



# CANADA'S LARGE INTACT FOREST LANDSCAPES

September 2006

# Canada's Large Intact Forest Landscapes

A report by Global Forest Watch Canada

*By:*

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# Preface

This report is a refinement and update of a preliminary analysis of the ecological integrity of Canada's forests, which was released in 2003 under the name "*Canada's Large Intact Forest Landscapes*." This edition incorporates a more comprehensive satellite image coverage as well as user feedback, and replaces the preliminary 2003 edition.

Canada's forests are immense by any measure. The authors have been able to produce a consistent picture of considerable detail across a vast space by relying heavily on publicly available satellite images. This is the first analysis of its kind for Canada's forests.

This important first step towards understanding the geographical distribution of Canada's Large Intact Forest Landscapes would not have been possible without the help and support of many individuals and organizations within and outside of Canada. To these contributors and supporters, the authors extend their gratitude. Even with the help of generous supporters, the resources available to execute this study—staff time, and funds—were small in relation to the magnitude of the task. The authors welcome feedback on any errors or suggestions that will help improve the accuracy of the analysis.

## Executive Summary

Canada's forests provide critically important benefits to the nation — ranging from their economic contributions via the forest products industry to recreational opportunities to life-sustaining ecosystem services, such as soil erosion control and watershed protection. The vast extent of Canadian forests represents one tenth of the world's forested area, one quarter of the world's temperate rainforests, and more than one third of the world's boreal (i.e., northern, conifer-dominated) forests.

Despite the importance and diversity of benefits derived from Canada's forests, until very recently Canadians had little access to information about forests other than timber production statistics. This is now beginning to change, with various national and provincial government agencies and other groups documenting and reporting on a wider range of forest values.

Mapping Large Intact Forest Landscapes continues to be important for several reasons.

Intact forest landscapes are becoming increasingly rare at the global level, due in large part to their vulnerability to the effects of large-scale human interventions — effects that are not easily or quickly reversed. The remaining global tracts of intact forest landscapes have intrinsic value as part of the Earth's natural endowment. They are also growing in importance as benchmarks or reference points for understanding managed forest landscapes and designing management schemes that preserve or restore significant aspects of the natural forest landscape. Indeed, intact forest landscapes are areas of opportunity and responsibility, where all land use options — from development to conservation — are still open. They are areas in which the best available knowledge and technology can be applied to inform effective and responsible decision-making.

This project to map Canada's intact forest landscapes aims to increase knowledge about their extent and location, and to enable better decision-making by providing data in accessible forms for use by government,

industry, and the public. It is the result of a unique collaboration among members of the international Global Forest Watch network and was carried out by Global Forest Watch Canada, partner organizations of Global Forest Watch Russia, and the World Resources Institute. The project builds on and extends previous work assessing forest intactness in Canada and is part of a larger effort by the Global Forest Watch network to map intact forest landscapes in important forest countries around the world. The methodology was initially developed by Global Forest Watch to map Russia's intact forest landscapes, and analysts from Global Forest Watch Russia have been key partners in this Canadian study.

For the purposes of this study, we define an intact forest landscape as a contiguous mosaic of natural ecosystems in a forest ecozone, essentially undisturbed by human influence, including both treed and naturally treeless areas. An intact forest landscape must be large enough to contain and support natural biodiversity and ecological processes, and to provide a buffer against human disturbance from surrounding areas. Hence, in this study, we decided to examine forest tracts of 50,000 hectares or larger that are at least 10 kilometres wide, and to refer to them as large, intact forest landscapes. Other forest areas may possess high conservation value, but mapping them was beyond the scope of this study.

This collaboration uses a modified version of the Russian methodology, tailored to suit Canadian circumstances. Building on previous work on forest intactness in Canada, this study presents the most detailed national assessment undertaken, looking at a wider range of human disturbances and using satellite images and better ancillary information. The methodology involves identifying intact forest landscapes using high-resolution satellite imagery (Landsat data at a resolution of 30 metres on the ground and ASTER data at a resolution of 15 metres) as well as some medium-resolution Landsat data and ground and aerial photography verification.

The method presumes all forest landscapes to be intact at the outset of the study, and disturbed areas are systematically eliminated through successive efforts to detect positive evidence of human influence on the landscape. Thus, the search is for signs of human disturbance, not for signs of intactness, as the former are much easier to detect. This simple methodology and decision model enables mapping of intact forest landscape areas that is replicable, cost-effective, feasible at the continental level, at a scale of 1:1.5 million, sufficiently detailed to support practical decision making.

Numerous data contributors, advisors, and collaborators provided input throughout the course of the project, and reviews by stakeholders and experts improved the result. It is important to bear in mind, however, that this methodology likely overestimates the area of intact forest landscapes, as signs of disturbance are more likely to remain undetected than to be mistakenly identified.

Key findings arising from our mapping of Canada's large, intact forest landscapes are:

- **Canada retains extensive, globally significant areas of large, intact forest landscape.** More than half of Canada's forest area (and more than one third of the country's total land area) consists of large intact landscapes. More than one third of the area of these intact landscapes is naturally treeless, such as bogs and areas above the tree line in high elevation mountainous areas.
- **Large, intact forest landscapes are unevenly distributed across the country, with most found in northern Canada and at higher elevations in western Canada.** The most biodiversity-rich and productive forests, which are located in southern Canada, have been the most extensively influenced by human activity.

- **Northern boreal forest regions remain largely intact, but southern boreal regions have been broadly affected by modern land use.** About half of the Boreal Shield, Canada's largest ecozone, is made up of large, intact forest landscapes. The northernmost boreal ecozones are least affected by human disturbance, with intact landscapes making up 84 percent or more of the study area in each of four northern boreal ecozones (Taiga Cordillera, Boreal Cordillera, Hudson Plains, Taiga Shield) and 51 percent in the Taiga Plains. The southernmost boreal regions have been considerably affected by industrial activity; for instance, the Boreal Plains ecozone retains less than one fifth (15 percent) of its area in large, intact forest landscapes.
- **About a quarter of temperate forest areas remains as large, intact forest landscapes.** About 90 percent of this area is located in British Columbia, with the remainder in Alberta. Of these intact landscapes, more than half are naturally treeless, including high-elevation alpine tundra, ice, and rock in the western mountains. No large, intact forest landscapes remain in the Mixedwood Plains and Atlantic Maritime ecozones.
- **Québec and the Northwest Territories together account for more than one third of Canada's large, intact forest landscapes; combined with Ontario and British Columbia, they account for about two thirds of these landscapes.** Three provinces — New Brunswick, Nova Scotia, and Prince Edward Island — have no remaining large, intact forest landscapes.
- **Only a small portion of Canada's large, intact forest landscape occurs in protected areas.** Although national parks make up over a third of Canada's protected areas, only 2 percent of large, intact forest landscapes are located in national parks. Boreal regions account for most of the area in protected, large, intact forest landscapes — about 20 million hectares versus almost 8 million hectares in temperate zones. However, a greater percentage of large, intact temperate forest landscape is subject to protection — about 28 percent, versus about 7 percent for boreal landscapes. The majority of these protected temperate forest landscapes are naturally treeless.
- **First Nation historic treaty areas contain half (55 percent) of Canada's large, intact forest landscapes.** About one quarter of large, intact forest landscapes are contained in modern land claim settlements.

Global Forest Watch is committed to providing the best possible information for decisions on forest land use. Thus, we plan to work to refine and expand this analysis to include more detailed data, map smaller (between 5,000 and 50,000 hectares) undisturbed areas of forest landscape, analyze the location of social, economic, and conservation values in the forest landscape, and conduct studies tracking past and future forest change. We encourage the Canadian government, industry, and public to join us in these efforts.