Barcoding our forests

by Anne Phillips

Building and managing a healthy forest inventory

THE FORESTRY INDUSTRY in Canada is of economic and environmental importance to several provinces as well as the federal government. Imagine if governments could see with precision the types of trees, their size, their health; imagine if governments could know exactly what grows where and in what quantity. Then with that kind of data, imagine how much easier it would be for governments to manage the forest inventory and to work more intelligently and efficiently with the forest industry. Accurate information would help both industry and governments build a sustainable forest that contributes to the economic well-being of Canada, provides a habitat for wildlife and offers forest users continued pleasure.

Bluewater Business Solutions Ltd., a company out of Prince George, BC is finalizing the development of an intelligent system that can provide just that – accurate base data critical for both governments and industry to build and manage the forests and the industry.

Forest companies require information that provides them a high degree of confidence in their efforts to bid and complete the job within a very competitive industry. A logging company's viability rests on an ensured source of supply of quality wood that can be harvested in the most efficient manner to ensure profitability. Companies need to know what trees are available in the blocks they bid on – the types of trees, their age, their health, their distribution over that area of land and what the characteristics of that block of land is so they can map out the most efficient location of their logging roads and develop their harvesting plans. Governments need to know the same thing when determining which blocks of timber will be put up for bid. Bluewater's TimberAnalyst (**www.bluewatersolutions.ca**) is on the cusp of doing all this and more.

According to Paul Klotz, Bluewater's vice president, "TimberAnalyst will provide an economic assessment of the forest area under consideration with mandated forest management objectives for both government and industry." For a logging company bidding on a government determined block, the supply and quality of the wood itself is only one aspect of the economic assessment: the number and skills of employees, and the amount and type of equipment owned are also key considerations. It is expensive to build roads. Building them in the optimal configuration to support the logging and the removal of the wood affects the cost per cubic metre that the company will have to spend.

All these elements are considered when a company bids on a timber lot. TimberAnalyst allows an owner to input his employee and equipment inventory along with data on the wood lots he will bid on, run test scenarios based on the employees and equipment available and determine the optimal bid to submit. Both he and the government will be more confident that his estimate will be accurate. And, once a logging project is completed the owner enters the actual cost data and TimberAnalyst's artificial intelligence will factor these costs plus other accumulated historical data into future estimations, continually narrowing the gap between estimations and results.

While TimberAnalyst can use any type of spatial data, Bluewater is developing methodologies to determine the height and health of individual trees and the local topography (accurate to 15cm). Bluewater uses LiDAR data to estimate tree heights and volumes and other forest characteristics, bringing LiDAR data to operational foresters. The data then produced is usually more than 100 times more detailed than the data currently available from provincial governments.

Identifying the health of the trees is critical to sustainable forest management and the forest industry. Using hyperspectral imagery, Bluewater can identify a sick tree even when it looks healthy to the human eye.


Hyperspectral image
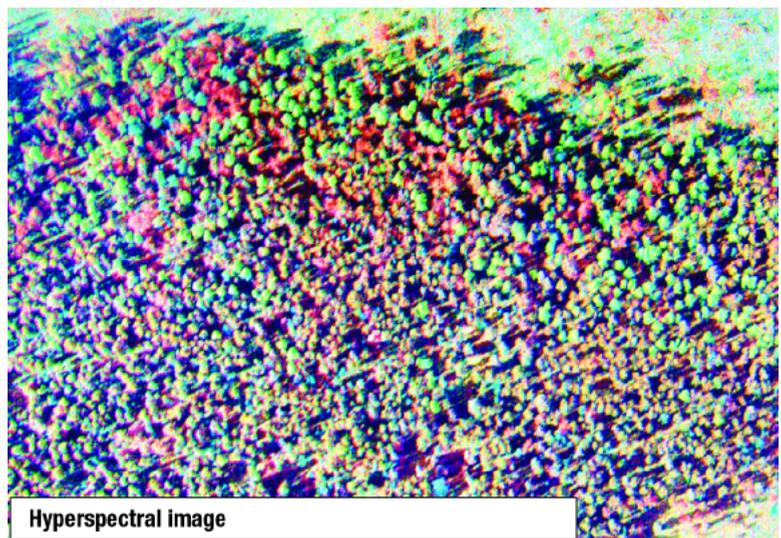
Bluewater Business Solutions Ltd.

False Colour Image – Mountain Pine Beetle Attack – Older red attack appears blue, newly attacked appears yellow/green, healthy trees appear red.

For example, a tree infected by mountain pine beetle can look healthy to the human eye for as many as two years. Knowing when trees are infected before it is visible to the naked eye would assist those fighting the spreading mountain pine beetle epidemic. This beetle has devastated the lodgepole pine species – a staple in the BC forest industry. Half a billion cubic metres have been affected in the province and by 2011 it is estimated that that will reach a billion. The rate of depletion of the healthy forest due to this beetle is proving to be a huge stress on the environment – without trees to suck up water, flooding and mudslides are likely and important changes to wildlife habitats and air quality will occur. The death of millions of hectares of trees

Bluewater Business Solutions Ltd.
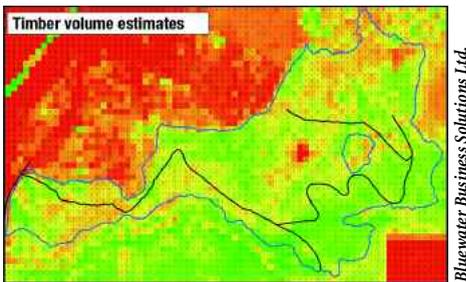
LiDAR image illustrates the density of harvestable forest (m³ per cell) in a timber lot.

severely affects the forest industry and the economies of forest dependant communities.

The beetle is now on the move into Alberta. Plus there is evidence that, having destroyed its favourite meal and home, the beetle is adapting and now attacking other species of coniferous trees. Despite ongoing research, there is no known means to kill this pest. It can be carried on the wind currents in 80 km or more leaps leaving forests in eastern Canada vulnerable to attack as well.

Bluewater's data will be of key importance for governments striving to build and maintain both a healthy forest and a healthy forest industry. Taking stock – barcoding our forests – and using that data to know exactly what is where, and its condition, is central to sustainable forest management and a sustainable forest industry. ⋀⋀⋀

Anne Phillips is the editor of Summit: Canada's magazine on public sector purchasing.