RESTORING LOST HABITATS IN CANADA

New analysis reveals up to 3.9 million hectares of Canada that, if restored, would help curb biodiversity loss and climate change

Ecosystem restoration is a nature-based solution that can recover nature, sustain biodiversity and improve resilience in a changing climate. However, not every landscape has the same restoration potential. It's critical that we identify where ecosystem restoration will yield multiple environmental benefits to ensure that efforts to achieve global goals (for example, the UN Decade on Ecosystem Restoration and the Kunming-Montreal Global Biodiversity Framework) deliver maximum gains for nature, wildlife, people and the climate. This must start with Canada developing its own national restoration target.

APPROACH

Based on current data availability, WWF-Canada's national restoration analysis focused on identifying ecological restoration opportunities within converted (human-dominated) terrestrial landscapes in Canada — a country that stores approximately one fifth of the world's soil carbon in its natural ecosystems and is home to over 800 species at risk. We first identified converted lands that would benefit from restoration, then integrated carbon storage potentials and biodiversity benefits for these areas, before evaluating the overlap and optimization of these elements using three area-based restoration targets: 5M ha, 10M ha and 15M ha — representing approximately 10 per cent, 20 per cent and 30 per cent of converted terrestrial lands, respectively.

KEY FINDINGS

Our results show that converted landscapes — covering around 50M ha across the country — are prevalent in southern human-dominated regions, with grasslands (34.5 per cent) and forests (33.8 per cent) offering the greatest restoration potential across the country (Figure 1a). Carbon density (tonnes C/km^2) and total carbon storage (tonnes C) potential were greatest for wetland and forest restoration (Figure 1b) respectively, while biodiversity benefits were more prevalent along the southern periphery of Canada (Figure 1c) — exhibiting somewhat diverging patterns.

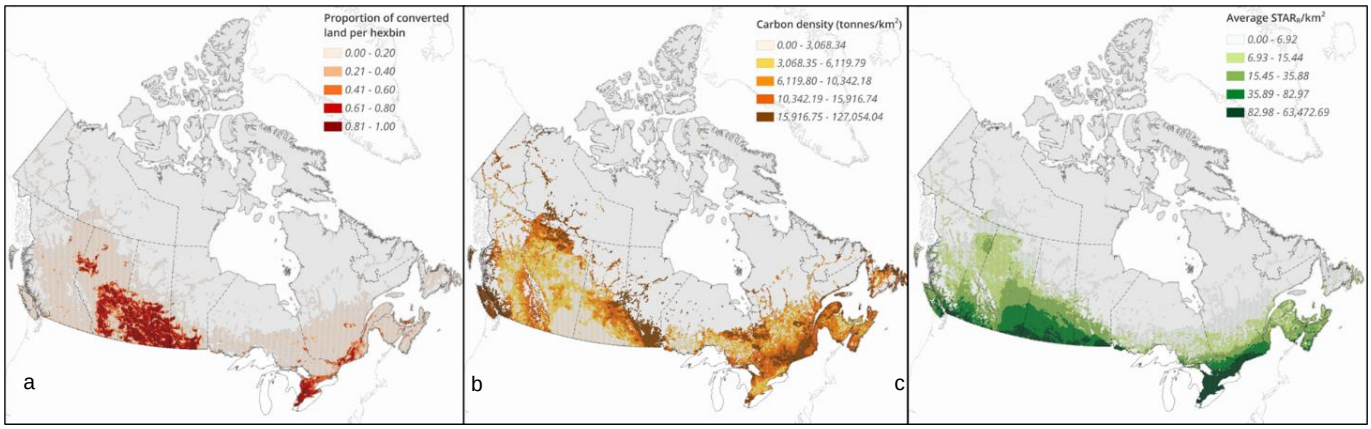

Figure 1. (a) Proportion of converted lands per pixel that would benefit from restoration, (b) net carbon density (tonnes C/km^2) potential of restoring converted lands, and (c) average Species Threat Abatement and Restoration (STAR$_R$/km^2) scores for species in Canada at 100km^2 hexabin resolutions. Colour gradients are visualized using quantiles.

OPTIMAL AREAS FOR RESTORATION OF CONVERTED LANDS

When biodiversity and carbon were both included in an optimization framework, the areas identified as most optimal for potential restoration equate to 0.95M ha, 2.6M ha, and 3.9M ha (corresponding to targets of 5M ha, 10M ha and 15M ha, respectively) — averaging approximately one quarter of initial targets — and are generally suited to reforesting croplands. Across all three scenarios, we saw prioritization for forest restoration in the St. Lawrence and Lake Erie Lowlands, with the Lake Manitoba Plains, Interlake Plains and Manitoulin-Lake Simcoe ecoregions also frequently identified as optimal ecoregions for potential restoration in converted lands (Figure 2).

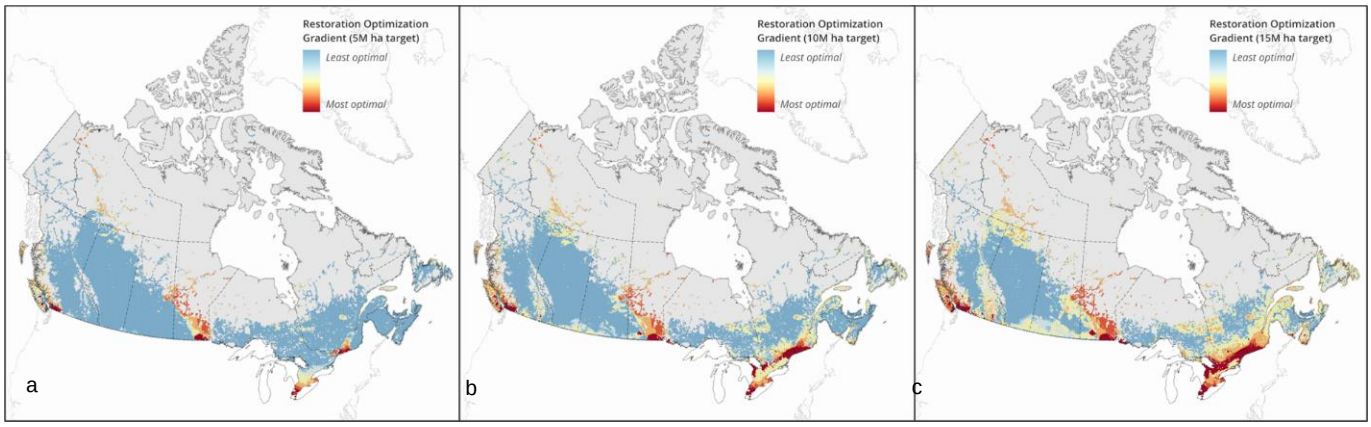

Figure 2. Spatial prioritization of converted lands in Canada that would benefit from ecological restoration, using a linear optimization approach (Restoration Opportunities Optimization Tool; ROOT) that approximates the optimal solution for maximizing both the carbon and biodiversity benefits of restoration using a (a) 5M ha, (b) 10M ha and (c) 15M ha restoration target.

MOVING FORWARD

There is an increasing need for conservation actions that address climate change and biodiversity loss simultaneously. Focusing solely on one environmental issue is no longer an option. While pathways to limit global warming to 1.5°C will require rapid and diverse approaches in every sector, climate mitigation options that work in tandem with nature are critically needed. Ecosystem restoration – on both converted and degraded lands – can provide climate mitigation opportunities, as well as additional benefits for climate adaptation and the recovery of wildlife, if combined with sustainable management and protection of restored ecosystems.

Spatial analyses to identify where such conservation actions would yield the greatest environmental benefits are critical to inform, prioritize and coordinate conservation action at multiple scales. In the absence of spatial prioritization and optimization information, countries may find it difficult to specify transparent objectives to advance progress on biodiversity and climate change. This study demonstrates how combining biophysical spatial data can facilitate the identification and optimization of areas for restoration across Canada.

It's also critical to note that in practice, restoration initiatives must respect social safeguards, take into consideration the knowledge and needs of Indigenous Peoples and local communities, and consider the local contexts in which restoration will take place. Restoration efforts should uphold the United Declaration on the Rights of Indigenous Peoples, including the principle of Free, Prior and Informed Consent. Restoration initiatives should guarantee Indigenous governance, knowledge and self-determination — aligning with recommendations from the Indigenous Circle of Experts.

In the short term, Canada will need to develop a clearly defined plan to meet its new international targets under the Kunming-Montreal agreement, including Target 2, which relates to restoration. This analysis can be used to inform key decision-making related to national target setting and effective implementation. Future work should identify degraded lands to complement the focus on converted lands presented here.

The peer-reviewed journal article can be accessed via this link.

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