CUTTING IT CLOSE:
HOW UNSUSTAINABLE LOGGING IN CANADA’S BOREAL FOREST THREATENS INDIGENOUS RIGHTS, WILDLIFE, AND THE GLOBAL CLIMATE
Acknowledgments

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This report is dedicated to the Indigenous Peoples who fight every day to protect their lands and ways of life. We would also like to thank the numerous organizations, communities, and individuals across Canada who work tirelessly to safeguard the boreal forest for future generations.

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Jennifer Skene, with significant contributions from Joshua Axelrod, Anthony Swift, Courtenay Lewis and Danielle Droitsch.

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The Natural Resources Defense Council is an international nonprofit environmental organization with more than 3 million members and online activists. Since 1970, our lawyers, scientists, and other environmental specialists have worked to protect the world's natural resources, public health, and the environment. NRDC has offices in New York City, Washington, D.C., Los Angeles, San Francisco, Chicago, Montana, and Beijing. Visit us at nrdc.org.

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Executive Summary

Just below the frozen Arctic Circle, the boreal forest crowns the earth’s Northern Hemisphere with a ring of deep green, primarily coniferous, trees. This forest stretches across Canada, Alaska, Russia, and Scandinavia, accounting for one-third of the world’s forested areas.\(^1,2\) Canada boasts a quarter of the world’s intact forests, with a boreal region spanning more than 1 billion acres from Newfoundland and Labrador to the Yukon Territory.\(^3\) It is home to more than 600 Indigenous communities, whose cultural identities are entwined with the forest, and to many non-Indigenous communities who continue to rely on the forest.\(^4\) The boreal is also important habitat for iconic species such as the boreal caribou, Canada lynx, and moose,\(^5,6,7\) and it is an essential nesting ground for hundreds of migratory bird species that enrich the skies of North America.\(^8\) The region also provides vital ecosystem services, including pristine freshwater bodies that millions of Canadians rely on for drinking water.\(^9\)

Furthermore, the boreal’s benefits extend far past Canada. The trees and rich soils create a powerful carbon sink that extracts carbon dioxide from the atmosphere and stores it, helping to mitigate global climate change.\(^10\) If we want to avoid the worst impacts of climate change, an intact boreal is an essential ally.

Unfortunately, Canada’s federal, provincial, and territorial governments are failing to protect the boreal and its vast ecological riches. They have allowed unsustainable logging to threaten Indigenous ways of life, iconic boreal species, and the global climate. Every day, logging companies push farther into intact forest regions, destroying complex old-growth ecosystems that had never previously been impacted by industrial development and leaving behind degraded landscapes.\(^11\) Between 1996 and 2015, more than 28 million acres of boreal forest were logged, an area roughly the size of Ohio.\(^12\)

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5. Also known as the boreal woodland caribou.
More than 90 percent of logging in Canada’s boreal is done by clearcutting. Large-scale clearcutting is an especially destructive forestry practice that removes nearly all trees from an area. A single clearcut can reduce as much as nearly 5,000 acres from tall, lush greenery to stumps. Forests can take centuries to regain even close to their original biodiversity, complexity, and ecosystem services after a large clearcut, if they ever do.

**THE IMPACTS**

This widespread logging threatens many Indigenous Peoples’ cultures and relationships to the land. Some communities have only a fraction of their territory left intact. While Canadian governments have made progress toward reconciliation and the establishment of Nation-to-Nation relationships with Indigenous Peoples, too often Indigenous Peoples are largely excluded from decisions about development in their traditional territories. Communities do not always have recourse to prevent logging operations on their land and often receive no compensation for the resulting degradation and lost resources. Yet Indigenous Peoples continue to assert their rights to determine the future of their territories.

To protect their homelands and to express their goals, objectives, and aspirations as Nations, many Indigenous Peoples are leading land-use planning initiatives to care for the boreal forest. Indigenous-designed protected areas, frameworks for caribou management, monitoring programs, and other initiatives have become models for sustainable economic development across Canada.

Logging has also taken a devastating toll on wildlife. Boreal caribou, which require large tracts of mature forest and are particularly sensitive to human disturbance, have been hit especially hard. According to the federal government’s boreal caribou Recovery Strategy, for a 60 percent chance of long-term survival, boreal caribou require ranges that are less than 35 percent disturbed. Yet across Canada, disturbance levels are well beyond this threshold. Only 14 of Canada’s 51 boreal caribou ranges are currently considered sufficient to support self-sustaining caribou populations. Without strong habitat protection measures, ongoing habitat loss will threaten the future of boreal caribou in these ranges. The federal government also reported that, since the release of the Recovery Strategy in 2012, caribou populations have continued to decline across the country. Caribou act as an “umbrella species,” which means their protection also safeguards other boreal wildlife. These animals are also bellwethers for the broader health of the forest, so their decline is particularly alarming. If caribou habitat continues to deteriorate, that will have negative ramifications for species like the Canada lynx, the American marten, and hundreds of birds—all of which perform essential ecosystem functions. Yet no province or territory has created meaningful protection plans. In fact, some provinces have even reversed progress toward caribou protection, further jeopardizing the future of this species—and the boreal itself.

Unsustainable logging is also undermining Canada’s international commitments to limit the greenhouse gas emissions causing global climate change, including its own pledge under the historic 2015 Paris Agreement. Logging in the boreal impacts the global climate in two ways. First, it removes vegetation and soils that continuously absorb greenhouse gases, diminishing the boreal’s powerful potential for carbon sequestration. Second, over time it releases the vast stores of carbon that have been captured in those soils. According to Natural Resources Defense Council (NRDC) estimates, clearcutting across the boreal forest releases on average more than 26 million metric tons (Mt) of carbon dioxide into the atmosphere each year. That’s equivalent to the annual emissions of nearly 5.5 million passenger vehicles, or 3.7 percent of atmosphere each year. That's equivalent to the annual emissions of nearly 5.5 million passenger vehicles, or 3.7 percent of

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13. Between 1996 and 2015, more than 25.3 million acres of boreal forest were clearcut. This estimate is based on clearcut logging done in the provinces where most logging activity takes place in the boreal forest: Newfoundland and Labrador, Quebec, Ontario, Manitoba, Saskatchewan, and Alberta. National Forestry Database, “Silvicultural Statistics.”


17. Reconciliation is an ongoing effort among governments, individuals, and institutions within Canada to redress the historical and systemic wrongs inflicted on Indigenous Peoples throughout the country’s history.


Canada’s total emissions in 2016. Despite these impacts, Canada does not fully account for logging’s substantial emissions in its national greenhouse gas inventories. Instead it overstates the climate benefits associated with Harvested Wood Products (HWPs) and does not include the vast release of carbon from the soil logging causes. Even if these emissions were adequately counted, Canada does not have a national strategy to limit its carbon emissions. Therefore, there is little opportunity to hold logging companies accountable for their climate impact.

**INDUSTRY PRACTICES AND INTERNATIONAL DEMAND**

Canada’s logging industry is driven largely by international demand. More than half of all Canadian forest products are exported—two-thirds of which go to the United States. As a result, the international marketplace has a substantial stake in the sustainability of Canada’s logging industry. Many of the sourcing policies for U.S. companies that purchase boreal forest products include commitments to protect intact forests, threatened and endangered species, and Indigenous communities. Major companies have called on Canada to create policies in consultation with Indigenous Peoples to ensure that their purchases will not come at the expense of the boreal forest, its inhabitants, and its plant and animal species.

Given the global demand for responsibly sourced forest products, sustainable practices can be a boon for the forest industry. Since 1994, the Forest Stewardship Council (FSC), for example, has proved that a credible certification system can reward more sustainable management. About 25 percent of boreal forest under commercial logging operation in Canada is FSC-certified, meaning these operations take measures to promote conservation, maintain biodiversity, and seek input from local and Indigenous communities. In addition, companies like Rayonier are leading the way in developing business models that thrive on boreal protection. These examples show that companies do not need to rely on destructive or unsustainable practices.

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RECOMMENDATIONS

Unsustainable boreal logging is harmful, both for today and for tomorrow. Canada will benefit significantly by embracing a healthier future and more responsible models of forest management. NRDC recommends the following:

- Canada should foster and support Indigenous-led land-use planning and decision-making on Indigenous lands, fully respecting Indigenous knowledge, sovereignty, and rights, including the right to free, prior, and informed consent (FPIC).
- Provincial and territorial decision makers should implement mandatory protections for critical caribou habitat.
- Where critical caribou habitat is left unprotected, the federal government should step in to safeguard it.
- Policymakers should improve measurement of greenhouse gas emissions associated with boreal logging and require companies to implement forestry practices that minimize emissions.
- Canada’s federal and provincial governments should implement policies to increase the boreal forest’s resilience to climate change.
- Corporate buyers of boreal forest products should ensure their sourcing policies and decisions are aligned with boreal protection and Indigenous sovereignty.
I. Introduction

Canada’s boreal is a natural wonderland full of rare intact, old-growth forests. North of the U.S. border, mixed-wood forests give way to conifers such as pine, fir, spruce, and larch. Moving farther north, the growing season shortens, winters lengthen, and the soil becomes a hard permafrost. Species like caribou, Canada lynx, and American marten roam the landscape. This is Canada’s boreal forest, one of the last great forests on earth and home to hundreds of Indigenous communities, along with many non-Indigenous communities that continue to rely on the forest. The boreal forest’s importance extends even beyond those communities that rely on it daily. As the 1998 Canada Forest Accord, signed by forest ministers across the country and industry representatives states, “Our forest heritage is part of our past, our present, and our future identity as a nation.”

The Canadian boreal’s vast intact forests and wild landscapes once seemed endless. But they are now rapidly disappearing. This international treasure is under threat from destructive and unsustainable logging practices that degrade more than 1 million acres of boreal forest every year. Each day, the Canadian logging industry pushes deeper into intact forests, with devastating impacts for communities across Canada, especially for many Indigenous Peoples. This runaway logging is also destroying the habitat of treasured species, such as the boreal caribou, and undermining global efforts to combat climate change. Despite these dire threats, Canada’s federal, provincial, and territorial governments have continually failed to implement policies that would encourage more sustainable practices.

This report examines the Canadian boreal’s immense value and the threats it faces from unsustainable logging. We also highlight efforts to safeguard the boreal, including by Indigenous Peoples and industry leaders, along with the stake all Canadians have in sustaining a healthy boreal. We call on Canada’s governments to engage, Nation-to-Nation, with Indigenous Peoples to implement more sustainable policies and land-use plans. Last, we urge companies sourcing from the boreal forest to ensure that their purchases do not come at the expense of this vital ecosystem.

II. The Value of the Boreal Forest

With vast areas generally free of large-scale human disturbance, Canada’s boreal region holds a quarter of the world’s intact forests—a larger proportion than even the Amazon rainforest. It is home to hundreds of Indigenous communities whose cultures have remained inextricably linked to the forest for millennia. The Canadian boreal is also habitat for thousands of species of mammals, fish, birds, and insects, including globally iconic species like the boreal caribou. In addition, the region provides essential ecosystem services for Canadians and the world, with some of the purest freshwater lakes and rivers on earth, and an immense capacity to store climate-disrupting carbon dioxide.

34 IBCC, “People of the Boreal.”
37 Jeffrey V. Wells and Peter J. Blancher, “Global Role for Sustaining Bird Populations.”
Intact forests are large stretches of forest unaffected by roads or other large-scale human disturbances, and they have exceptional ecological value. In contrast to many fragmented forests, these forests are structurally complex, creating diverse habitat for a broad range of wildlife. Their complexity makes them more resilient to disturbances and alterations in climate. Among their many ecological services, intact forests help to regulate local and regional weather as well as water flow. They are also particularly effective at sequestering and storing carbon, making them essential in the fight against climate change.

The boreal forest contains primarily coniferous trees including pine, fir, spruce, and larch.

THE IMPORTANCE OF INTACT FORESTS

THE TERRITORIES OF INDIGENOUS PEOPLES

The Canadian boreal forest has been the homeland for many Indigenous Peoples since long before European settlement. Today more than 600 Indigenous communities live in the boreal region and depend on intact, healthy forests. As the Poplar River First Nation’s 2010 Land Management Plan stated, “Like our ancestors, we are the caretakers of this land and we know once the resources from the land are depleted we will have nothing. We have been told by our elders to keep the land as it was when the Creator made it.”

45 Ibid.
46 IBCC, “People of the Boreal.”
The boreal’s rich resources provide for these Indigenous communities. The forest furnishes an abundance of roots, fruits, wild rice, and berries.\(^\text{48}\) It also supports animals like caribou, hare, deer, geese, and salmon. These and other resources continue to be essential sources of food, clothing, shelter, medicines, and household goods.\(^\text{49}\) The boreal also holds immense spiritual and cultural significance for many Indigenous Peoples. Sacred sites large and small are found throughout the boreal forest, including landscape features and burial grounds.\(^\text{50}\) Boreal fauna, in particular, are closely tied to Indigenous lore, traditions, and place names.\(^\text{51}\) For instance, for the Innu, the Caribou Master controls the fate of the human world,\(^\text{52}\) and caribou are a source of both physical and spiritual nourishment.\(^\text{53}\) The loon, meanwhile, is central to Anishinaabe and Cree creation stories.\(^\text{54}\)

A healthy boreal forest also provides economic opportunities for Indigenous communities. Indigenous Guardians programs, for example, employ members of communities as “moccasins on the ground” to monitor and protect species and habitats and to maintain cultural sites.\(^\text{55}\) The programs unite boreal protection, economic growth, and Indigenous sovereignty and reconnect youth with elders and the land, creating a new generation of advocates for protecting Indigenous territories. Indigenous Guardians programs are funded by local communities, provincial and federal governments, and nongovernmental organizations.


\(^{51}\) Michael Beresford, Jessica Brown, and Nora Mitchell, “The Protected Landscape Approach.”


\(^{54}\) Michael Beresford, Jessica Brown, and Nora Mitchell, “The Protected Landscape Approach.”

A study of two such programs in the Northwest Territories found that every dollar invested generated $2.50 in social, economic, cultural, and environmental benefits. With stable core funding from a partner like the federal government, this return on investment could increase to $3.70 or more. There are currently about 30 Guardians programs across Canada, and Indigenous leaders are advocating for the creation of a National Indigenous Guardians Network. The federal 2017–2018 budget committed $25 million over five years as an initial investment in this initiative.

Sustainable, Indigenous-led resource management, including logging, offers an important means for many communities to develop economically on their own terms. Indigenous logging operations often look substantially different from those of the large outside companies, since they incorporate the values and respect for the land that have guided Indigenous stewardship for millennia. The Atikamekw of Opitciwan, for example, co-own and operate their own logging mill, which allows the community to retain some economic benefit from their forests. The sawmill’s logging area is significantly smaller than other companies’, and logging proceeds much more slowly and sustainably, with a focus on the Atikamekws’ close ties to the land. In the words of Opitciwan Chief Christian Awashish, “The pressure of forestry development would not be as great as it is now ... if we managed the territory ourselves.” The Atikamekw “have to maintain a balance, a habitat for animals ... Our identity, our culture is more conducive to the sustainability of traditional activities” than outside logging operations.

**Canada’s 2020 Biodiversity Goals and Targets**

Under the 2010 Convention on Biological Diversity’s Aichi Biodiversity Targets, Canada committed to conserve at least 17 percent of its land and inland waters, along with 10 percent of marine areas, by 2020. In 2015 it adopted the 2020 Biodiversity Goals and Targets for Canada in part to honor that commitment, which became Target 1. Canada’s Pathway to Canada Target 1 Initiative places great significance on the creation of Indigenous Protected and Conserved Areas (IPCAs). To support this effort, an advisory group known as the Indigenous Circle of Experts (ICE) was formed. In 2018, ICE released a report that identified the central role that “Indigenous knowledge, systems, legal traditions, and cultural practices” will play in achieving the target. These Target 1 efforts received a significant boost in 2018 when the Canadian government allocated $1.3 billion over the next five years to nature conservation, in large part supporting its Target 1 commitment. There is, however, much work left to be done. Today, only 10.6 percent of Canada’s total landmass and 12 percent of the boreal is protected.

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57 Ibid.
58 Ibid.
60 Indigenous Leadership Initiative, “Indigenous Guardians Program.”
61 Indigenous Leadership Initiative, “Indigenous Guardians Network Receives Funding.”
62 Chief Christian Awashish, interview by Jennifer Skene, Opitciwan, Quebec, February 20, 2018.
The boreal forest is home to some of North America’s most treasured wildlife. More than 85 mammal species live in Canada’s boreal forest, including black bears, American martens, and Canada lynx. Species like the boreal caribou rely on undisturbed forest habitat, which means that their fate depends on a healthy boreal. Conversely, the forest’s ecological function is dependent on wildlife. Scientists believe, for example, that the way the snowshoe hare consumes plants and shrubs stimulates plant growth. The hare is also vital prey for larger predators like the Canada lynx.

Each summer, up to 3 billion migratory birds comprising 325 species breed and nest in the boreal forest. In the fall, as many as five billion birds migrate south from the boreal for the winter. Some fly immense distances to return to the boreal every summer, traveling from regions as remote as South America and Antarctica. This wide array of migratory birds is drawn to the Canadian boreal by the prime breeding habitat and abundance of insects and fish that thrive in the boreal wetlands, lakes, and rivers.

Boreal waters support about 130 fish species. Some, like the Atlantic salmon, have disappeared from many other parts of the continent. The Canadian boreal is also habitat for approximately 32,000 insect species. Bees and monarch butterflies pollinate boreal plants and help to decompose dead vegetation. Insects are also important food sources for animals, including birds and fish.
The boreal caribou holds an iconic status in Canada’s national consciousness, and not only because it is North America’s version of Santa’s Christmastime reindeer. In Canada, the caribou has year-round significance. As Minister of Environment and Climate Change Catherine McKenna has stated, “Few symbols of Canada’s natural heritage could be stronger.” Canadians have only to reach into their wallets to see the boreal caribou’s antlered visage emblazoned on the Canadian quarter.

Boreal caribou are an ecotype of woodland caribou, which is one of four subspecies of caribou in Canada. They are permanent residents of the boreal region and live in groups of about a dozen individuals. Throughout the year, boreal caribou require large tracts of intact old-growth forest for protection and food—particularly the lichens found primarily in mature forests. They have also been central to the ways of life of Indigenous Peoples for thousands of years.

Yet boreal caribou have been declining across Canada for decades as a result of habitat loss. Nationally listed as threatened since 2003, caribou continue to face an uncertain future, in large part due to logging.

Often compared to a shadow or a ghost, the Canada lynx is an elusive boreal predator. A cousin of the bobcat, it resembles a giant gray housecat with tufted ears and a stubby, black-tipped tail. The Canada lynx’s range was greatly curtailed throughout the 20th century due to habitat destruction and fragmentation from logging and other industries. While the lynx historically thrived in 25 U.S. states in addition to Canada, it has now disappeared from much of the United States, making the Canadian boreal forest a critical refuge.

86 Phileas Fogg is the fictional protagonist of Jules Verne’s Around the World in 80 Days, who circumnavigates the globe in a hot-air balloon.
89 The European reindeer and boreal caribou are members of the same species, Rangifer tarandus. European reindeer are typically domesticated. Monte Hummel and Justina C. Ray, Caribou and the North, p. 31-32.
97 Ibid.
A VITAL RESOURCE FOR CLIMATE CHANGE MITIGATION

The boreal forest plays a vital role in mitigating climate change by absorbing and storing greenhouse gas emissions. The global boreal forest contains more carbon per acre than any other forest biome in the world—including tropical forests.\(^{98}\) Canada’s boreal holds more than 12 percent of the world’s land-based carbon stock—as much as 300 billion tons.\(^{99}\) That’s equivalent to over three decades worth of global carbon dioxide emissions from burning fossil fuels.\(^{100}\)

The Canadian boreal forest is extremely effective at storing atmospheric carbon for long periods, even thousands of years,\(^{101}\) due to its short summers and high soil acidity, which slow rates of decomposition.\(^{102}\) While tropical forests hold most of their carbon in trees and other aboveground biomass, boreal forests hold up to 95 percent of their carbon in soils, wetlands, and peatlands.\(^{103}\) Absent human-caused impacts, this carbon has largely remained locked up, even as the forest continues to absorb more.\(^{104}\) While the boreal does release carbon through natural processes and disturbances like decomposition and forest fires, this carbon release is far less than what can result from the addition of impacts from industrial activities, which also decrease the boreal forest’s capacity to store additional carbon. (See “Logging’s Impacts on the Boreal Forest,” below).

In addition to its extraordinary carbon storage capacity, the boreal forest continually removes carbon from the atmosphere, absorbing an estimated 113.4 million metric tons\(^{105}\) of carbon dioxide each year. That’s equal to the annual emissions of 24 million passenger vehicles.\(^{106}\) Contrary to some assumptions, healthy old-growth forests continue to accumulate biomass for centuries, and older trees grow at an exponential rate, absorbing more and more carbon as they do.\(^{107}\) As a result, older forests generally store more carbon than younger ones, making them a particularly valuable resource in the global fight against climate change.\(^{108}\)

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103 Corey J. A. Bradshaw and Ian G. Warkentin, “Global Estimates of Boreal Forest Carbon Stocks.”
105 This boreal region estimation is based on estimates finding that the mean carbon flux (sequestration) for the Canadian boreal region is 0.056 Mg C/hectare per year. Canada’s boreal region covers 552 million hectares (slightly more than the area covered by boreal forest), resulting in total positive flux of 30.9 million metric tons of carbon per year. Converted to carbon dioxide, this totals 113.4 million metric tons per year. Bradshaw and Warkentin, “Global Estimates of Boreal Forest Carbon Stocks,” p. 29.
108 Ibid.
The Canadian boreal region is the largest source of unfrozen freshwater on the planet and has the greatest number of long, undammed rivers in North America. Boreal water bodies are largely free from invasive species, and the quality of this water is among the highest on earth. The region contains more than 197 million acres of unpolluted surface freshwater, 1.5 million lakes, and 294 million acres of wetlands. Lakes and rivers that flow through the boreal region provide drinking water for millions of Canadians, including the residents of Ottawa, St. John’s, and Calgary. For example, one of the largest boreal rivers, the Mackenzie River, accounts for 11 percent of the freshwater that flows into the Arctic Ocean. Lakes and rivers also increase regional precipitation and regulate local temperatures throughout the year.

Wetlands also perform essential ecological functions for many Canadian communities. Because water moves so slowly through them, boreal wetlands essentially act as the world’s largest water filters. They have the capacity to remove a significant quantity of chemicals, sediments, phosphorus, and nitrogen deposited by rainwater and runoff before water enters drinking water sources. These wetlands also store excess water in years of heavy rain, providing flood control for communities across Canada. During droughts, wetlands create a more stable water supply by slowly releasing this water.

Canada’s boreal region provides immense economic benefits. Each year, according to estimates from 2002, Canada receives free nonmarket ecosystem services from the boreal that exceed $700 billion in value. This dwarfs the economic contribution of the logging industry. These ecosystem services come in the form of carbon storage, flood control, pest control, subsistence, recreation, and municipal water use.

111 Ibid. p. 9.
112 Hinterland Who’s Who, “Boreal Forest.”
113 Mark Anielski and Sara Wilson, Counting Canada’s Natural Capital.
115 Mississippi-Rideau Source Protection Region, “Drinking Water in Ottawa”.
117 The City of Calgary, “Calgary’s Water Supply”.
121 Ibid. p. 7.
124 Anielski and Wilson, Counting Canada’s Natural Capital, p. 3.
125 In 2015, the logging industry’s contribution to Canada’s real GDP was $21.1 billion. Natural Resources Canada, “Statistical Data: Domestic Economic Impact.”
126 Anielski and Wilson, Counting Canada’s Natural Capital.
III. Logging’s Impacts on the Boreal Forest

The annual rate of logging in Canada has fallen from its high in the 1990s and early 2000s, heavily influenced by the decline of print media. However, the total footprint of logging in the boreal continues to expand each year as the industry pushes north into forests previously untouched by industrial operations, reducing the amount of remaining intact forest every day. Between 1996 and 2015, more than 28 million acres of boreal forest were logged—an area roughly the size of Ohio (see Table 1).

More than 90 percent of boreal logging is done by clearcutting. While methods can vary, large-scale clearcutting is an especially devastating forestry practice that removes nearly all the trees from a given area. These clearcut areas can reach about 5,000 acres, or about six times the size of Central Park in New York. Clearcutting specifically targets older forests for their commercial value, reducing the proportion of more mature, old-growth stands—the highest-quality habitat and the very trees we need to mitigate climate change. Intact, old-growth forests in the southern boreal, which are more biodiverse than those in the north, also contain more commercially viable timber. As a result, they have been hit hardest by the logging industry, with devastating impacts on wildlife.

Due to the cold temperatures and short summers, boreal trees grow slowly. The ecosystem dynamics and structural diversity that make old-growth forests so unique and valuable come only with the long passage of time. Therefore, areas that have suffered large clearcuts can take centuries to return to their pre-logging condition—if they ever do. In the meantime, the wildlife that rely on complex, old-growth ecosystems often struggle to survive in the degraded habitat.

130 U.S. Census Bureau, “State Area Measurements and Internal Point Coordinates.”
136 University of California Museum of Paleontology, “The Forest Biome.”
138 Ibid.
The effects of logging on plants, soil, and animals differ from the impacts of natural disturbances, to which forests have adapted over thousands of years. For instance, clearcutting typically targets older stands of trees and has a greater impact on species diversity and composition. Clearcutting also damages soils, which can change natural patterns of plant succession and composition. This can lead to a decline in lichens, mosses, and other species that are important food for wildlife like boreal caribou. In the Canadian boreal, clearcutting has also been shown to benefit invasive species that aggressively dominate the consumption of organic materials.

The logging industry relies heavily on replanting efforts that create tree stands that are less biologically and structurally diverse and less resilient to future disturbances like extreme weather and climate change than the trees that have been removed. This exacerbates clearcutting impacts because even when these forests regrow, many have been turned into monoculture tree plantations that do not have the same ecological health as intact, multispecies forest ecosystems. One 2012 study argued that “the widespread application of even-aged, single species management at all scales of boreal forest management interferes with fundamental ecological processes that maintain ecosystem integrity in boreal forests.”

<table>
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<th>Province</th>
<th>Logged Area 1996–2015 (acres)</th>
<th>Area Equivalent</th>
<th>Average Acres Logged Per Day</th>
<th>Area Equivalent</th>
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<td>Quebec</td>
<td>13,100,000</td>
<td>2 times bigger than Vermont</td>
<td>1,800</td>
<td>4,802 NHL hockey rinks</td>
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<td>2.5 times bigger than Connecticut</td>
<td>1,200</td>
<td>3,201 NHL hockey rinks</td>
</tr>
<tr>
<td>Alberta</td>
<td>3,810,000</td>
<td>3 times bigger than Grand Canyon National Park</td>
<td>522</td>
<td>1,392 NHL hockey rinks</td>
</tr>
<tr>
<td>Saskatchewan</td>
<td>972,000</td>
<td>Rhode Island</td>
<td>I33</td>
<td>355 NHL hockey rinks</td>
</tr>
<tr>
<td>Newfoundland and Labrador</td>
<td>848,000</td>
<td>Yosemite National Park</td>
<td>I16</td>
<td>309 NHL hockey rinks</td>
</tr>
<tr>
<td>Manitoba</td>
<td>635,000</td>
<td>2 times bigger than Los Angeles</td>
<td>87</td>
<td>176 NHL hockey rinks</td>
</tr>
<tr>
<td>Total Boreal Loss</td>
<td>28,200,000</td>
<td>Ohio</td>
<td>3,860</td>
<td>10,298 NHL hockey rinks</td>
</tr>
</tbody>
</table>

In assessing the health of managed forests, Canada’s federal government and industry focus on a single indicator: “deforestation.” This term, however, has a narrow definition, and it drastically downplays the impact of logging on the boreal forest. Deforestation refers to the conversion or changing of a forested area into something else—usually farmland, roads, or some other form of built environment. Forest “degradation,” on the other hand, covers any human activity that diminishes the health of a forest, including by reducing biodiversity, undermining ecosystem services, and altering the forest’s structure. While the Canadian government often fails to mention forest degradation statistics, its consequences—including carbon emissions, species loss, and water pollution—can be just as severe as those of deforestation.

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140 Ibid.
143 Sybille Haeussler et al., “Silvicultural Disturbance Severity.”
144 Ibid.
146 Yves Bergerson and Nicole J. Fenton, “Boreal Forests of Eastern Canada Revisited,” p. 51B.
147 National Forestry Database, “Silvicultural Statistics.”
148 Numbers do not reflect forest degradation for oil and gas development, which is significant in Alberta.
152 Food and Agriculture Organization of the United Nations, “Forest Degradation.”
Wildfires are vital to disturbance cycles that have long played an important role in boreal forest ecosystem dynamics. Vegetation and wildlife have adapted to them. For instance, the cones of some tree species, such as jack pine and lodgepole pine, require heat from fire to release seeds; fire also releases nutrients that facilitate seed germination and plant growth. Unlike most clearcutting, wildfires generally leave dead and burned wood, which provides habitat for many species. They also produce more complex disturbance edges, which are more favorable to biodiversity.

In those limited circumstances when the forest is located near a community, logging can serve as a mechanism for reducing the size and destructiveness of wildfires near homes and other structures since it removes flammable materials. However, clearcut logging and monoculture replanting often exacerbate wildfires, and studies have shown that intact forest areas experience less severe fires than logged areas.

Since so much of the boreal forest is made up of Indigenous territories, protecting the boreal forest is inseparable from protecting Indigenous rights. As the 2018 Indigenous Circle of Experts report stated, “The right to a healthy environment is a pillar right upon which the exercise of other Indigenous rights depends. If environmental degradation occurs, it threatens the rights and responsibilities of Indigenous Peoples, as well as the well-being of nature and peoples.”

Because of colonial legacies related to land rights and the fact that many remaining commercially viable forests in Canada are located on Indigenous lands, Indigenous Peoples often suffer the worst of Canada’s unsustainable logging. Logging, for example, undermines the traditional relationships Indigenous Peoples have had with species like boreal caribou.

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154 Ibid.
161 Indigenous Circle of Experts, We Rise Together.
Despite logging’s devastating impact on Indigenous Peoples, many Nations and communities are largely excluded from decision making about development in their territories. This is particularly true for larger-scale landscape planning. This exclusion undermines Indigenous rights established internationally and adopted nationally.

Canadian courts have held that Indigenous Peoples must be consulted “in good faith” about development on their lands, and that projects must make “accommodations” when there are impacts on Indigenous Peoples’ rights. The Canadian Supreme Court has held that these consultations must be done “with the intention of substantially addressing the concerns of the aboriginal peoples whose lands are at issue.” However, the right to consultation and accommodation is often poorly acknowledged and executed in practice. Furthermore, these rights do not give Indigenous Peoples the right to determine the extent of resource extraction on their land.

Recent developments may one day grant Indigenous Peoples greater management control. Under Prime Minister Justin Trudeau, Canada has committed to “a renewed, nation-to-nation relationship with Indigenous Peoples, based on recognition, rights, respect, co-operation, and partnership.” In 2016, Canada announced its full support of the United Nations (UN) Declaration on the Rights of Indigenous Peoples. This declaration enumerates, among other things, the right to free, prior, and informed consent (FPIC). Article 32 of the UN Declaration states that signatory governments “shall consult and cooperate in good faith with the indigenous peoples concerned . . . in order to obtain their free and informed consent prior to the approval of any project affecting their lands or territories and other resources.” Canada’s adoption of the UN Declaration may mean that Indigenous communities will eventually have the right to bar industrial development in their territories.

INDIGENOUS-LED BOREAL PROTECTION

Indigenous leadership is providing models for sustainable economic development, including plans for land use, boreal caribou management, Guardians programs, and Indigenous-run protected areas. Valérie Courtois, Director of the Indigenous Leadership Initiative, stated, in Canada “the most innovative, boldest creative conservation solutions have all come from Indigenous Peoples.” Many Indigenous communities are also asserting their right to FPIC to protect their homelands and ways of life from unwanted industrial development. As Canada strives to meet its international commitment to protect 17 percent of its land by 2020, promoting Indigenous leadership and heeding communities fighting for a voice in decision making on their land is critical.

The Fort Nelson First Nation in British Columbia has demonstrated the kind of boreal caribou protection leadership that the provinces have largely lacked. The Nation’s 2017 Medzh171 Action Plan (MAP) to protect and recover caribou populations within its traditional territory is Canada’s first and only recovery plan to spatially identify and protect critical boreal caribou habitat in compliance with federal law. With the MAP, Fort Nelson First Nation has embraced its responsibility to protect boreal caribou through sustainable economic development and caribou recovery initiatives and shown Canada’s governments a workable model for meaningful caribou protection.


166 See, e.g., Presse Canadienne, “Judge Issues Injunction.”


171 Meaning “boreal caribou.”

The Lutsel K’e Dene First Nation in the Northwest Territories worked with Canadian governments to develop a proposal in 2015 for the Thaidene Nene (“Land of the Ancestors”) National Park Reserve, a 3.5 million-acre protected area. The effort also resulted in an agreement with the Northwest Territories and Canada for the creation of a nearby 2.9 million-acre territorial park. Combined, the two parks will be larger than the state of Vermont. The region is an important habitat for numerous species including barren-ground caribou, moose, bears, and songbirds. The Lutsel K’e Dene will co-manage the park reserve, providing employment in park stewardship and tourism as part of the National Indigenous Guardians Network. Thaidene Nene provides a model for sustainable, diversified, Indigenous-led economic development.

In 2011, Poplar River First Nation in Manitoba created a government-endorsed land-use plan that protects 90 percent of its traditional territory. This region spans 2 million acres, most of which is intact forest. The Poplar River First Nation was also integral in the campaign to have Pimachiowin Aki (“The Land That Gives Life”) named a World Heritage Site. Pimachiowin Aki is an intact forest that stretches across 7 million acres and contains the traditional territories of four Anishinaabe communities. In July 2018, after more than fifteen years of lobbying by these Anishinaabe communities, Pimachiowin Aki became the first mixed cultural and natural World Heritage site in Canada.

In 2013, the Sahtu Dene and Métis in the Northwest Territories finalized the Sahtu Land Use Plan, which protects more than 70 million acres of boreal forest. The plan was developed by the Sahtu Land Use Planning Board and approved by both the federal and territorial governments. In drafting the plan, the board worked with communities, industry, and NGOs and incorporated both Indigenous and Western knowledge and science. As the board wrote, the plan “provides a unique opportunity to reconcile the different world views and systems of laws and beliefs . . . bring[ing] communities and government together in a collaborative decision-making process to integrate their different values into one plan that guides land use for the region.”

The Atikamekw in Quebec have fought to protect their homeland despite being continuously shut out of decision making for their territory. In 2012, after years of failed attempts to negotiate with the Quebec government, the Atikamekw communities of Opitciwan and Wemotaci erected roadblocks to stop logging operations in their territory and assert their right to FPIC. Two years later, the Atikamekw Nation declared its sovereignty over 19.7 million acres of land between Montreal and Lac Saint-Jean. Shortly afterward, they announced any logging in the region would require their consent. Members of the Opitciwan community, in particular, are continuing to fight against unapproved logging in their territory and are exploring legal avenues to protect their way of life.

Like the Atikamekw, the Moose Cree First Nation in Ontario is asserting its right to FPIC in the face of government intransigence. The Moose Cree are working to protect and restore the North French River watershed, which spans 1.6 million acres across Ontario and constitutes 10 percent of the Moose Cree’s traditional territory. Over decades, the region has been impacted by mineral exploration, logging, and road construction. In 2002, the Moose Cree declared the North French River to be permanently protected. Ever since, they have defended the area from industrial development. In 2017, the Moose Cree unanimously rejected an exploratory drilling proposal that could degrade the region. Due to this opposition, Ontario placed its review of the project on hold, pending consultations with the community.

These initiatives are only a fraction of the Indigenous-led campaigns to protect the boreal. While these campaigns are diverse, they are all examples of how Indigenous communities are empowering themselves to assert their rights to their land and create healthy futures for their people. Canada’s federal and provincial governments should follow their lead to protect the country’s treasured landscapes and paint a brighter future for Canada and the rest of the world.

182 Ibid.
185 Ibid.
188 Ibid.
189 Moose Cree First Nation, “Drilling Project Unanimously Rejected.”
Logging has already taken a devastating toll on the Broadback region and the Waswanipi Cree. Between 1980 and 2015, the disturbed area in the Broadback River watershed grew by 280 percent, from 113,000 to 429,000 acres. During that same period, more than 2,000 miles of roads were built in the watershed. Mandy Gull, the Deputy Chief for the Cree Nation Government stated, “When we see these large spaces that are clearcuts . . . we often consider them to be dead zones. There’s no wildlife in these areas. The vegetation doesn’t grow back.”

Today only 10 percent of the Waswanipi Cree’s traditional territory remains intact, and logging companies continue to push into the remaining undisturbed portion in the Broadback. The Waswanipi Cree have 62 traditional traplines, which are areas essential for subsistence hunting, each managed by a Cree tallyman. Only three of these traplines remain unfragmented by roads and clearcuts.

While Quebec has protected some areas of Eeyou Istchee, these protections are far from sufficient. As Chief Happyjack explained, Quebec’s efforts don’t “protect what should really be protected.”

For more than 15 years, the Waswanipi have asked the Quebec government to safeguard the Mishigamish, a 1.2 million-acre region with some of the last intact forest the Waswanipi have left, as an essential means of “protecting the traditional Cree way of life.” In 2011 they submitted the Mishigamish Protected Area Proposal to the Quebec government.

Since then, the threat to the Mishigamish has only increased. In a 2015 agreement between the Cree Nation Government and the Quebec government, the latter expressed its intention to have “meaningful discussions” with the Cree Nation Government and Waswanipi Cree regarding options for additional protective measures in the Broadback region, including the Mishigamish. Yet the Quebec government through the Broadback Task Force has met with Cree leaders to discuss the Mishigamish only once, back in 2015, and has failed to meaningfully respond to requests for further discussions.

In early 2018, Quebec released a logging plan that would allow clearcutting in and near the Mishigamish, undermining myriad commitments the government has made to the Cree. Urgent action is needed to stop this plan and permanently protect this spectacular region of intact forest.

190 Hinterland Who’s Who, “Canada Lynx.”
192 Hinterland Who’s Who, “Marten.”
193 Tyler Rudolph et al., Status of Woodland Caribou (Rangifer tarandus caribou) in the James Bay Region.
198 NRDC, “The Call to Protect One of the Last Untouched Stretches of the Boreal Forest”.
200 James Bay and Northern Quebec Agreement (JBNQA) (1975), Section 24.
203 Cree First Nation of Waswanipi, “The Mishigamish Protected Area Proposal.”
204 Ibid.
DISTURBANCES, PLANNED CUTS, AND CARIBOU HABITAT IN THE BROADBACK WATERSHED

NOTE: Proposed Cuts show limited and approximate area digitized from
*Authorised 2017-2020 Forestry Activities in Woodland* (Feral Population of
Eccentric Animals) Critical Core Habitat*
demonstrating areas of "Authorised Planned Cut Blocks".

Sources: Esri, HERE, i-cadmu, International Inc., GeoBase, USGS,
FAO, NRCAN, Geoscience Canada, INRS, Kadaster NL, Ordnance Survey, Eini Japan,
METI, Geo.com (Hong Kong), MapmyIndia, © OpenStreetMap contributors, and the OGC User Community.

Sources: Esri, HERE, i-cadmu, International Inc., GeoBase, USGS,
FAO, NRCAN, Geoscience Canada, INRS, Kadaster NL, Ordnance Survey, Eini Japan,
METI, Geo.com (Hong Kong), MapmyIndia, © OpenStreetMap contributors, and the OGC User Community.
Logging does not impact only the land. It can devastate the boreal’s freshwater resources as well, harming the millions of Canadians who rely on them. Logging and the accompanying road construction can erode soils, which increases sediment runoff into waterways. This sediment can increase mercury levels, which can harm fish nursery habitat and poison drinking water, and phosphorus levels, which can increase harmful algal blooms. In addition, logging near water bodies increases water temperatures and radiation levels, further disturbing fragile aquatic ecosystems. Logging and road construction also slow surface and groundwater flows, altering wetland hydrology.

SPECIES IMPACTS: BOREAL CARIBOU AS THE FOREST’S CANARY IN THE COAL MINE

Over the past several decades, logging has severely impacted the boreal forest’s wildlife. Clearcut logging degrades mature forests and leaves ranges greatly diminished for species like the American marten, Canada lynx, wolverine, and boreal caribou. These animals rely on food like lichens and sheltering features such as woody debris and tree cavities found primarily in old-growth forests. In degraded areas, they struggle to survive. Even degradation of a relatively small area can fragment large, contiguous stretches of forest into smaller, isolated patches. When habitat is fragmented, the ratio of a forest’s area to its disturbed edges decreases, meaning more of the forest is located near a disturbance. This exposes more of the forest to “edge effects,” which include wind and weather disturbances, encroachment by invasive species, and changes in sunlight and humidity. Fragmentation also isolates species populations, undermining their genetic health and resilience to environmental changes. These impacts result in forest areas with far less ecological value than intact forests.

Logging’s impact on wildlife is best illustrated by the decline of boreal caribou. Caribou are an “indicator species,” a barometer for the health of the boreal forest more broadly, because they require large tracts of intact forest and are particularly sensitive to human disturbance. The animals will generally not venture within 2.8 miles of disturbed areas, which attract predators like wolves and bears. Due to their substantial habitat requirements, caribou also act as an “umbrella species,” a species whose protection in turn safeguards the habitat of other boreal wildlife. Boreal caribou have declined significantly due to habitat loss, particularly from logging, and now occupy only half of their historic range. Scientists have found that it can take up to 80 years following an industrial disturbance for habitat to become sufficiently mature for boreal caribou to return, although if forests are clearcut and fail to recover their former characteristics, caribou may not return at all.
The federal government’s 2012 boreal caribou Recovery Strategy, created to address the species’ threatened status, determined that boreal caribou require ranges less than 35 percent disturbed in order to have a 60 percent chance of long-term survival. Yet boreal caribou habitat and populations have continued to decline, and today only 14 of Canada’s 51 boreal caribou ranges are currently considered sufficient to support self-sustaining populations. Reports say that more than 30 percent of the country’s boreal caribou could disappear in the next 15 years if current trends continue.

The 2012 Recovery Strategy sought to push provinces and territories to protect boreal caribou habitat, urging “immediate action” in critical habitat areas with declining boreal caribou populations. According to the Recovery Strategy, as of 2012 the recovery of all 51 ranges was “technically and biologically feasible” if the proper protection measures were taken. As such, the federal government called on provinces and territories to develop detailed conservation plans based on Western and Indigenous knowledge and science for each of Canada’s 51 boreal caribou populations by October 2017. However, as of publication, no province or territory has finalized a plan in compliance with the Recovery Strategy. Even worse, some provinces have reversed previous progress. The provincial and territorial failure to protect critical boreal caribou habitat was acknowledged in a 2018 report issued by the federal government under the Species at Risk Act. Without policies that protect the critical habitat of this species, scientists and government reports predict that populations will continue to decline.

Lichens are vital food sources for boreal caribou and are found more abundantly in old-growth forests. The 2012 Recovery Strategy, as of 2012 the recovery of all 51 ranges was “technically and biologically feasible” if the proper protection measures were taken. As such, the federal government called on provinces and territories to develop detailed conservation plans based on Western and Indigenous knowledge and science for each of Canada’s 51 boreal caribou populations by October 2017. However, as of publication, no province or territory has finalized a plan in compliance with the Recovery Strategy. Even worse, some provinces have reversed previous progress. The provincial and territorial failure to protect critical boreal caribou habitat was acknowledged in a 2018 report issued by the federal government under the Species at Risk Act. Without policies that protect the critical habitat of this species, scientists and government reports predict that populations will continue to decline.
Provinces with some of the most at-risk caribou populations are among the most egregious laggards on implementing protections. In Ontario, for example, boreal caribou range deterioration has been documented for more than 80 years. Only two of the province’s 13 woodland caribou ranges currently have sufficient undisturbed habitat to sustain caribou in the long term. Without action, it is estimated that the boreal caribou will be locally extinct in Ontario within 76 years. Yet in July 2013, the Ontario Ministry of Natural Resources gutted its previously renowned Endangered Species Act (ESA) by exempting logging companies from the law’s core provisions that protected Ontario’s most vulnerable species.

In particular, these exemptions allow logging companies to harm or harass caribou and destroy their habitat as long as the companies are operating under an approved forest management plan. In addition, logging companies are only required to mitigate impacts rather than act to benefit species; this enables them to abandon efforts at boreal caribou recovery.

The Ontario government extended these exemptions for two more years in 2018, making action by Ontario’s new government elected in June 2018 even more urgent.

In Quebec, boreal caribou also face ongoing habitat loss and population decline. In 2015, Quebec’s chief forester found that 70 percent of studied caribou habitat was currently too disturbed to support caribou populations in the long term. Without policy changes, this decline will only increase, the chief forester concluded, as “the current management strategies will provoke, in the long run, a decrease in the remaining habitat where caribou self-sufficiency is still possible.” Quebec’s 2016 action plan for the management of forest-dwelling caribou committed to “immediate” steps to protect boreal caribou. However, the government failed to establish timetables or an implementation plan and gave little guidance as to what habitat would be protected. The plan did lead to the creation of a protected area for caribou habitat in Quebec’s Montagnes Blanches region in November 2017. While this is an important step, the Montagnes Blanches protection plan still allows mineral exploration and does not include certain critical habitat areas. Meanwhile, the province has moved its northern logging limit, opening up more land to logging and potentially leaving even more critical caribou habitat vulnerable to degradation.

In Alberta, woodland caribou populations—both boreal and mountain ecotypes—are declining at an estimated rate of 50 percent every eight years. Each herd’s habitat is between 57 and 96 percent degraded—far above the 35 percent threshold mentioned earlier. In May 2018, Alberta, in collaboration with the Tallcree First Nation, designated four new parks in the province’s northern region, creating the largest contiguous boreal protected area in the world. However, across the rest of the province, boreal caribou remain largely unprotected. In 2018, Alberta’s environment minister announced the province was suspending consideration of potential protected areas in its northwestern region and requested more time to complete range plans, despite worsening conditions in caribou habitat.

238 Ibid.
244 Ibid.
246 Dave Hervieux et al., “Widespread Declines in Woodland Caribou,” p. 872.
THE VAL-D’OR HERD: A CAUTIONARY TALE

In a particularly striking example of caribou loss, one of Quebec’s southernmost caribou populations, the Val-d’Or herd, has declined by almost 80 percent over the past 60 years. The population had around 80 individuals in 1955 and has now dwindled to approximately 18.250 These remaining Val-d’Or caribou are struggling to survive in a range that is 76 percent disturbed—more than double the 35 percent threshold they need for a 60 percent chance of survival.251

Quebec has consistently promoted industrial development in the Val-d’Or range, despite more than 30 years of strong scientific evidence of the herd’s decline and warnings from First Nations.252 While management plans for the Val-d’Or region have been in place since 1989, they have consisted of insufficient, piecemeal solutions. When Quebec finally did create a caribou reserve in 2008, it was only one-third the size of what scientists recommended and had already been degraded by recreational development.253

Even when the herd’s numbers reached an alarming low of 30 individuals in 2008, Quebec continued permitting development.254 In 2017 the government announced—and then retracted due to public outcry—a plan to remove the remaining Val-d’Or caribou to a zoo as a last resort that would also allow the continued degradation of the herd’s habitat.255 Just one month later, the Quebec government approved a logging road in the herd’s critical habitat, over the objections of First Nations and its own scientists.256

In early 2018 the Quebec government made the announcement that it was not going to take action to try to recover the herd.257 The chiefs of the Algonquin Anishinabeg Nation Tribal Council denounced the decision and the Quebec government’s failure to consult with them. The chiefs demanded that Quebec immediately designate a protected area for the herd and reiterated that the boreal caribou is central to their way of life. More than 13,000 individuals have petitioned Quebec to reverse its decision.258 The sad fate of the Val-d’Or herd is an illustration of what could happen across Quebec—and all of Canada—if governments do not act to protect this iconic, and important, species. There is a beacon of hope, and it is coming from Indigenous Peoples in the region. In June 2018, the Lac Simon, Kitcisakik, and Long Point Algonquin First Nations announced a partnership with the federal and Quebec governments to, among other initiatives, restore habitat in the area, monitor the Val-d’Or herd’s population, and conduct research.259 This is another example of Indigenous Peoples providing leadership after years of government inaction and demonstrates the need to facilitate Indigenous leadership across Canada before conditions become as dire as those in Val-d’Or.

Note: In some instances, crops removed from imagery impacted the results in the anthropogenic disturbance analysis. However, disturbance other disturbances were identified as logging activities by examining multispectral imagery.

Data From:

251 Ibíd.
FOREST DEGRADATION’S IMPACT ON MIGRATORY BIRDS

Forest degradation has taken an alarming toll on migratory bird habitat. Many bird species that rely on the boreal forest are now listed under Canada’s Species at Risk Act (SARA). This includes treasured songbirds such as the olive-sided flycatcher and the iconic Canada warbler (pictured), which have declined by more than two-thirds. If this rapid destruction of vital migratory bird nesting habitat continues, the skies throughout the Western Hemisphere could become much less musical.

MINING THE BOREAL FOREST

Across Canada, the extraction of potash, copper, gold, and other minerals is degrading intact boreal forest. Approximately 80 percent of Canada’s mining operations occur in the boreal region, creating additional threats to the forest.

Mining occurs in multiple stages. After prospecting and staking, companies move onto a potential mining site to take physical samples through methods that include drilling. Next comes mine construction, which brings roads, more extensive drilling, and the development of tailings ponds that will contain highly concentrated toxic heavy metals and other waste materials. The ore is then mined and processed, with the valuable minerals separated from waste materials. When mining is completed, the mine closure and remediation process can take decades and requires ongoing monitoring.

Each stage of the mining sequence impacts the boreal ecosystem. Mining practices strip vegetation, destroy habitat, erode soil, and create noise pollution, which can disrupt wildlife behavior like mating and migration. Mining also releases contaminants like lead, arsenic, and cyanide into the ground, air, and waters, which can persist long after a mine has closed. In addition, the associated road construction dramatically expands the reach of the degradation, fragments the forest, and makes the area more vulnerable to future disturbances.

Tailings ponds are among the most dangerous features of mining infrastructure. These open-air reservoirs can leach toxins like mercury, arsenic, and lead into the surrounding environment. Human consumption of these contaminants through drinking water and food sources like fish can cause cancer, birth defects, heart disease, and other health impacts.

Tailings ponds also pose a risk of breaching, even after a mine’s closure, with disastrous effects on the surrounding environment and communities. In 2014, a tailings pond for the Mount Polley gold and copper mine in British Columbia failed, spilling more than 2.6 billion gallons of toxic materials, including arsenic, lead, and mercury, into surrounding lakes and creeks.


261 Jeff Wells et al., Boreal Birds Need Half.


263 Does not include oil and gas development.


265 Ibid. p. 4.


267 MiningWatch Canada, “The Boreal Below: Mining Issues.”


269 MiningWatch Canada, “The Boreal Below: Mining Issues.”


surrounding communities.\textsuperscript{272} It destroyed Indigenous Peoples’ traditional fisheries and reduced their access to sacred lands and plant resources around the affected water bodies.\textsuperscript{273} Communities are still uncertain about the quality of their water and the long-term health impacts of the spill, especially since much of the toxic material still remains in the environment.\textsuperscript{274} Despite ongoing environmental harms from the disaster, in 2016, less than two years later, the mine and its tailings pond were returned to full operation.\textsuperscript{275}

**THE CLIMATE IMPACT OF CLEARCUTTING IN THE BOREAL**

Under the historic 2015 Paris Agreement, more than 190 countries, including Canada, agreed to limit global temperature rise to 2 degrees Celsius above preindustrial levels, and to pursue efforts to limit this increase to 1.5 degrees Celsius.\textsuperscript{276} The Paris Agreement also identified the world’s forests as vital tools for achieving these goals. Yet, by clearcutting the boreal forest, Canada is undermining its commitment. In a 2017 report and technical paper, NRDC concluded that each year, clearcutting accounts for 12 percent of the annual emissions Canada agreed to cut by 2030 under the Paris Agreement.\textsuperscript{277}

Logging the boreal impacts the global climate in two ways. First, it removes vegetation and soils that continuously absorb greenhouse gases, diminishing the boreal’s significant potential to continue to sequester carbon.\textsuperscript{278} Second, it gradually releases the vast stores of carbon previously captured in boreal soils.\textsuperscript{279} The loss of forest cover increases soil temperature and decreases water transpiration, increasing decay and therefore carbon emissions. In addition, by loosening the soil, logging can lead to the release of previously locked up carbon.\textsuperscript{280}

NRDC developed a model to estimate the long-term carbon impact of clearcutting in the boreal forest. It showed that a clearcut acre of boreal forest acts as a net source of carbon dioxide for 13 to 27 years following harvest. According to our estimates, each year clearcutting across the boreal forest releases, on average, more than 26 million metric tons (Mt) of carbon dioxide into the atmosphere—equivalent to the annual emissions of nearly 5.5 million passenger vehicles or 3.7 percent of Canada’s total reported emissions in 2016.\textsuperscript{281} Our analysis found that, even assuming successful forest regeneration following clearcutting, Canada’s boreal forest is not recovering fast enough to offset the carbon dioxide emissions from clearcutting (see “How Well Is the Boreal Forest Recovering?” below).

\textsuperscript{273} Ibid., p. 5.
\textsuperscript{277} United Nations Framework Convention on Climate Change, Paris Agreement, Article 5 (2015).
\textsuperscript{278} Joshua Axelrod, “Pandora’s Box,” p. 11.
\textsuperscript{279} Sebastiaan Luyssaert, et al., “Old-Growth Forests as Global Carbon Sinks.”
\textsuperscript{279} James and R. Harrison, “The Effect of Harvest on Forest Soil Carbon.”
Like the federal government, provinces are undermining commitments to mitigate greenhouse gas emissions (see Table 2). In Quebec, with clearcuts averaging 407,000 acres each year, the yearly cut can be expected to release 11.2 million Mt of carbon dioxide over the next 27 years.\(^{282,283}\) When cumulative cutting impacts are analyzed across an 85-year period—the time Quebec allows between harvests on the same area of forest—these emissions equate to 10.7 Mt/year, on average. This is equivalent to 13 percent of total provincial emissions in 2015.\(^{284}\) That’s nearly 62 percent of the 17.3 Mt of annual emissions the province has promised to cut by 2020.\(^{285}\) In Ontario, which sees an average of 318,000 acres clearcut each year, the yearly cut can be expected to release at least 8.7 Mt of carbon dioxide over the next 27 years.\(^{286,287}\) When the cumulative impact is analyzed over an 85-year period, these emissions equate to 8.3 Mt/year, on average, or 31 percent of the 27 Mt in annual emissions the province has promised to cut by 2020.\(^{288}\)

Despite logging’s significant effect on the boreal’s ability to store carbon, Canada does not report the full extent of carbon emissions associated with logging in its National Inventory Reports (NIR) to the United Nations Framework Convention on Climate Change (UNFCCC), upon which the Paris Agreement is built.\(^{289}\) Canada is beginning to acknowledge that woody debris from logging results in carbon emissions. However, its reports to the UNFCCC still overstate the climate benefits associated with Harvested Wood Products (HWPs) and do not account for the vast release of carbon from the soil logging causes.\(^{290}\) Similarly, Canada’s national climate change plan, the Pan-Canadian Framework on Clean Growth and Climate Change, hints at characterizing logging as a means of mitigating national carbon emissions.\(^{291}\) Yet even if logging’s full carbon footprint were counted, Canada has little opportunity to hold companies accountable for logging’s climate impact, as it lacks a strategy for limiting national carbon emissions.

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283 Joshua Axelrod, “Pandora’s Box.”

284 Cumulative analysis of emissions curves generated by a black spruce-dominated boreal forest model with a moderate forest recovery assumption was done for an 85-year period (Quebec’s current harvest rotation period), resulting in 907 Mt of emissions. This equates to 10.7 Mt/year, on average, over that time period. Quebec’s reported annual greenhouse gas emissions were 80.1 Mt in 2015. Environment and Climate Change Canada, “Greenhouse Gas Emissions by Province and Territory,” www.ec.gc.ca/indicaturs-indicators/default.asp?lang=en&n=18f3bb9c-1 (accessed May 13, 2018).


287 Joshua Axelrod, “Pandora’s Box.”


291 Environment and Climate Change Canada, Pan-Canadian Framework on Clean Growth and Climate Change.
The impacts of climate change on the Canadian boreal are likely to be significant. As the global boreal becomes stressed by higher temperatures, its ability to hold its vast carbon stores will come under threat. Because large, intact forests are more resistant to disturbances and changing conditions, a healthy boreal forest will be far more capable of withstanding these impacts and therefore retaining its carbon storage capacity than one that has been degraded by industrial activity. For example, intact forests tend to experience milder temperature changes, are more resistant to invasive species, and have greater species adaptability as a result of their genetic diversity. Large, connected intact forest ecosystems will also assist species as they migrate to adapt to changing conditions. Protecting large, intact boreal forest ecosystems and their carbon storage capacity, therefore, is more vital than ever to help to prevent even more dramatic changes in the global climate.

### TABLE 2: AVERAGE ANNUAL AREA CLEARCUT AND ESTIMATED ASSOCIATED CO₂ EMISSIONS

<table>
<thead>
<tr>
<th>Province</th>
<th>Quebec</th>
<th>Ontario</th>
<th>Alberta</th>
<th>Newfoundland &amp; Labrador</th>
<th>Saskatchewan</th>
<th>Manitoba</th>
<th>Totals</th>
</tr>
</thead>
<tbody>
<tr>
<td>Annual Harvested Area (acres)</td>
<td>407,000</td>
<td>318,000</td>
<td>190,000</td>
<td>32,000</td>
<td>35,000</td>
<td>25,000</td>
<td>1,007,000</td>
</tr>
<tr>
<td>CO₂ Emissions Associated With Annual Harvest (million metric tons)</td>
<td>11.2</td>
<td>8.7</td>
<td>3.4</td>
<td>0.9</td>
<td>0.6</td>
<td>0.5</td>
<td>25.3</td>
</tr>
</tbody>
</table>

### HARVESTED WOOD PRODUCTS: AN UNPROVEN AND MISLEADING CLIMATE SOLUTION

Provincial and federal governments have touted harvested wood products (HWPs) as climate “solutions.” They have made misleading claims that because HWPs retain the carbon that was originally stored in the logged wood, sustainably managed forests are always a carbon sink. However, the studies cited to support this claim caution that this is true only under very strict conditions. For example, according to the Intergovernmental Panel on Climate Change (IPCC), the mitigation potential of carbon storage in HWPs is contingent on preventing deforestation and degradation and suppressing disturbances. In addition, the carbon contained in HWPs must be greater than the carbon that was expended to produce, transport, and dispose of them. These conditions are rarely met in large parts of Canada’s boreal forest. Furthermore, the harvested trees’ lost carbon sequestration potential further undermines the climate value of HWPs. Moreover, these claims assume that the carbon remains stored in the HWPs for long periods, which is inaccurate in many cases. While further study is needed, the purported climate value of HWPs diverts attention from logging’s real impact on the Canadian boreal forest’s capacity to sequester and store carbon and the role the forest plays in the in the global fight against climate change.

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294 Ibid.
296 Ibid. p. 601.
297 These figures have been rounded to the nearest 1,000 acres.
302 Ibid.
HOW WELL IS THE BOREAL FOREST RECOVERING?

Canada’s annual federal reports claim that “[t]he regeneration rate on harvested [public] lands in Canada is nearly 100 percent when artificial and natural regeneration rates are combined.” 305 These metrics for successful recovery paint a rosy, but misleading, picture. Regeneration does not mean that the forest has returned to its preharvest condition. In Ontario, for example, the logging industry and the Ministry of Natural Resources and Forestry consider a forest successfully regenerated if a mere 40 percent of the harvested area’s tree capacity has grown back.306 In addition, little information is available on the actual conditions of these postharvest areas. Studies indicate that conditions in regenerated forests may, in fact, be a far cry from those that existed before the logging occurred.307

Simple tree regrowth does not replace an intact forest’s ability to support wildlife and perform ecosystem functions like carbon sequestration. The new forest composition may be vastly different from its preharvest condition.308 Ideally, clearcut forests would regrow to mirror their preharvest state with similar species of vegetation and canopy density as well as a return of displaced wildlife. Unfortunately, the limited scientific literature examining postharvest outcomes in the boreal forest points to a very different reality. Research has found, for example, forests that regenerate after intensive harvesting “retain less biological and structural diversity than those originating from natural disturbances in which rapidly changing habitats and high species turnover enhance the adaptation potential to new environmental conditions.”309 Regeneration statistics, therefore, belie the true impact that logging has on forests.310,311

307 Yves Bergeron and Nicole J. Fenton, “Boreal Forests of Eastern Canada Revisited.”
308 Ibid.
IV. Canada’s Logging Industry: International Demand and Domestic Challenges

Extensive logging across the boreal feeds Canada’s forest products industry. This industry is one of the world’s largest producers of forest products, including newsprint, wood pulp, and printing and writing paper.312 While international demand for newsprint has plummeted since 2000, Canada remains the world’s leading producer, accounting for approximately 12 percent of the global total.313 Companies in Canada are also expanding their production of forest biomass, placing more pressure on the boreal and increasing logging’s climate impacts.314 Canada is also one of the world’s top producers of softwood lumber, which is used primarily to build homes.315 Increasingly, international consumers are calling on Canada to ensure that their forest products do not come at the expense of Indigenous communities fighting to protect their traditional territories, boreal species, and the global climate.316 To maintain its international market share and its reputation, Canada should heed these calls for increased boreal protection.

THE U.S. MARKET IS A DRIVER OF BOREAL LOGGING

International demand for wood products, especially demand from the United States, is a major driver of the Canadian forest industry’s continued push into undisturbed boreal forest. The international market accounts for more than half of the revenue Canada brings in from the industry, with two-thirds of this export revenue coming from the United States.317,318 The impact of U.S. demand is even more pronounced in boreal provinces. The United States imports 80 percent of the combined forest product exports from Alberta, Saskatchewan, Manitoba, Ontario, Quebec, New Brunswick, and Newfoundland and Labrador (see Table 3). Canada’s eastern provinces of Ontario and Quebec, which account for more than 75 percent of forestry activities in Canada’s boreal forest,319 are even more dependent on the U.S. market.

315 Natural Resources Canada, “Forest Products and Applications.”
Many of the U.S. companies that purchase boreal products have sourcing policies intended to protect intact forests, threatened and endangered species, and Indigenous communities. Major purchasers have expressed increasing concern regarding Canada’s insufficient boreal habitat protections. Since October 2017, when provinces and territories failed to meet a federal deadline for enacting boreal caribou habitat recovery plans, 21 companies with a combined annual revenue of more than $140 billion have called on Canada to act. They have voiced their desire for “materials that are free of controversy and have been acquired through sustainable harvesting,” and asked for “robust caribou habitat protection plans that are grounded in science” and created in consultation with Indigenous Peoples. This action from a variety of sectors demonstrates a growing desire in the international marketplace to purchase forest products that do not jeopardize boreal ecosystems.

### A FOREST INDUSTRY IN TRANSITION

Industry groups representing some of the largest logging companies operating in Canada argue that protections for the boreal would harm the industry’s profits and thus cause job losses and lower wages. However, a closer look at government employment data and industry reports reveals this argument to be a red herring, distracting from the larger systemic challenges the industry faces.

Canada’s forest industry is changing. Two decades ago, forest products accounted for 3 percent of Canada’s gross domestic product. In 2015 they accounted for just over 1 percent. Canada’s forestry trade surplus has fallen by nearly half over the past 15 years, declining from CAN$38 billion in 2000 to CAN$21.5 billion in 2015. Twenty of the 50 paper mills operating in 2000 have shut down. From 2004 to 2014, Canada’s forest products industry shed more than a third of its jobs.

These changes are largely due to reduced global demand for paper and newsprint resulting from the seismic shift toward digital media and increased paper recycling over the past decade. The Forest Products Association of Canada’s own study in July 2015 pointed to declining demand as the primary cause of job losses and plant closures in Ontario. This global change in demand has forced the industry to restructure, affecting workers and communities and leading to facility closures. Industry leaders have acknowledged that this trend is unlikely to reverse.

In order to cut costs to survive, the industry has invested in increased automation, slashing jobs and salaries in the process. In Quebec and Ontario, the amount of lumber harvested per worker increased by 67 percent between 2007 and 2015.
However, according to the Canadian System of National Accounts, employment in the logging industry in these provinces declined from 18,575 to 11,200 workers over the same period, and average salaries declined from $45,741 to $42,773 (see Table 4). In 2015, the logging industry in Ontario and Quebec maintained a harvest nearly identical to 2007 levels, while cutting its payroll for forest workers by 44 percent.

### TABLE 4: ONTARIO AND QUEBEC FOREST AND LOGGING INDUSTRY LABOR STATISTICS

<table>
<thead>
<tr>
<th></th>
<th>2007</th>
<th>2015</th>
<th>Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>Workers Employed</td>
<td>18,575</td>
<td>11,200</td>
<td>-40%</td>
</tr>
<tr>
<td>Total Payroll (CANS)</td>
<td>$849,644,000</td>
<td>$479,054,000</td>
<td>-44%</td>
</tr>
<tr>
<td>Per Capita Wage (annual)</td>
<td>$45,741</td>
<td>$42,773</td>
<td>-6.5%</td>
</tr>
<tr>
<td>Total Volume Harvested (cubic meters)</td>
<td>44,090,000</td>
<td>44,388,000</td>
<td>+1%</td>
</tr>
<tr>
<td>Labor Productivity (cubic meters/worker)</td>
<td>2,373 m³</td>
<td>3,963 m³</td>
<td>+67%</td>
</tr>
</tbody>
</table>

When the logging industry blames conservation efforts for its troubles, it is creating a scapegoat. As a recent publication finds, the logging industry’s “manufactured uncertainty” about the need for and impacts of conservation measures “negatively affects forestry-dependent communities by deflecting attention from the real and ubiquitous issues facing the future of Canada's forest products sector, including the actual causes behind local mill closures and job loss, which are not primarily supply-side driven.” Instead of trying to undermine conservation efforts, logging companies should confront their actual economic challenges and seek solutions. They should focus on the need for economic diversification and mechanisms by which to relieve burdens on the workers who have borne the brunt of the industry's hardships.

### THE FOREST STEWARDSHIP COUNCIL: A BETTER DIRECTION FOR THE FOREST INDUSTRY

Just as the landscape-level protections created in partnership with Indigenous Peoples are essential to meaningfully protecting the boreal forest, industry must also be at the forefront of generating solutions to safeguard this precious resource. The Forest Stewardship Council (FSC) is an international nonprofit organization established in 1994 to create standards certifying responsible logging operations. It is the world’s most credible independent certifier of responsibly managed forests, rewarding companies that implement sustainable practices.

FSC’s Canada chapter promotes less destructive, more responsible logging in the boreal forest. To obtain FSC certification in a given area in Canada, logging companies must promote conservation, maintain biodiversity, and seek input from local and Indigenous communities. Today, about 25 percent of boreal forest under commercial operation in Canada is FSC-certified.

While the FSC’s forest management requirements are the strongest in Canada, they continue to evolve based on new knowledge and concerns. The FSC has begun moving toward requiring protection of intact forests and is updating its National Forest Management Standard to include more stringent caribou and Indigenous cultural landscape indicators. FSC Canada has also strongly advocated for incorporating Indigenous voices in decisions affecting forests and waters, including conservation decisions. In October 2017, for example, the FSC endorsed the addition of a chapter to the North American Free Trade Agreement recognizing and supporting Indigenous rights.

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336 Natural Resources Canada, “Statistical Data: Employment.”
337 Ibid.
339 Natural Resources Canada, “Statistical Data: Employment.”
340 Ibid.
342 Natural Resources Canada, “Statistical Data: Employment.”
346 FSC Canada, “Moving Towards Motion 65.”
While there are other certification systems used by the forest industry in Canada, namely the industry-created and funded Sustainable Forest Initiative (SFI), none match the FSC’s credibility. Among its critical weaknesses, the SFI allows companies to engage in ecologically damaging practices, including the unsustainable conversion of intact, natural forests to monoculture tree plantations, and has no protections for old-growth forests. The SFI also fails to adequately protect threatened and endangered species and does not meaningfully incorporate standards to mitigate logging’s effects on climate change.\(^{350}\)

Unfortunately, the FSC has come under attack from industry trade groups and logging companies in Canada who argue that its policies hurt their access to important wood sources and thereby impact their operations and bottom lines.\(^{351}\) Some companies have allowed their FSC certificates to expire or are threatening to remove their forests from FSC certification, as the Quebec Forest Industry Council did in October 2015.\(^{352}\) The following month, Canada’s largest logging company, Resolute Forest Products, questioned the “viability” of the FSC and criticized the organization’s policies, including its support for protecting intact forests and boreal caribou.\(^{353}\)

Now more than ever, FSC certification is a critical tool for moving the forest industry toward more sustainable management of Canada’s forests. Customers are increasingly pressuring international companies to sell responsibly sourced products. As a result, companies with billions of dollars in purchasing power have looked to the FSC to show customers that their purchases do not endanger intact boreal forests and the communities and iconic wildlife that depend on them. Logging companies and industry associations need to work with the FSC to protect the boreal forest and build Canada’s reputation as a source of sustainable forest products.

**RAYONIER: CREATING A BETTER MODEL FOR SUSTAINABLE LOGGING**

The forestry company Rayonier is distinguishing itself for its work to promote more sustainable logging and protect Indigenous rights. Rayonier is building on the legacy of Tembec, the forest products company it acquired in 2017.\(^{354}\) In addition to operating many FSC-certified tenures in Ontario and Quebec, Tembec worked with environmental organizations on conservation initiatives for almost two decades.\(^{355}\) Now, Rayonier is partnering with the FSC, Indigenous Peoples, environmental NGOs, and local officials in Ontario and Quebec to create forest management plans that protect boreal caribou.\(^{356}\)

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V. Recommendations

This report urges policymakers to partner with Indigenous communities to take immediate action to protect boreal forests through mandatory and enforceable boreal caribou protections and Indigenous-led management. Second, to embrace its reputation as an international climate leader, Canada should formally recognize logging's climate impacts and incorporate these impacts into national greenhouse gas emissions calculations and a national strategy to limit carbon emissions. Finally, this report points to the international marketplace as a powerful force to encourage Canadian governments to implement these policies.

Canada should foster and support Indigenous-led land-use planning

Having lived sustainably with Canada’s boreal landscapes for thousands of years, Indigenous Peoples are in a unique position to lead broadly beneficial land-use plans for the boreal forest. First, the process of reconciliation must include guaranteeing Indigenous Peoples’ right to free, prior, and informed consent and the power to refuse resource development in their homelands. In addition, the numerous successful Indigenous-led land-use planning processes have demonstrated that a community-based governance model can instigate long-term protection that considers all stakeholder interests and empowers communities to protect their territories and craft their own economic futures. Governments at all levels should act to position Indigenous-led land-use planning—including caribou protection plans—as central to their policies to protect the boreal forest.

Taking these actions not only will promote Indigenous Peoples’ rights in their territories but will also provide more certainty about where industry can operate. The federal government has the opportunity to facilitate the creation of Indigenous-led protected areas through the $1.3 billion it has already allocated toward Canada’s international commitment to protect at least 17 percent of its land by 2020. This should include dedicated funding for Indigenous land-use planning and other Indigenous-led conservation initiatives.

Provincial and territorial decision makers should implement mandatory protections for critical caribou habitat across the boreal forest

One of the most urgent and practical ways to ensure a healthy future for the broader boreal forest is to protect critical caribou habitat. Canadian provinces and territories should meet their obligations to submit caribou range protection plans that satisfy the critical habitat requirements of the 2012 boreal caribou Recovery Strategy. They should craft and implement these plans in partnership with Indigenous Peoples. In addition, provinces and territories should ensure that the protections around critical boreal caribou habitat are mandatory and enforceable. Loopholes that undermine species protection laws should be closed.

Moreover, provinces and territories should immediately stop logging in the ranges that have already passed the 35 percent disturbance threshold and work to restore habitat in those ranges. Further destruction and degradation in these areas risks the local extinction of many of Canada’s boreal caribou herds.

Canada’s federal government should step in to safeguard unprotected critical caribou habitat

Both the Canadian federal government’s 2012 boreal caribou Recovery Strategy and its 2017 progress report on this strategy make clear that boreal caribou populations have continued to decline since the species was listed as threatened in 2003. While the federal government took an important step in releasing its 2018 report highlighting provincial inaction, it has not yet used its most effective legal tools to enforce protections. The Canadian government should, therefore, meet its obligation under SARA to continue to regularly document through subsequent reports where critical boreal caribou habitat remains unprotected, and to identify steps to remedy the situation. In the absence of adequate provincial protections, the federal government should implement “safety net” orders that stop destructive activities in severely threatened ranges until provinces and territories complete land-use plans that include mandatory protections against habitat degradation.

360 Ibid.
361 Ibid.
In 2010, logging companies and NGOs signed the Canadian Boreal Forest Agreement (CBFA), with the intent to implement more stringent sustainability standards on 178 million acres of Canada’s boreal forest. Signatories agreed to a three-year suspension (2010–2013) of logging activity on 71.6 million acres of boreal forest that is critical caribou habitat. Many NGO signatories emphasized that the CBFA would give governments the opportunity to accelerate caribou habitat protection plans and expressed hope that the three-year moratorium would become permanent.\textsuperscript{363} In return for the logging companies’ participation, the NGOs agreed to suspend boycotts against their products.\textsuperscript{364} The agreement was initially lauded as a world-class conservation initiative.

The CBFA spurred some important industry action. For example, Weyerhaeuser partnered with Indigenous, provincial, and municipal governments in Saskatchewan to propose a 741,000-acre protected area in the Mossy River watershed and conserve a 988,000-acre area of habitat for caribou.\textsuperscript{365} However, satellite imagery revealed evidence that logging continued in areas meant to be covered by the voluntary moratorium (see maps below).\textsuperscript{366} Additionally, by 2013, the provinces still had not created any protected areas identified under the CBFA, and the three-year pact lapsed without permanent measures to conserve these regions.\textsuperscript{367} The creators of the CBFA also did not incorporate any Indigenous voices into the agreement. The CBFA reveals the inadequacy of voluntary agreements in the absence of official government participation or mechanisms for enforcement.

\textbf{DISTURBANCES IN REGIONS COVERED BY THE CBFA MORATORIUM}

\begin{figure}[h]
\centering
\includegraphics[width=\textwidth]{disturbances.png}
\caption{Disturbances in regions covered by the CBFA moratorium.}
\end{figure}

\begin{table}[h]
\centering
\begin{tabular}{|c|c|c|}
\hline
Region & 2013-2016 & 2010-2013 \\
\hline
Lac Saint-Jean & Yellow line shows tenure boundary from the inset map. & \\
\hline
Broadback River & An area of the CBFA moratorium south of the Broadback River watershed. & \\
\hline
\end{tabular}
\caption{Disturbances in regions covered by the CBFA moratorium.}
\end{table}

\textsuperscript{364} Ibid.
\textsuperscript{368} Anthony Swift, “New Maps.”
\textsuperscript{369} Ibid.
Canada’s federal and provincial decision makers should improve measurement of greenhouse gas emissions associated with logging in Canada’s boreal forest and develop forestry practices to minimize carbon emissions

As a first step to limiting greenhouse gas emissions associated with boreal logging, Canada should adopt transparent, scientifically credible methods to properly account for logging’s greenhouse gas emissions. These data should then be included in provincial, national, and international greenhouse gas inventories and climate plans and be used to bring logging under a national strategy to regulate carbon emissions. In addition, these measurements should serve as the basis for designing “climate safe” forestry practices in partnership with Indigenous Peoples. These practices should protect large-scale intact forest areas, promote forest recovery, ensure biodiversity preservation, and maximize carbon sequestration and storage.

Canada’s federal and provincial governments should implement policies to increase the boreal forest’s resilience to climate change

The boreal forest’s resilience to climate change over the next century will be dependent upon the management decisions made today. In the face of global climate change, it is imperative that Canada’s governments implement policies to promote a healthy, resilient boreal forest through protecting intact forests and recovering degraded landscapes. In addition, Canadian policymakers should expand research on how the boreal forest will adapt to climate change and incorporate these findings into land-use planning. This will not only help protect plant and animal species from the stresses of climate change but also help to ensure the forest’s carbon remains stored in a healthy, complex ecosystem.

Corporate buyers of boreal forest products should ensure their sourcing policies and decisions are aligned with boreal protection and Indigenous sovereignty

The international marketplace—particularly companies in the United States—has the economic power to urge Canada’s federal, provincial, and territorial governments to protect the boreal forest’s ecologically and culturally important landscapes. Accordingly, companies that source from the boreal forest should use their market power to encourage conservation solutions and sustainable development and promote Indigenous rights. International companies should call on federal, provincial, and industry leaders to ensure that Indigenous Peoples’ rights to their land are respected and implement policies that account for logging’s climate impacts. They should also push Canada’s governments to implement mandatory and enforceable laws to protect critical boreal caribou habitat and ensure that no more than 35 percent of each caribou range is degraded.

CONCLUSION

The boreal forest is a global treasure. Its importance to Indigenous Peoples, wildlife, and the global climate cannot be overstated. Yet, by failing to safeguard this treasure, Canada’s federal and provincial governments are playing fast and loose with this irreplaceable ecosystem, gambling with its future.

On the international stage, the Canadian federal government has depicted the country as an environmental leader and promised to create a new Nation-to-Nation relationship with Indigenous Peoples. It’s time for Canada to live up to its commitments and ideals by protecting the boreal and respecting the self-determination of the Indigenous Peoples who live there. We need action now. Every day without it has consequences. Protecting the boreal means a healthier future for species, Indigenous Peoples, and the planet.