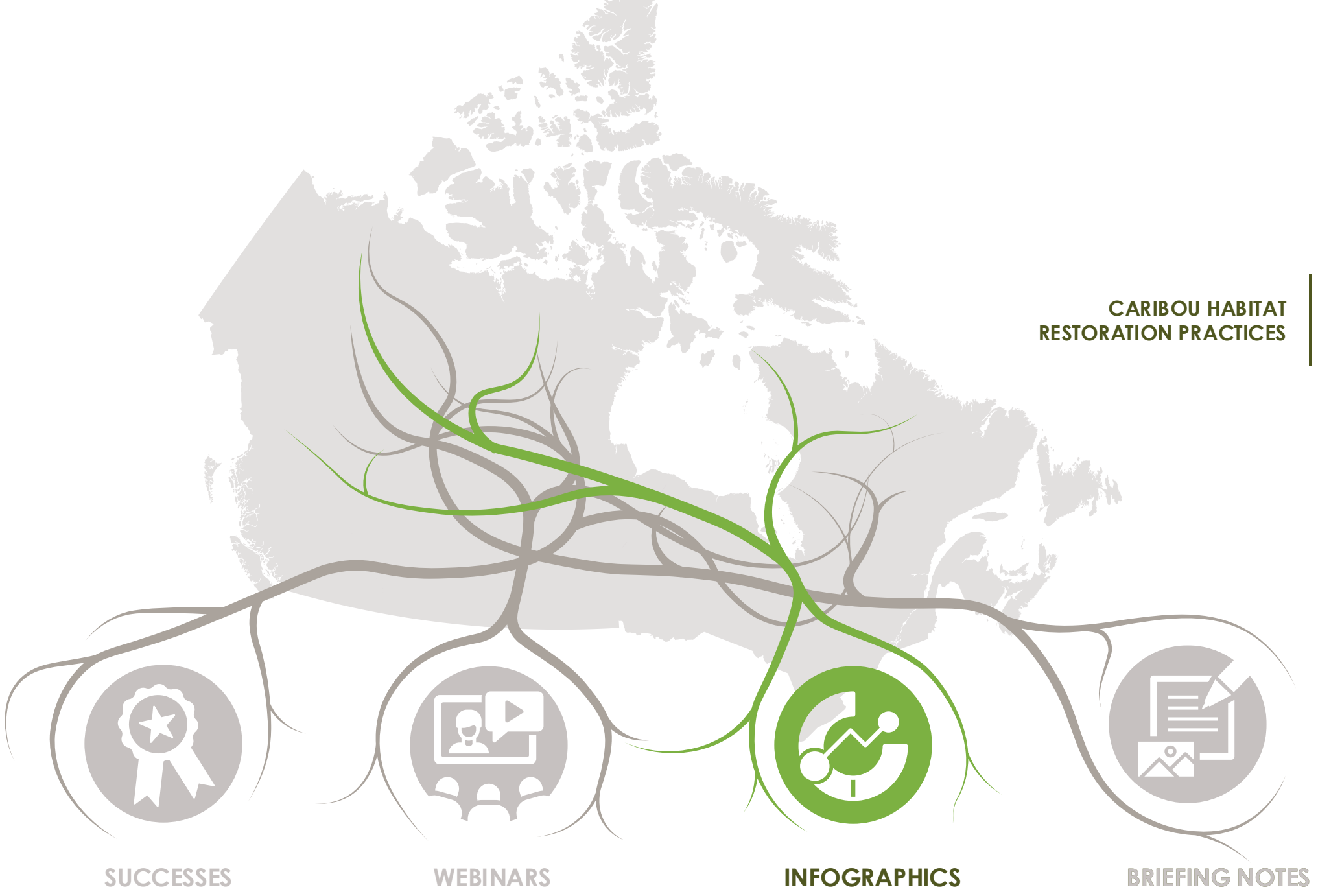
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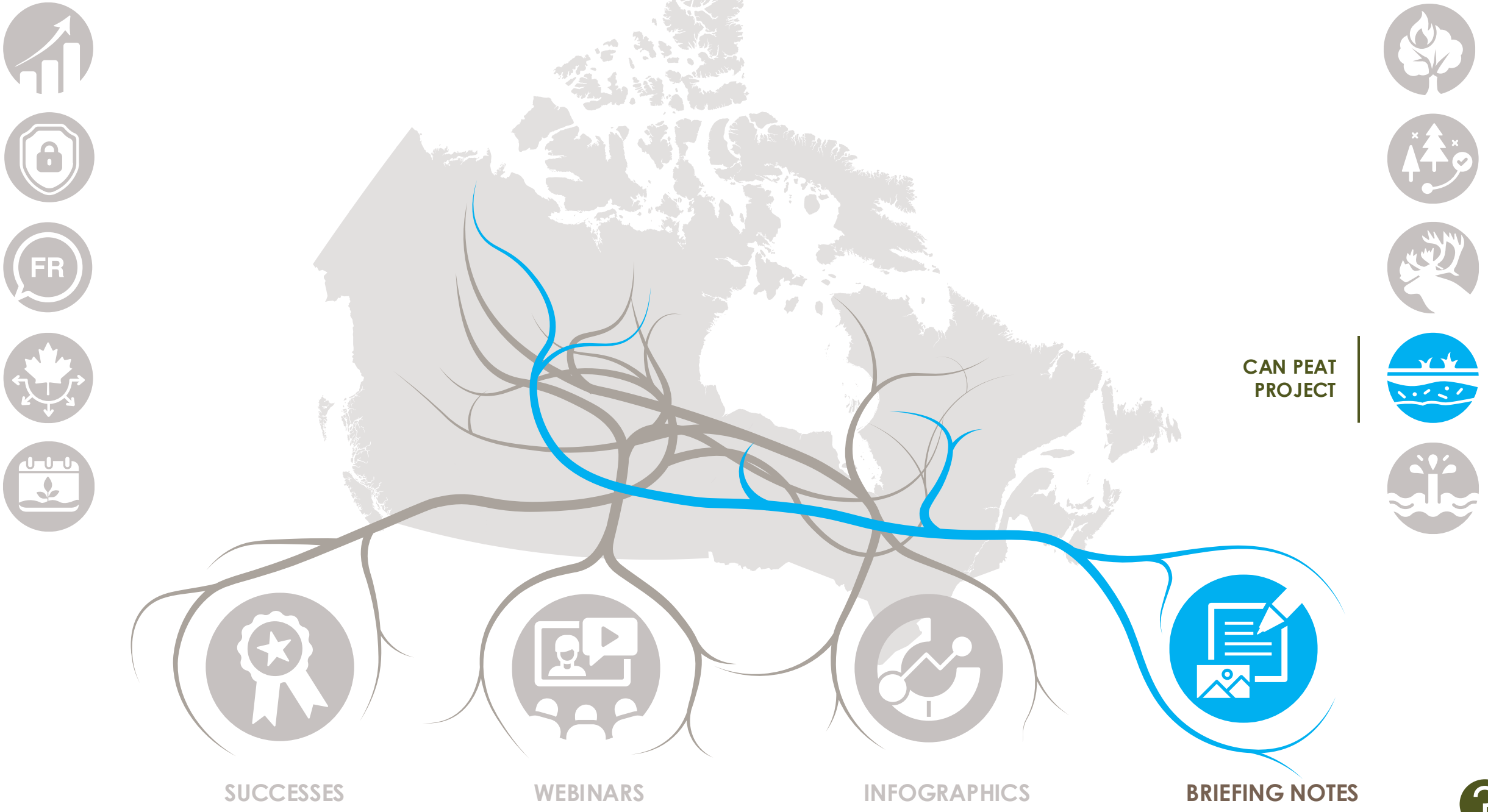
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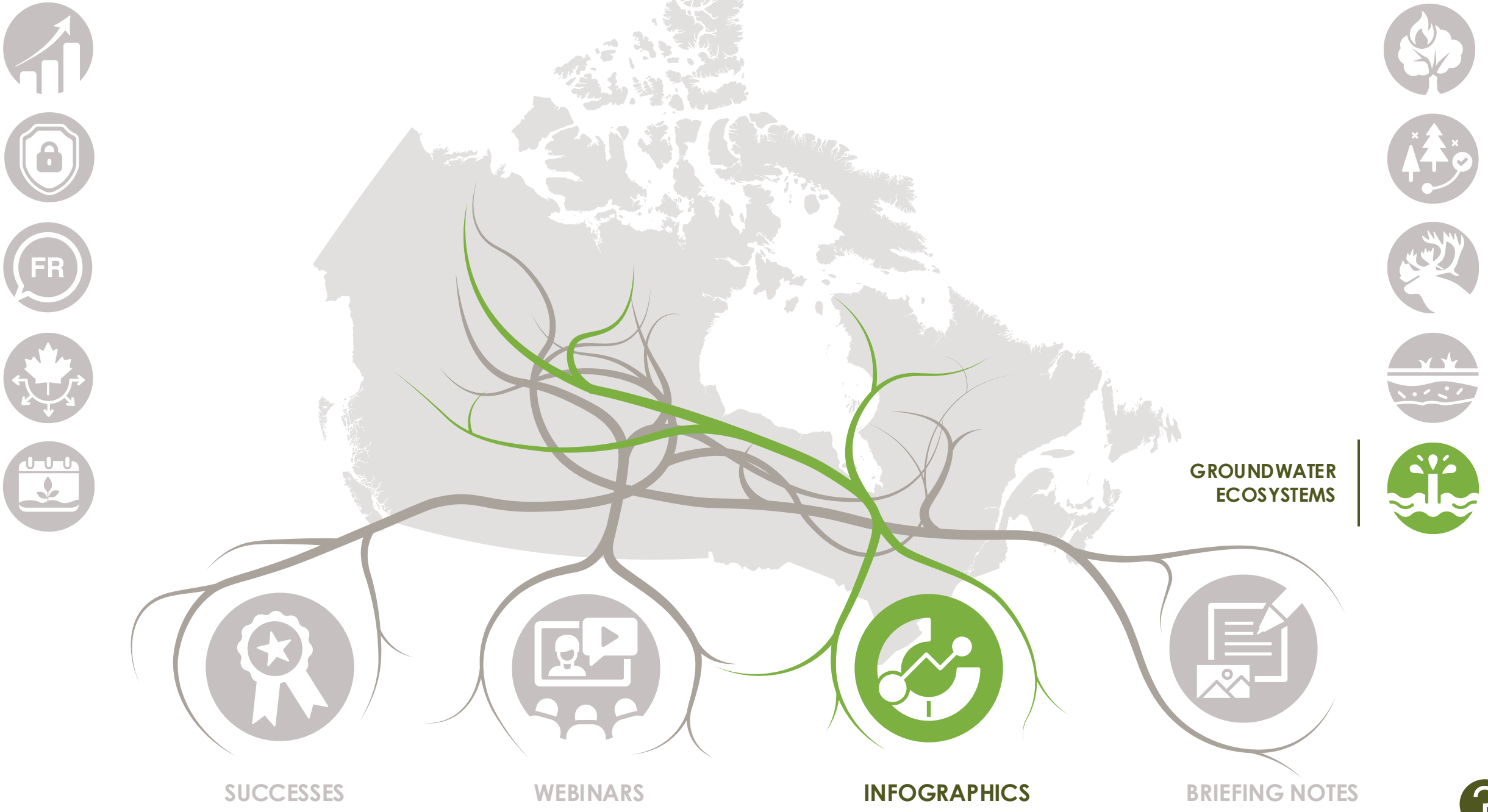
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GROWTH OF CCLM SINCE LAUNCH

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SUMMARY AND HIGHLIGHTS | COLLABORATORS AND HISTORY | METRICS

GROWTH OF CCLM SINCE LAUNCH

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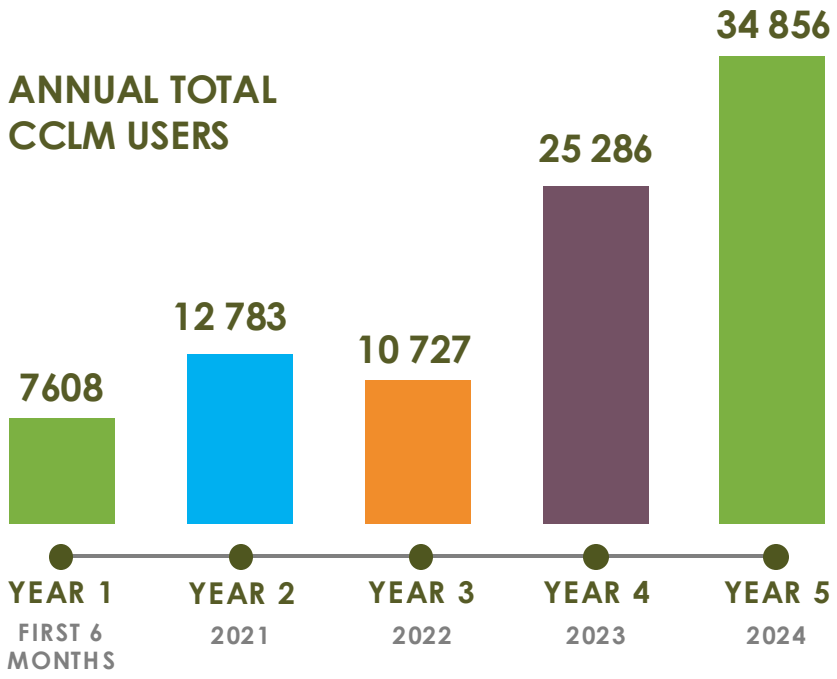
SUMMARY AND HIGHLIGHTS | COLLABORATORS AND HISTORY | METRICS

The Canadian Conservation and Land Management (CCLM) Knowledge Network is a collaborative group of organizations committed to creating a forum for sharing information and lessons learned about boreal caribou conservation, wetland best practices, land restoration and land reclamation.

Over 5 years, the CCLM has developed an accessible online platform, the CCLM Knowledge Portal to share resources and to connect practitioners across Canada.



GROWTH OF CCLM SINCE LAUNCH

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SUMMARY AND HIGHLIGHTS | COLLABORATORS AND HISTORY | METRICS

PROGRAM LAUNCH

INDIGENOUS-LED CONSERVATION HUB

2020 — 2021 — 2022 — 2023 — 2024

IPCA Knowledge Basket

Tehdzo Got'ıné Gots'é Nákedı — Sahtú Renewable Resources Board

Forests Canada

Ecological Forestry Research Initiative

CIER Centre for Indigenous Environmental Resources

FIRST NATIONS LAND MANAGEMENT RESOURCE CENTRE

conservation reconciliation

Ducks Unlimited Canada

National Boreal Caribou Knowledge Consortium

ALBERTA INNOVATES

INDIGENOUS CLIMATE HUB

In 2024 we hosted our annual member meeting and heard about two new initiatives: Forests Canada and the Ecological Forestry Research Initiative (EFRI). We are excited to welcome EFRI as an affiliate member and host their website and resources moving forward.

GROWTH OF CCLM SINCE LAUNCH

Return to Start

SUMMARY AND HIGHLIGHTS | COLLABORATORS AND HISTORY | METRICS

There are now over 3,500 resources within the CCLM portal, and this number continues to grow daily as we grow in our membership.

TOTAL METRICS SINCE LAUNCH

IN THE SPIRIT OF KNOWLEDGE EXCHANGE:

SECURITY – AN INCREASING CHALLENGE

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SUCCESSES

July 2024

SUMMARY

In today's interconnected world, knowledge exchange has become a cornerstone for innovation, progress, and problem-solving across industries. The ability to share and access knowledge quickly and efficiently can lead to significant advancements. However, the process of knowledge exchange comes with a set of challenges, especially in the realm of security.

In July of 2024, the CCLM experienced extremely high spikes in spam traffic causing site slowdowns. (All spam traffic was removed from site analytics reported in the "Growth" section). rTraction closely monitored this issue for us and got the site functioning properly. In early August 2024 the website was repeatedly being attacked by malicious Ips. rTraction investigated this issue and quickly addressed our security concern by installing a Cloudflare Web Application Firewall (WAF). This application works by watching all the traffic (data) that comes to the CCLM, checking if anything looks suspicious, like a hacker trying to get in. If Cloudflare detects something bad, it blocks it before it can reach the site.

Cyberattacks can pose significant risks and we are thankful to rTraction for their continuing support to help safeguard the CCLM and it's valuable resources.

OFFICIAL FRENCH LAUNCH

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SUCCESSES

January 2025

LEARN MORE

SUMMARY

In January 2025 the CCLM officially became a bilingual website.

With the click of a button, users have the option to explore the website in both French and English, making it easier to find resources in their preferred language.

This has been a collaborative effort and the CCLM is thankful to everyone who helped behind the scenes to make this happen. Thanks to 2Billion Trees and Environment and Climate Change Canada for funding this initiative.

2023 NATURE STRATEGY

Return to Start

WEBINAR
Sept 2024

WATCH | LEARN MORE

This webinar engaged three experts from across Canada:

MEGAN LAFFERTY
Manager of Land Protection Measures
Nature Conservancy of Canada

HUGO MORAND
Manager of Environment and Climate Change Canada

CHRISTIAN MALOUIN
Manager, Canadian Wildlife Service
Environment and Climate Change Canada

SUMMARY

The Global Biodiversity Framework (GBF) is a comprehensive international agreement aimed at halting and reversing biodiversity loss globally. It was established under the Convention on Biological Diversity (CBD) and is designed to address the rapid decline in species, ecosystems, and genetic diversity worldwide.

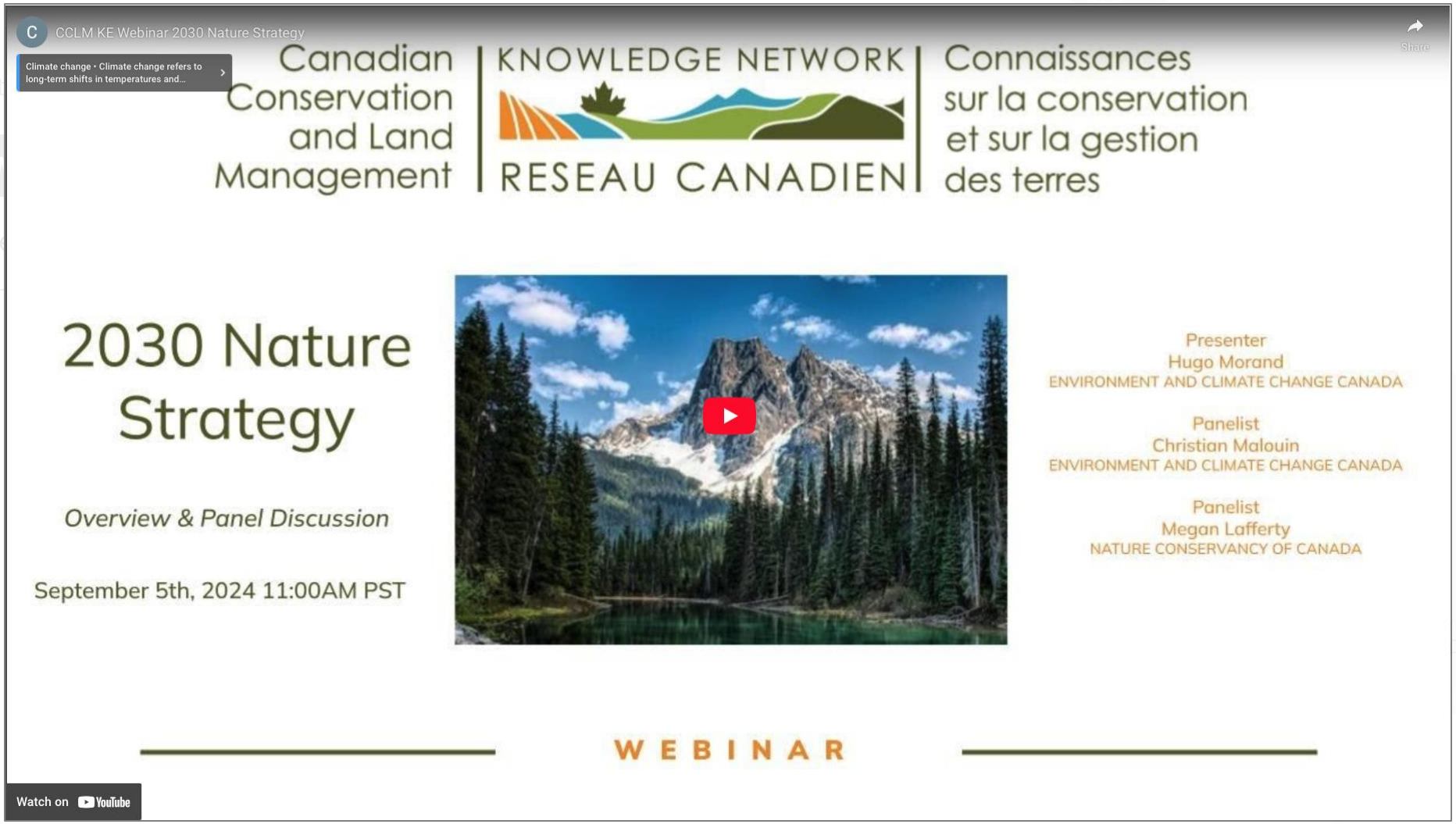
Canada has developed a national strategy that aligns with the Global Biodiversity Framework (GBF) and reflects its commitments under the Convention on Biological Diversity (CBD).

By aligning its national strategy with the Global Biodiversity Framework, Canada aims to contribute to global conservation goals while addressing its unique ecological and socio-economic context. This alignment ensures that Canada's efforts are both effective and integrated within the broader international biodiversity agenda.

On September 5, 2024 the CCLM hosted a webinar that provided a brief overview of the GBF and focused on a panel discussion with experts who shared their knowledge on practices across Canada.

This was one of two webinars hosted by the CCLM Knowledge Exchange program in 2024.

2023 NATURE STRATEGY



This was one of two webinars hosted by the CCLM Knowledge Exchange program in 2024.

NATIONAL AUDIENCE GOAL 2024

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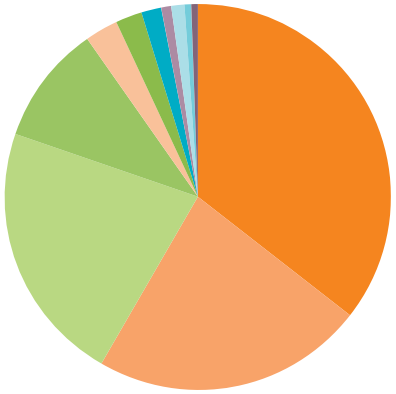
SUMMARY

In 2024, the majority of the CCLM userbase connected from Alberta, British Columbia, Ontario and Quebec. Our goal for 2024 was to prioritize resources and connections to organizations that would provide further value to users in Eastern Canada, the Prairies, and the Territories. In 2025 we will continue to expand our national focus.

USERBASE BY LOCATION

25%	AB	1.2%	NS
16.2%	BC	0.75%	NWT
15.5%	ON	0.63%	NL
7%	QC	0.52%	NB
2%	SK	0.43%	YK
1.5%	MB		



WILDFIRE

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WEBINAR

Sept 2024

WATCH | LEARN MORE

This webinar engaged three experts from across Canada:

DAYAL WIJAYARATHNE
Researcher / Geoscientist
Innotech Alberta

JEN BEVERLY
Associate Professor, Wildland Fire
University of Alberta

JOE GILCHRIST
Indigenous Firekeeper

SUMMARY

Impacting biodiversity, ecosystems and land use practices, wildfires pose an increasingly significant challenge for land conservation and management. As wildfires grow in frequency and intensity, it is crucial to explore effective strategies for prevention, recovery, and long-term resilience. This requires adaptive strategies, ongoing research, and collaboration.

On February 27, 2025 the CCLM brought together three experts to share their knowledge and best practices and to speak about the complex challenges associated with fire management, conservation, and land stewardship.

Dr. Dayal Wijayarathne , Joe Gilchrist, and Dr. Jen Beverly each provided a presentation before convening a panel on the topic of wildfire management in Canada.

This was one of two webinars hosted by the CCLM Knowledge Exchange program in 2024.

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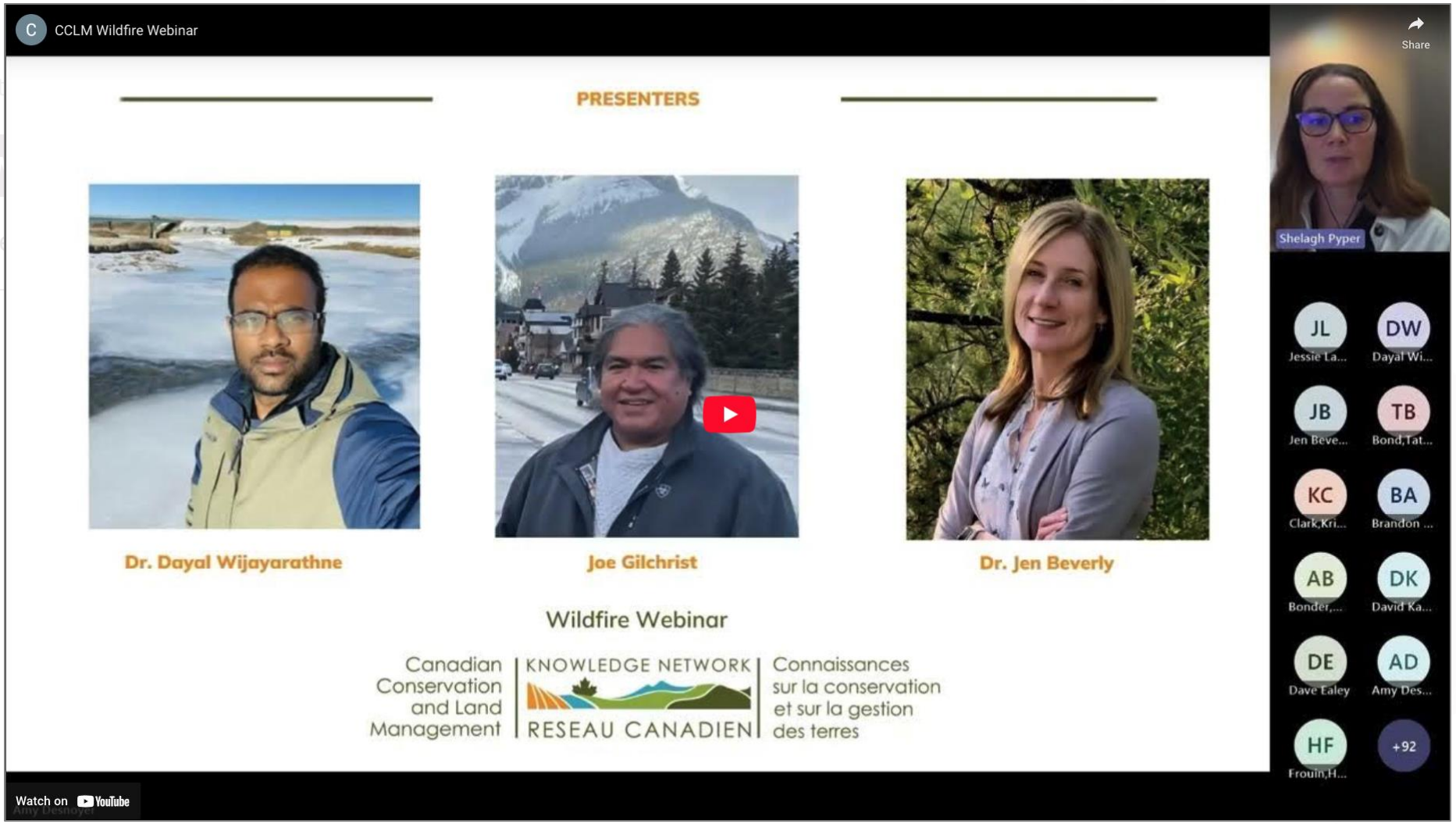

SILVICULTURE SYSTEMS

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BRIEFING NOTE

Sept 2024

PREVIEW DOWNLOAD

SUMMARY

Our coastal montane forests are a treasure trove of biodiversity, offering crucial cultural, social, and ecological benefits while also serving as valuable economic resources. Yet, high demand for timber and the challenges of forest regeneration in these unique high-elevation areas pose significant concerns.

The Montane Alternative Silviculture Systems (MASS) project was established to address these issues. This multi-agency initiative is dedicated to exploring and implementing innovative approaches to forest harvesting and regeneration. The goal? To balance timber needs with the imperative of maintaining the diverse values these forests provide.

This briefing note from the CCLM highlights the findings from the paper by Beese et. al., 2022. Understory vegetation response to alternative silvicultural systems in coastal British Columbia montane forests.

Learn how shelterwood silviculture treatments balance sustainable forestry practices with preservation of coastal montane ecosystems!

COSMIN FILIPESCU
Montane Alternate Silvicultural System (MASS)

BILL BEESE
Montane Alternate Silvicultural System (MASS)

This knowledge product was created as part of the CCLM Knowledge Exchange program in 2024.

WHAT LIES BENEATH

HOW ALTERNATIVES TO CLEARCUTTING AFFECT UNDERSTORY VEGETATION IN BRITISH COLUMBIA'S COASTAL FORESTS

British Columbia's (B.C.) coastal montane forests are rich in plant and animal life that provides significant cultural, social and ecological benefits. They are also a valuable economic resource and are in high demand for their timber. However, forest regeneration following harvest is a key concern and challenge in these areas due to their high elevation and some unfavorable re-growth conditions created by large clearcuts. In addition, there is growing concern and awareness about the impacts of clearcutting on the region's biodiversity. Forest and other resource managers need to select silviculture treatments that achieve management goals, including restoring/retaining the many values these forests provide.

In response to these challenges, the Montane Alternative Silviculture Systems (MASS) project, a multi-agency partnership, was established to test and study new approaches to forest harvesting and regeneration in coastal montane forests on central Vancouver Island, B.C.

MASS Study Site

This study investigated the **effects of clearcutting and three alternative silvicultural systems on understory vegetation** compared to an undisturbed old-growth forest.

Specifically, they looked at **understory vegetation:**

1. **Cover and diversity** responses to four silviculture treatments.
2. Responses to **edge effects** within and surrounding patches of forest (retained aggregates) that were left uncut.

Sites were observed before harvest and at regular intervals up to 26 years after harvest and compared with an adjacent old-growth forest.

The four silviculture treatments:

CLEARCUTTING: All trees harvested within the block.

PATCH CUTTING: Small cutblocks alternating with uncut patches (50% patch retention).

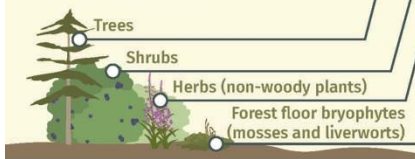
DISPERSED RETENTION: Retention of 25 trees dispersed throughout each hectare (sometimes called 'green tree retention').

SHELTERWOOD: Trees of all sizes and species left uniformly (~25% retention and 200 trees per hectare) to protect re-growth from the elements.

Silvicultural systems *are the set of treatments applied before, during, and after a forest is harvested (over the life of the stand) to achieve specific forest characteristics. They are often designed to maximize timber production, but now more commonly consider other factors like ecological, social, and cultural values.*

KEY TAKEAWAYS

In the year after harvesting, all silviculture treatments reduced understory vegetation cover due to ground disturbance and logging debris. Plant life-forms recovered at different rates:



- Recovered to pre-harvest cover after 15 years and exceeded pre-harvest cover after 26 years.
- Recovered to pre-harvest cover after 5-10 years and continued to increase following all non-clearcut treatments after 15 years.
- Cover was low pre-harvest, but rapidly increased between years 3 and 10 due to the fast growth of early-seral species (plants that grow first after a disturbance) like fireweed. This was least pronounced in the shelterwood treatment. They have since declined rapidly after year 15.
- Most negatively affected by forest harvesting compared to other plant species, with less than 5% cover following all treatments except shelterwood. They remain at one-third or less of their pre-harvest cover after 26 years.

All silviculture treatments temporarily increased the number and diversity of understory species compared to pre-harvest and old-growth control conditions and peaked at year 15. By year 26, the number and diversity of understory species began to decrease as early-seral species were outcompeted, but still above pre-harvest levels. After 26 years, the number and diversity of understory species was similar among all treatments.

Blueberry and huckleberry species were still increasing in all systems and berry production remained abundant—an important consideration for forest management given their significance for wildlife forage and First Nations traditional food gathering.

In some cases, vegetation cover, and the number and diversity of understory species varied by silviculture treatment:

Many of the vegetation responses in these treatments were similar to the clearcut.

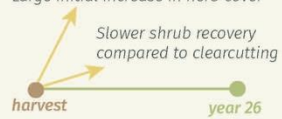
CLEARCUTTING:

Large increase in herb cover and rapid recovery of shrubs

PATCH CUTTING:

Large initial increase in herb cover

Slower shrub recovery compared to clearcutting



DISPERSED RETENTION:

Large initial increase in herb cover and rapid recovery of shrubs

This is the only treatment with **significantly higher number of species** than the pre-harvest forest after 26 years, but the trend was similar for all treatments.

SHELTERWOOD:

Least amount of change between pre-harvest, old-growth conditions compared to other treatments because it retained undisturbed ground and more stand structure:

Slower conifer regeneration because of competition with shrubs and shade created by the overstory.

Retention patches did not have significant edge effects into the uncut areas and patches had a similar number and diversity of species to the pre-harvest forest. This suggests that **aggregated retention can be effective for maintaining late-seral understory species that are more abundant in older forests.**

MANAGEMENT IMPLICATIONS: RETAIN PATCHES OF INTACT FOREST

Because of the high winds in forests along BC's coast, retaining dispersed single trees is not practical in many areas due to high losses to windthrow. Therefore, **retaining forest patches, especially of mature, or old-growth forest, may help mitigate the impact of harvesting on late-seral forest herbs and bryophytes.**

These results are most applicable to montane ecosystems along BC's coast and in some forests in BC's Interior Cedar-Hemlock biogeoclimatic zone. For other regions, **retention patch sizes and patterns should be adjusted to local conditions, species, and forest management goals.**

CCLM KNOWLEDGE NETWORK | Canadian Conservation and Land Management

TO LEARN MORE ABOUT THE MASS PROJECT ON THE CCLM, VIST CCLMPORTAL.CA

Reference: Beese et al., 2022. Understory vegetation response to alternative silvicultural systems in coastal British Columbia montane forests. Forest Ecology and Management.

CARIBOU HABITAT RESTORATION PRACTICES: APPLICATIONS AND OUTCOMES

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INFOGRAPHIC

November 2024

PREVIEW DOWNLOAD

STEVE WILSON

Habitat Restoration Working Group

SUMMARY

The decline of boreal caribou across Canada is a significant conservation challenge.

The Habitat Restoration Working Group of the National Boreal Caribou Knowledge Consortium commissioned a report to summarize learnings from habitat restoration projects aimed at disrupting the pathways leading to caribou decline.

This infographic from the CCLM highlights the findings from the report by Wilson, S. (2024) Boreal Caribou Habitat Restoration Practices: Application and Outcomes.

Discover the key takeaways around knowledge sharing, scaling restoration and the issue of confounding factors. It is clear that communities of practice, like the CCLM network, can enhance caribou recovery by integrating collective insights into restoration practices.

This knowledge product was created as part of the CCLM Knowledge Exchange program in 2024.

BOREAL CARIBC

INFOGRAPHIC
November 2024

SUMMARY

Insert writeup here

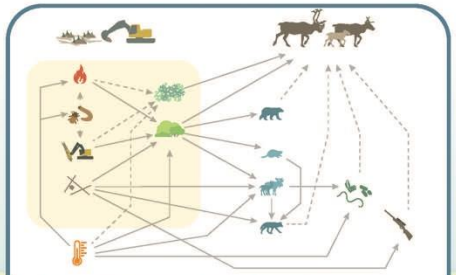
LEVERAGE OUR LEARNINGS:
APPLICATIONS AND OUTCOMES OF BOREAL CARIBOU HABITAT RESTORATION

HABITAT RESTORATION IS A KEY PRIORITY TO ADDRESS BOREAL CARIBOU DECLINES.

Across Canada, boreal caribou are in decline and their recovery is a key conservation challenge. To support recovery efforts, the Habitat Restoration Working Group of the National Boreal Caribou Knowledge Consortium (HRWG–NBCKC) developed a conceptual model to characterize the different pathways contributing to boreal caribou declines and how they interact. The model can inform habitat restoration by identifying treatments that can be applied to disrupt key pathways.

With habitat restoration projects ongoing, there is a need to review projects and their outcomes to date.

THE BOREAL CARIBOU ECOLOGICAL MODEL*



*Visit the references for the full, labeled graphic

HABITAT RESTORATION PROJECTS HAVE BEEN CONDUCTED TO ADDRESS TWO HABITAT-RELATED PATHWAYS THAT CONTRIBUTE TO CARIBOU DECLINE:

PREDATION
Key problem addressed:

NUTRITION
Key problems addressed:

WHAT HAVE WE LEARNED FROM THESE PROJECTS:

KNOWLEDGE SHARING:
A lot of knowledge gained in the field (e.g., through trial and error) is rarely captured in scientific papers and only partially in reports. We need other knowledge transfer methods to share and leverage these learnings.

SCALE:
There is a need to shift from small-scale treatments and short-term monitoring (e.g., animal movements) to larger-scale treatments and longer-term monitoring (e.g., population responses).

CONFOUNDING FACTORS:
Single restoration treatments can have multiple effects (e.g., affecting both browse and access) associated with separate pathways. This can make it difficult to distinguish effects and to determine which pathway is most important to address (e.g., impede access or reduce browse).

ADAPTIVE MANAGEMENT:
Adaptive management is necessary to maximize learnings—we cannot delay restoration until we know more.

CCLM KNOWLEDGE NETWORK | Canadian Conservation and Land Management

TO LEARN MORE ABOUT THE BOREAL CARIBOU MODEL ON THE CCLM, VIST CCLMPORTAL.CA

References:

Bentham et al. (2022) The Boreal Caribou Ecological Model - Technical Report

Fuse Consulting Ltd. (2022) The Boreal Caribou Ecological Model - Infographic

Wilson, S. (2024) Boreal Caribou Habitat Restoration Practices: Application and Outcomes

DEVELOPING AN EFFECTIVE COMMUNITY OF PRACTICE TO SHARE BEST PRACTICES AND TRAIN FIELD STAFF IS CRITICAL TO SHARE FINDINGS, SCALE RESTORATION EFFORTS, AVOID COSTLY ERRORS AND ULTIMATELY SUPPORT CARIBOU RECOVERY.

Communities of practice can share through:

face-to-face interactions | *presentations* | *site visits*

Communities of practice are key for sharing information about permitting, project design and implementation and involves other land users and rightsholders throughout the process.

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rking Group

art of the CCLM Knowledge Exchange program in 2024.

CAN PEAT PROJECT

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BRIEFING NOTE

January 2025

PREVIEW DOWNLOAD

MARIA STRACK
Can Peat Project
University of Waterloo

IQRA NAEEM
Can Peat Project
University of Waterloo

SUMMARY

Peatlands are a critical part of Canada's carbon storage system, playing a key role in mitigating climate change globally. However, despite extensive research, much of the data is inaccessible, creating knowledge gaps and duplicated efforts.

To address this, collaboration across scientific, Indigenous, and policy sectors is essential to improve peatland carbon modeling, advance management practices, and support the protection and restoration of peatlands.

In September 2022, the Can-Peat project was launched through the ECCC Environmental Damages Fund to help meet Canada's 2030 and 2050 climate targets. This 5-year initiative brings together peatland experts to enhance our understanding of how peatland management actions can reduce greenhouse gas emissions and evaluate policy tools.

This briefing note from the CCLM highlights the 5 key objectives of the Can-Peat project and the importance of Indigenous perspectives and knowledge.

This knowledge product was created as part of the CCLM Knowledge Exchange program in 2024.

CAN-PEAT PROJECT:
BRINGING TOGETHER PEATLAND EXPERTS TO ADVANCE NATURE-BASED CLIMATE SOLUTIONS

PEATLANDS PLAY A KEY ROLE IN CANADIAN AND GLOBAL CARBON STORAGE.

While a lot of research and data exists on peatlands, much of this work is not accessible or being shared which has led to knowledge gaps and duplication of efforts. There is a need for collaboration across scientific, Indigenous, and policy domains to improve the accuracy of peatland carbon modeling, advance peatland management and support the protection, responsible use and restoration of peatlands.

In September 2022, the Can-Peat project began with funding from the ECCC Environmental Damages Fund to help meet Canada's 2030 and 2050 climate change targets. This five-year project aims to highlight the potential of peatland management as a nature-based climate solution, by recognizing that peatlands are a critical component of the Canadian landscape and a significant source of the country's carbon stocks.

WHY DO WE CARE ABOUT PEATLANDS?

Peatlands are highly specialized wetland ecosystems that have built up a thick soil organic layer. This accumulated organic material is evidence that they have absorbed more carbon than they have released. Therefore, peatlands are a substantial portion of Canada's nature-based carbon stocks.

Canada has over 1.13 million km² of peatland area, accounting for approximately 12% of its land area and representing a quarter of all global peatlands.

Despite their importance, Canada's peatlands are threatened by:

climate change *land development*

CAN-PEAT IS BUILDING A NETWORK OF PEATLAND EXPERTS TO IMPROVE OUR UNDERSTANDING OF HOW DIFFERENT PEATLAND MANAGEMENT ACTIONS CAN REDUCE GREENHOUSE GAS EMISSIONS AND TO EVALUATE POLICY TOOLS TO SUPPORT THE IMPLEMENTATION OF THESE ACTIONS.

KEY OBJECTIVES OF THE CAN-PEAT PROJECT INCLUDE:

1. **The network:** Create a Canada-wide peatland research network.
   - ✧ *Indigenous Advisory Council to guide research.*
2. **Data repository:** Compile a data portal where users can access information on peatland carbon stocks, greenhouse gas exchange, and supporting data.
   - ✧ *The **Local Contexts Hub*** allows communities to express local and specific conditions for sharing and engaging in future research and relationships in ways that are consistent with community rules, governance and protocols.*
3. **Advance models** of peatland carbon cycling from site to national scale. Apply these models to evaluate future peatland greenhouse gas uptake and emissions under changing climate and disturbance scenarios.
   - ✧ *Indigenous data sovereignty best practices.*
4. **Implementation:** Investigate mechanisms to implement peatland nature-based solutions in Canada and develop a decision-support framework for peatland management.
5. **Outreach:** Communicate findings to knowledge users and provide the tools needed for climate-friendly peatland management and greenhouse gas emission reporting. This helps identify key knowledge gaps and areas where policy decisions can have the biggest impact.
   - ✧ *Indigenous Advisory Council to guide outreach.*

✧ SUPPORTING INDIGENOUS DATA SOVEREIGNTY AND THE INCLUSION OF INDIGENOUS PERSPECTIVES IS A KEY PRIORITY FOR CAN-PEAT:

Indigenous communities have stewarded peatland areas for millennia and their generations of knowledge about peatlands is important for present and future peatland conservation.

Defn' of Indigenous Data Sovereignty: *the right of Indigenous Peoples, Nations and Communities to govern the collection, ownership, and application of data about and from their members, knowledge systems, customs, or territories and resources.*

*See the **references** section for how Can-Peat is supporting Indigenous Data Sovereignty and how you can collaborate.*

ARE YOU INTERESTED IN JOINING THE NETWORK?

Can-Peat is actively seeking researchers, students, land managers, industry, all levels of government, Indigenous governments and communities, and others who are interested in Canadian peatland management and research.

To join the network, visit:
uwaterloo.ca/can-peat/network

CCLM KNOWLEDGE NETWORK | Canadian Conservation and Land Management

TO LEARN MORE ABOUT CAN-PEAT AND THEIR WORK CHECK OUT THESE RESOURCES AND MORE AT WWW.CCLMPORTAL.CA

Can-Peat's data portal is underway and is guided by FAIR and CARE principles.

Access the Local Contexts Guide for more information on supporting Indigenous Data Sovereignty within the Can-Peat project: Can-Peat - Local Contexts Guide - Part 1 - V1

***Visit the Local Contexts Hub** to learn how you can identify the presence of Indigenous Data in your work: Local Contexts – Grounding Indigenous Rights

This project was undertaken with the financial support of the Government of Canada.

Ce projet a été réalisé avec l'appui financier du gouvernement du Canada.

HIDDEN WATER: UNTANGLING THE EFFECTS OF MINING ON GROUNDWATER ECOSYSTEMS

Return to Start

INFOGRAPHIC

April 2025

PREVIEW

SUMMARY

Groundwater is a vital yet often overlooked part of healthy watersheds and our water supply. It sustains lakes, rivers, and wetlands, supports ecosystems on land and in water, and is essential to Indigenous communities who rely on groundwater for traditional harvesting and cultural practices, making clean, abundant water fundamental to their way of life.

Monitoring groundwater is complex due to its hidden nature, making it crucial for land managers to improve mapping and prediction of groundwater–surface water interactions.

This Infographic from the CCLM highlights the findings from the report by S.J. Birks, et al., (2024) Groundwater vulnerability in the Athabasca and Cold Lake oil sands regions: gaps, opportunities, and challenges.

With increasing pressure on water systems, collaboration is key to protect groundwater and its connected ecosystems.

This knowledge product was created as part of the CCLM Knowledge Exchange program in 2024.

INFOGRAPHIC

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With increasing pressure ... nd its connected ecosystems.

UNTANGLING THE EFFECTS OF DEVELOPMENT ON GROUNDWATER DEPENDENT ECOSYSTEMS

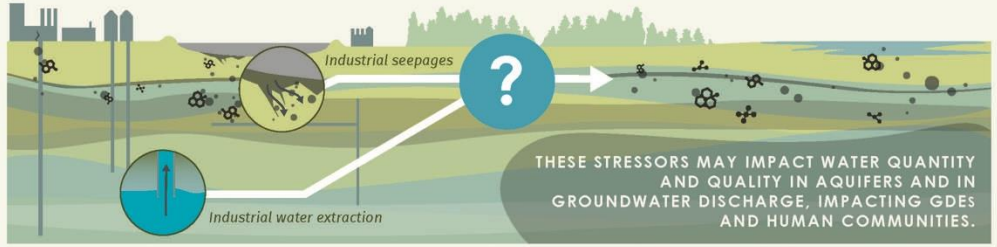
GROUNDWATER— WATER STORED BELOW THE EARTH'S SURFACE— PLAYS A CRITICAL AND OFTEN OVERLOOKED COMPONENT OF HEALTHY WATERSHEDS AND OUR WATER SUPPLY.

Groundwater helps sustain the hydrological and geochemical balance of surface water systems, including lakes, rivers, and certain wetlands. These inputs can be foundational in supporting ecosystems that rely on its availability or chemical qualities for either the whole, or a portion of their water and nutrient needs.
These ecosystems are called groundwater-dependent ecosystems (GDEs).

For Indigenous communities, whose livelihoods and cultural practices rely on the land and watershed for harvesting plants and animals, the health of groundwater is essential.

RESOURCE DEVELOPMENT CAN IMPACT GROUNDWATER

A conceptual model has been developed to help explain potential stressors and mechanisms, and to predict the effects of development on GDEs in Alberta's oil sands region. The researchers who developed the model noted that stressors from mine construction and operations, wastewater storage and disposal, steam injection, and reclamation activities may be priority stressors to focus further research on due to their potential effects on groundwater.



It is not always clear whether changes in groundwater conditions can be attributed to specific oil sands stressors or whether changes are within natural ranges. However, current monitoring and research is helping to clarify these connections and improve GDE monitoring.

SOLVING THE MYSTERY

MAPPING GROUNDWATER

Cutting-edge research by scientists at ABMI and InnoTech Alberta uses **machine-learning mapping** to determine where GDEs exist to better monitor changes in aquatic and terrestrial ecosystems.

BASELINE DATA

Collaborating with Indigenous communities, who have long monitored their water systems, is essential to understanding the broader impacts of groundwater change on human and environmental health.

A pilot program to inventory Indigenous Knowledge in the MacKay River watershed aims to collaboratively monitor and provide baseline information on groundwater using Traditional and Western Knowledge.

CCLM KNOWLEDGE NETWORK | Canadian Conservation and Land Management

TO LEARN MORE ABOUT THE GROUNDWATER-DEPENDENT ECOSYSTEMS CONCEPTUAL MODEL ON THE CCLM VISIT, WWW.CCLMPORTAL.CA

References:

S.J. Birks et al. (2025) Groundwater vulnerability in the Athabasca and Cold Lake oil sands regions: gaps, opportunities, and challenges

...part of the CCLM Knowledge Exchange program in 2024.