



# The TAIGA Project: Uniting Research Efforts to Better Protect Canadian Forests

Several factors affect forest biodiversity, including climate change, habitat degradation, timber harvesting and the introduction of invasive alien species. These species, in the form of both insects and diseases, threaten the integrity of forests. The risk of introducing alien species and the resulting damage may increase in Canada, due in part to increased trade. What role can research play in protecting Canada's forests from these invasive species?

## “Vast territory in need of protectors”

The TAIGA project (Tree Aggressors Identification using Genomic Approaches) was launched in 2011 and is funded primarily by Genome Canada and Genome British Columbia. The project brings scientists together from the University of British Columbia, Simon Fraser University, the Genome Science Centre, the Canadian Forest Service (CFS) of Natural Resources Canada, the Canadian Food Inspection Agency (CFIA) and FPInnovations. This project aims to:

- 1 develop more effective tools for the detection and monitoring of exotic pathogens considered as potential threats to the integrity of Canadian forests;
- 2 anticipate and detect the arrival of exotic pathogens that are currently unknown but possess pest traits;
- 3 identify the migration routes of pathogens already introduced into Canada in order to limit their spread and to prevent their introduction in the future.

In practice, where does the detection of forest diseases start?



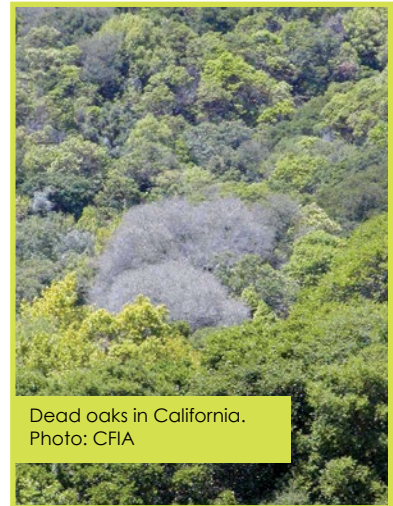
## The solution lies in DNA

Why do researchers use DNA to differentiate between pathogens responsible for forest diseases? Here are a few reasons.

- Extraction can be made from various types of materials: pure culture of the pathogen, herbarium specimen preserved for decades, infected plant tissues, air, water or soil samples, etc.
- Reliable detection is achievable from a minuscule amount of material.
- A large number of discriminating characteristics exist in the genome that can be used to detect a target species.

## Tracking Sudden Oak Death in nurseries

Sudden Oak Death is a well-established disease in the western United States, particularly in California, where it has destroyed numerous oak and beech (*tanoak/Lithocarpus*) stands. It is one of the priority diseases studied by TAIGA project researchers. Although strict phytosanitary measures have been implemented throughout North America, concerns remain over the possibility of the disease becoming established on the eastern side of the continent.



Dead oaks in California.  
Photo: CFIA



Necrosis due to Sudden Oak Death on California bay leaves. Photo: CFIA

Contrary to what its name suggests, Sudden Oak Death affects more than 100 plant species in addition to oaks. Since 2003, infected material – originating from California,

among other areas – has been identified in a few nurseries in British Columbia. Destruction, quarantine and disinfection measures have prevented this disease from becoming established in natural forests.

Tools developed by the CFS<sup>1</sup> have made it possible to confirm the effectiveness of quarantine and detection measures, and have improved the CFIA's ability to draw a precise picture of the extent of the problem and to consider adequate prevention and eradication measures. These tools, based on easily traceable characteristics of the pathogen's

DNA (molecular detection), enable simple, quick and cost-effective detection of target pathogens, while minimizing the risk of error.

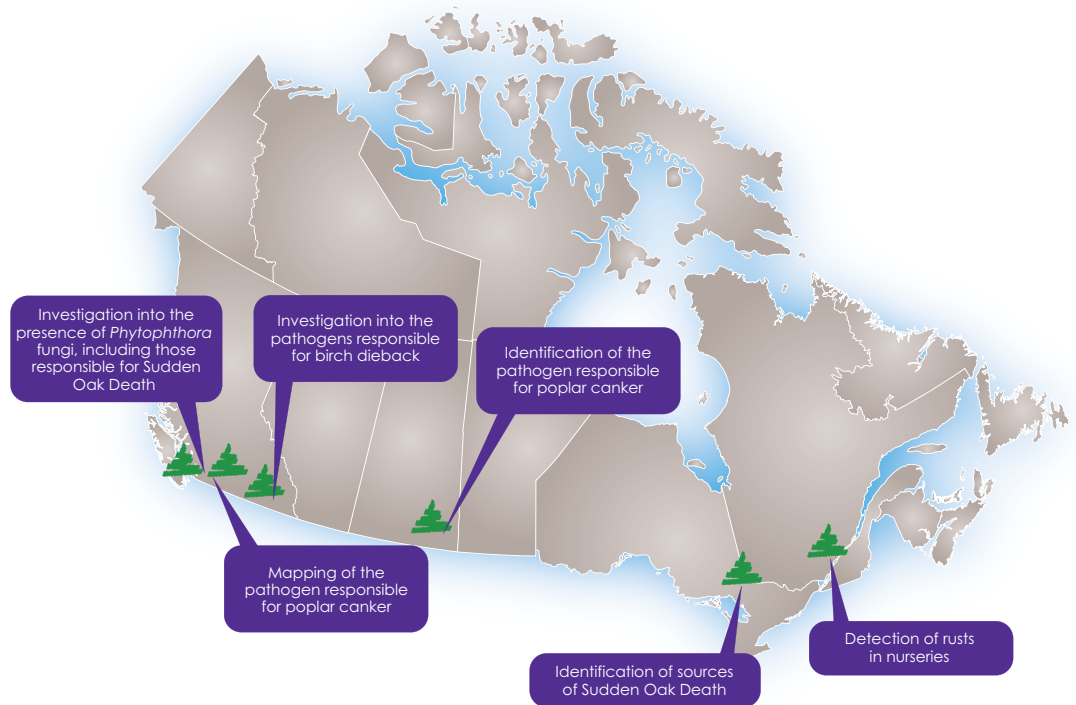
### Useful links

<http://cfs.nrcan.gc.ca/pubwarehouse/pdfs/34638.pdf>

<http://taigaforesthealth.com/>

## TAIGA: Beneficial applications for Canada's forests

The map below displays various TAIGA projects carried out for different levels of government and for the forest industry. These applications contribute to maintaining the integrity of forest ecosystems, and support the competitiveness of the Canadian forest sector.



1. See *Branching Out*, No. 29, <http://scf.nrcan.gc.ca/entrepotpubl/pdfs/26558.pdf>

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