



# 2BILLION TREES

## 2 BILLION TREES SCIENCE

### Research in Support of Tree Planting

NOTE 6

## High-resolution productivity mapping to support 2BT using remote sensing

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#### CFS CENTRE:

Laurentian Forestry Centre,  
Great Lakes Forestry Centre,  
Northern Forestry Centre,  
Pacific Forestry Centre (NFI)

#### PROJECT LOCATION:

National

#### Project Drivers

Site productivity (i.e., the potential of a planting site to produce biomass, or in other words, trees) can be evaluated with different metrics, including site index (SI). SI is a more robust metric than traditionally used methods, including diameter growth or tree ring analysis, for evaluating site potential. A precise and accurate mapping of tree species' potential productivity using SI would help both 2 Billion Trees (2BT) program proponents and the 2BT program management team to identify and optimize site selection for tree plantations. In Canada, the selection of tree species for large-scale plantations typically relies on Ecosystem Land Classification (ELC) systems. However, the value of these systems as planting guides may become increasingly limited under climate change. To address these concerns, the CFS has developed tools to forecast future climate suitability for tree species by developing maps of future climate habitats. However, current efforts have not yet considered information on soil and site conditions. This project will produce a national level map of species' potential productivity that considers the relationship between changing climate, soil and site conditions, and SI.

#### Project Approach

Hardwood species are broad-leaved (such as oak, maple or teak), whereas softwood species are evergreens (such as spruce, pine or fir). The project team will select different common hardwoods and softwoods species to model. For each selected species, the team will create national maps (30m resolution) showing SI under current climate and different climate change scenarios. This project will bring together cutting-edge datasets, including new (or recently updated) national datasets about remote sensing, forest inventory ground plots (NFI and MAGPlots), soil properties, hydrology, tree species distributions, and current and future climate. Bringing these different dataset layers together will produce a comprehensive tool that can support optimal tree-planting decisions.

#### Anticipated Outputs and Impacts

This project will produce the first national dataset that provides spatially explicit information on current and future site productivity for common tree species. The project team will summarize the results of this project and post all maps online for the benefit of 2BT proponents and others interested in this work. This dataset will help guide 2BT proponents in making site selection decisions that consider rapidly changing climate.

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