WHAT'S NEXT?

Based on the findings of this study, WWF-Canada recommends the following actions be taken in partnership with all levels of government:

RECOMMENDATION 1

Avoid the conversion and degradation of large stores of carbon in nature by:

a. Creating protected and conserved areas designed to maximize carbon storage.

b. Legislating that environmental impact assessments by all levels of government take into account the presence of ecosystem carbon stocks and quantify and consider carbon emissions associated with the conversion and degradation of carbon stored in nature.

c. Managing areas of high-carbon stocks to allow continued storage of carbon and an enhanced ability to absorb it in the future.

RECOMMENDATION 2

Establish and fund a Carbon Guardians program to support interested Indigenous communities and governments in the monitoring and measurement of ecosystem carbon.

RECOMMENDATION 3

Develop a set of financial mechanisms — defined and supported collaboratively by Indigenous nations and communities, financial institutions, governments and responsible businesses — to support stewardship of carbon storage in nature.

RECOMMENDATION 4

Ensure that Canada has a clear framework for international carbon reporting and accounting for nature-based climate solutions by:

a. Including targets for avoided emissions as part of Canada's Nationally Determined Contributions.

b. Improving monitoring and reporting of emissions from ecosystem carbon storage areas, especially for peatlands, as part of Canada's international emissions reporting.

"The findings of this study are empowering in the fight against the climate crisis. We now know exactly what we have to gain by protecting the most carbon-rich landscapes — and preventing the release of billions of tonnes of carbon that's been stored for millennia — and what's at risk if we don't."

— Megan Leslie,
WWF-Canada President and CEO

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To learn more:
wwf.ca/carbonmap/

WWF CANADA

EXECUTIVE SUMMARY

MAPPING CANADA'S CARBON LANDSCAPE

A NEW STUDY BY WWF-CANADA, LED BY SCIENTISTS AT McMASTER UNIVERSITY'S REMOTE SENSING LAB, REVEALS WHERE CARBON IS STORED IN CANADA'S LANDSCAPES.

High-carbon landscapes play an important role in regulating the Earth's climate by removing carbon from the atmosphere and storing it in natural ecosystems. While these ecosystems help curb climate change, if they are disturbed, that stored carbon can be released back to the atmosphere, accelerating climate change.

This study showed Canada is home to billions — yes billions — of tonnes of carbon. And while some is stored in the trees and natural landscapes that Canada is known for, the study found disproportionately large carbon stocks underground, in soils and peatlands throughout the country, including in many Indigenous territories.

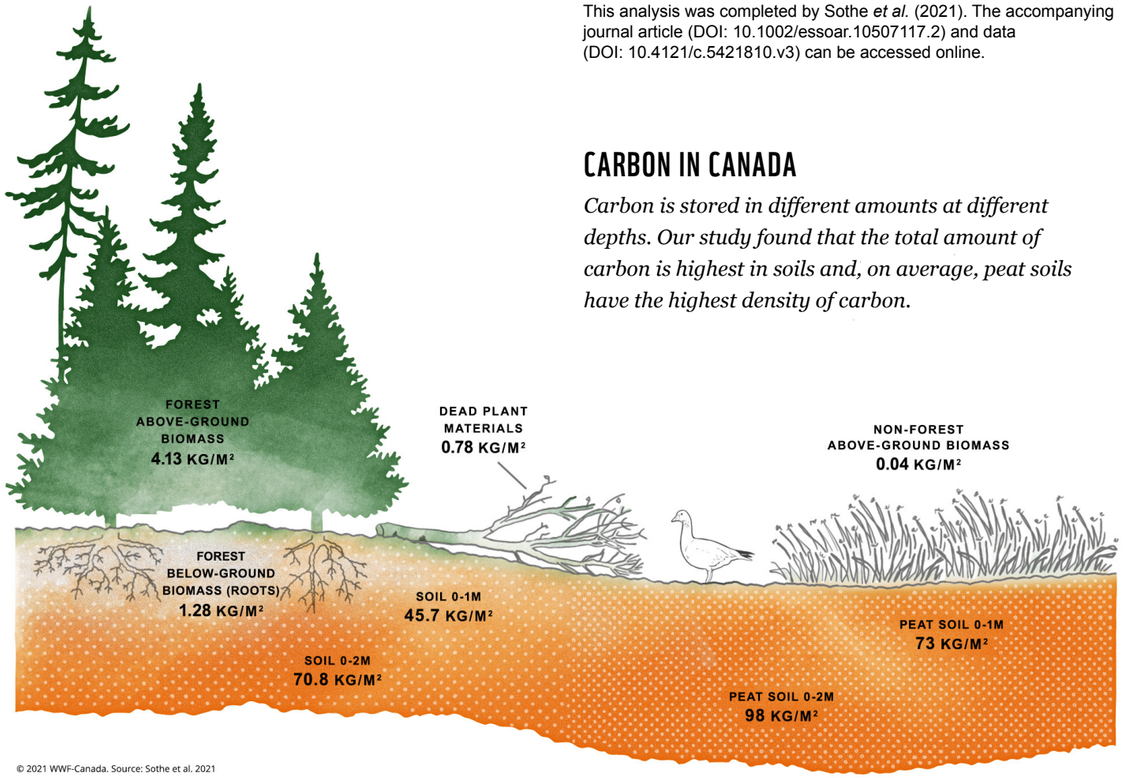
This national carbon map helps us understand where large ecosystem carbon stocks are located, which allows us to prioritize their protection and management. The results will change the way we approach conservation in Canada: we can now be much more strategic in how we implement nature-based climate solutions (NbCS) — strategies that use the unique powers of nature to catch and store carbon while also benefitting wildlife — and be more effective in our fight against the climate and biodiversity crises.

KEY FINDINGS

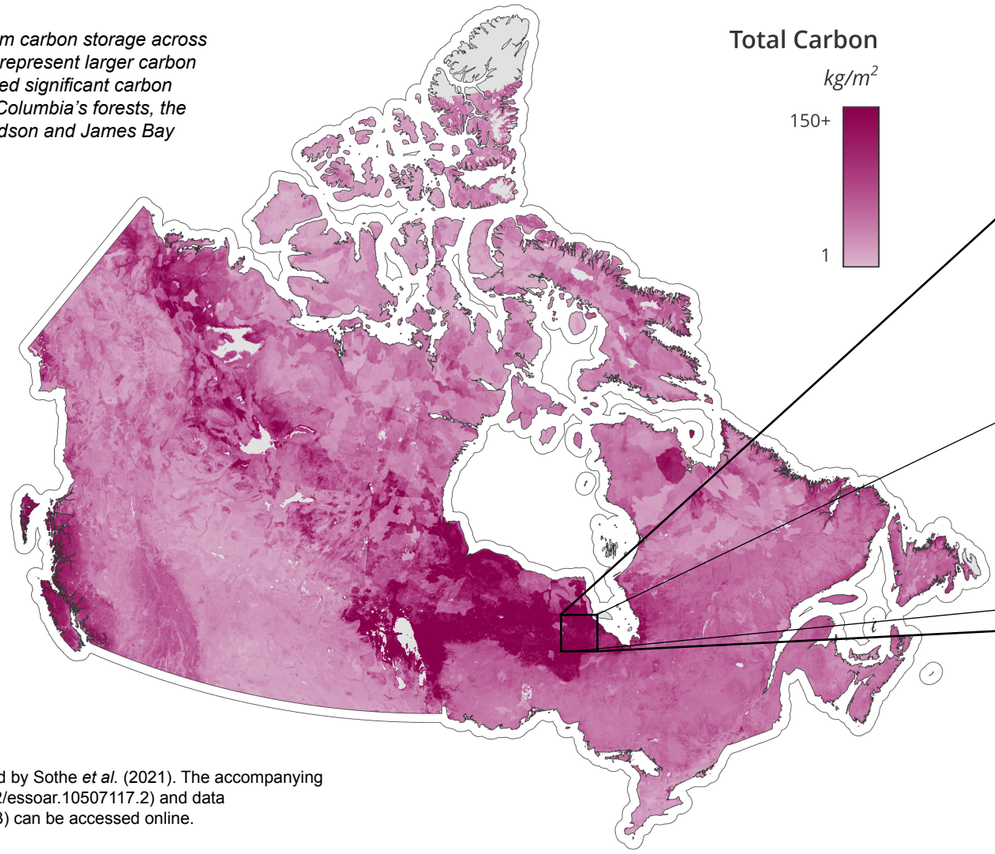
Canada stores massive amounts of carbon in its terrestrial ecosystems — **405 Pg**, to be exact. This is equivalent to about 30 years of human-caused global greenhouse gas emissions, at 2019 emission levels.

About five per cent of this carbon is stored in vegetation (trees, shrubs, grasses, dead leaves and roots). The **remaining 95 per cent** is found in the top one metre of soil (with **24 per cent** of soil carbon found in peatlands). In fact, soils in Canada store 384 Pg of carbon in the top metre, **which is about a quarter of the world's soil carbon.**

These findings show that we need to consider carbon at different depths when deciding what areas are critical to protect. Canada's carbon is also globally significant. Decisions about how to manage and protect carbon-rich landscapes have the potential to impact our goals of keeping warming below 1.5°C.



Total terrestrial ecosystem carbon storage across Canada. Darker shades represent larger carbon stocks. The study revealed significant carbon stores in coastal British Columbia's forests, the boreal forest and the Hudson and James Bay Lowlands.



This analysis was completed by Sothe *et al.* (2021). The accompanying journal article (DOI: 10.1002/essoar.10507117.2) and data (DOI: 10.4121/c.5421810.v3) can be accessed online.

CARBON IN CANADA

Carbon is stored in different amounts at different depths. Our study found that the total amount of carbon is highest in soils and, on average, peat soils have the highest density of carbon.

CASE STUDY:
HUDSON AND JAMES BAY LOWLANDS

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The Hudson Plain ecozone has considerably more soil carbon per area than any other ecozone in Canada, largely due to massive concentrations of peatlands, which store and sequester more carbon than any other type of terrestrial ecosystem. Within this ecozone, the Hudson and James Bay Lowlands are a globally renowned ecosystem carbon store that has formed over tens of thousands of years.

Protecting one of the world's largest peatland complexes from releasing its stored carbon is critical — not only for the First Nations communities in the area, but for our country's climate targets and people around the planet — and helps to safeguard wetland and coastal wildlife, including migratory birds.

HOW WE MAPPED CARBON

Over the span of two years, the research team fed data — soil samples, long-term satellite data and topographic and climate variables — into a machine-learning algorithm. Researchers were able to estimate carbon at a 250-metre spatial resolution in different carbon pools (plant biomass and soils), as well as at multiple depths (1–2 metres).

WWF

Working to understand Canada's carbon stores.

RESEARCH PARTNER

Remote Sensing Laboratory | McMaster University

FUNDING PARTNERS

MAPLE LEAF | METCALF FOUNDATION

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