



# Bugs & Diseases

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## Research targets beetle survival in chips

**S**ustainable Resource Development is currently exploring single-tree treatment options for managing the multitude of pine trees currently infested with mountain pine beetle (MPB).

Chippers, mulchers and debarkers have been used for mechanical control of other insect pests, and various prototypes have been developed specifically for controlling MPB. These machines can be fast, mobile, cost-effective and cause as little impact as possible to the stand.

But how effective are these machines at actually killing the beetles? Can the beetles survive in the resulting chips? How small do the bark chips have to be to kill the beetles?

To answer these questions we felled three heavily infested trees and cut them into 45cm bolts. The bolts were split lengthwise so we could compare the observed survival in the treated section with the untreated section. SRD's summer beetle crews drilled chips of 5 different sizes from 20



MPB emergence trap containing 1<sup>1/8</sup>" wood chips.

bolts and constructed emergence cages for the chips and the untreated bolts.

*“...we should be able to further quantify the relationship between chip size and beetle survival.”*

Within the cages, MPB that emerge from the wood are attracted to light and fly into a glass jar mounted on the sealed plastic containers. The jars are checked daily and the emerged beetles are counted. So far up to 10 beetles per day were collected in cages containing the

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## Alberta's eye on forest health

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untreated bolts, and very few emerged from the chips.

The study is ongoing until the end of the flight period. We should then be able to further quantify the relationship between chip size and beetle survival.

The threshold size where the number of surviving beetles is negligible can then be com-

pared to the distribution of chip sizes produced by various chippers, mulchers and debarkers. If the chips produced by a particular machine are smaller than the threshold size, it may be considered effective at killing MPB.

This study will be repeated to further assess the effect of spreading vs. piling the chips.

*Anina Hundsdorfer*

## Western spruce budworm infests the Southern Rockies

The current outbreak of the western spruce budworm (*Choristoneura occidentalis*) was first noticed in the Beaver Creek area of the Porcupine Hills in 2004.

Douglas fir is the preferred host of the western spruce budworm, but it will also feed on white spruce and sometimes lodgepole pine. Trees of all ages are susceptible, and mortality can occur after prolonged outbreaks of this pest.

Although initially predicted to subside in a year or two, this budworm population has

continued to grow. This pest is currently infecting most of the Douglas fir stands in the south half of the Porcupine Hills. Tree mortality is starting to become apparent in these areas

*“This pest is currently infecting most of the Douglas fir stands in the south half of the Porcupine Hills.”*

The Blairmore Ranger Station and the Municipality of Crowsnest Pass office were flooded with calls early this summer inquiring about caterpillars in their trees. Upon examination by SRD staff, it was determined that the culprit was the western spruce budworm.

The infestation has now spread to Douglas fir stands from Coleman west to McGillvary Creek, and from Burmis west to Bellevue. Monitoring of the extent and severity of the damage caused by the budworm will continue.

*Rupert Hewison*



*Mature western spruce budworm larvae.  
Photo: Forestry Canada*



## Protecting Willmore's whitebark pine - update

The whitebark pine (*Pinus albicaulis*) is currently under pressure within the Willmore Wilderness Park from the increasing population of mountain pine beetle (MPB). With inner bark that is roughly 2 to 3 times thicker than in lodgepole pine, whitebark makes an excellent host for the beetles.

Pines have been fading in the Willmore for more than a month, and the observed number of MPB-attacked whitebark pine has grown substantially. In the Fetherstonhaugh and DeVeber drainages nearly 20% of the whitebark pines have been attacked.

As the whitebark pine is in danger within the park, one possible protection method is an anti-aggregation pheromone called verbenone. The verbenone pouches can be attached to trees in an attempt to repel beetles.

In mid-July, 2006, prior to the major MPB flight period, a 7.5 hectare stand west of the Fetherstonhaugh-Muddywater confluence containing a number of large cone-bearing whitebark pine was verbenone-protected. The stand was transect surveyed in March of 2007 for MPB-attacked trees, and a tally of un-hit pine was conducted concurrently. Of the unprotected lodgepole pine >12.5 cm DBH, 31 of 128 (24%) were MPB-attacked. Of the protected whitebark pine >12.5 cm DBH, 19 of 275 (6.9%) were MPB-attacked.

In this study site, the MPB-attacked trees were controlled by peeling at the end of June 2007 to ensure no local source of MPB existed. Verbenone pouches were then redeployed in the stand in mid-July prior to MPB flight. The method of deployment changed for

this year to a 13m by 13m grid deployment (60 verbenone pouches/hectare) instead of on each whitebark pine. This change was recommended to protect the stand rather than individual trees.

*“...the observed number of MPB-attacked whitebark pine has grown substantially.”*

A stand in the DeVeber drainage was also verbenone-protected in mid-July this year. This 4 hectare stand is currently un-hit but under threat from MPB. The stand was chosen for its very high (60%) composition of largely cone-bearing whitebark pine.



*Whitebark pine within the DeVeber Creek drainage - Willmore Wilderness Park.*

The results from the 2006 verbenone trial at the Fetherstonhaugh show some success at a fairly low MPB intensity.

While the operational use of verbenone to protect large tracts of land from MPB is not practical, the goal of this program is the protection of viable whitebark seed sources. 2007 results may help indicate if verbenone is an effective method at a higher MPB intensity.

*Brooks Horne*

## What caused this?

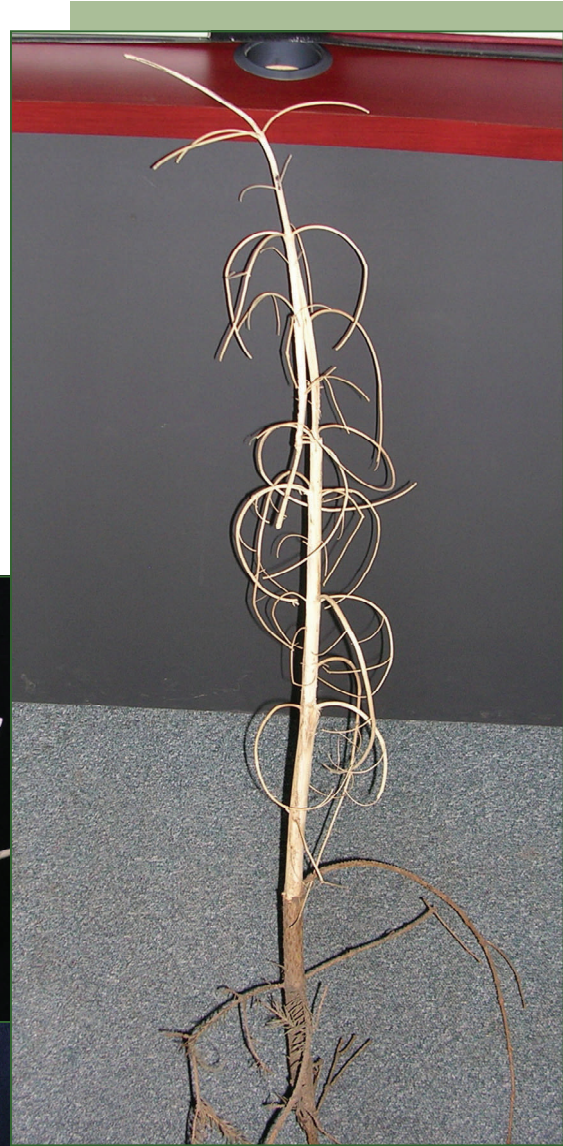
**I**t seems that once a person becomes part of the forest health world, you are asked to diagnose a multitude of tree damage. And of course, you are expected to instantly know what caused it.

So for fun, I have included a photograph of a sample of spruce top that was brought to me recently by a logger. His question was “What bug did this?”

I know it isn't like having the real sample in your hands, but can you guess what caused this?

Check out the next issue for the answer.

*Rupert Hewison*





## Mountain pine beetle priority ranking system

Ranking pine stands for mountain pine beetle (MPB) control is not a simple endeavor when considering the MPB stand susceptibility index, the locations and number of beetle-infested trees, R-values (population trend), and management zone designations (leading edge/holding/salvage).

The basic design of the analysis model was defined by a 7 foot long flow chart. The job of the forest health GIS team was to create a program that takes all the data inputs and assigns a MPB priority rank. Sounds too easy, right?

Well the first step was to calculate the connectivity between the identified beetle-infested trees and the susceptible stands. Within one

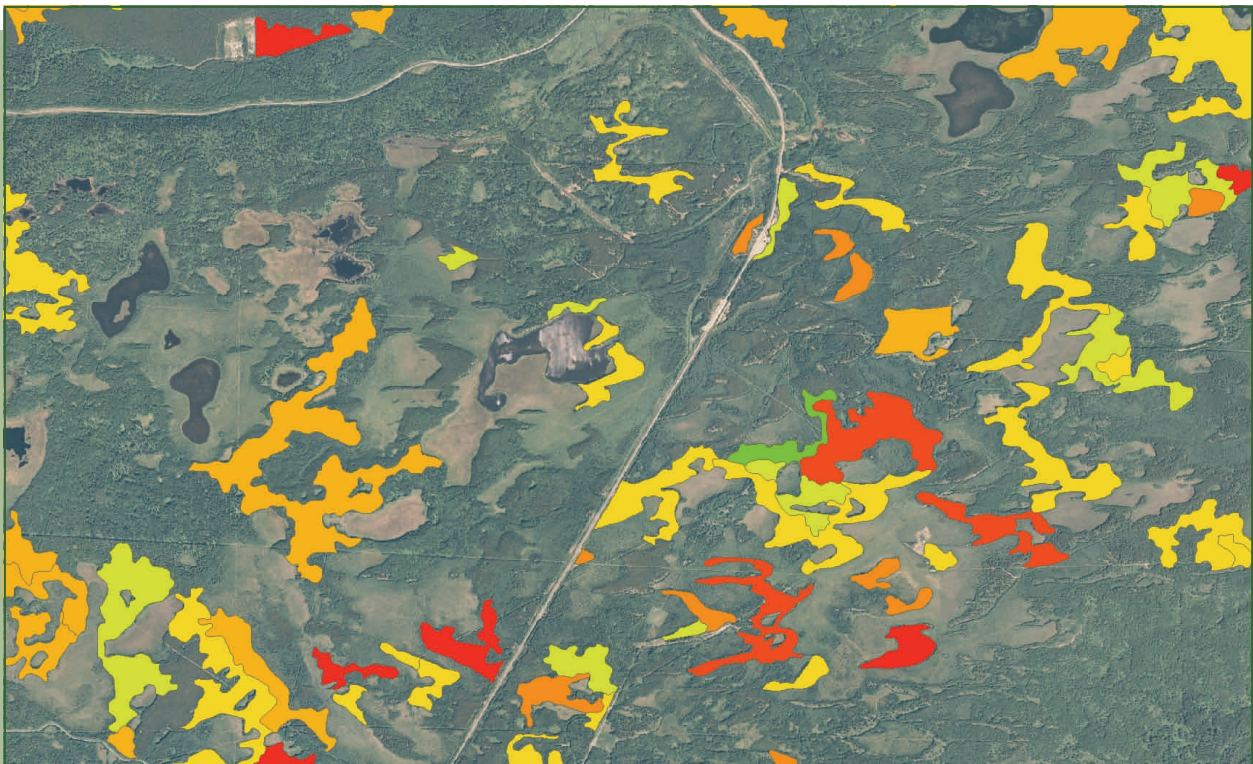
*“The job of the forest health GIS team was to create a program that takes all the data inputs and assigns a MPB priority rank.”*

afternoon a script was written to do this. To calculate the connectivity for the Weyerhaeuser Grande Prairie FMA, it took 60 hours! We are attempting to find ways to cut down on processing time.

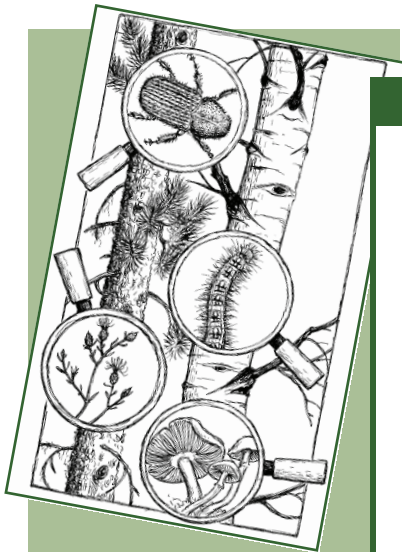
With the connectivity finished it was simply a process of creating a model that would calculate the priority rank. With a few calculations, a couple table joins, combined with some scripts we have a working model. After hours of testing using exaggerated scenarios the ranking system turned out to work just as was hoped.

For a detailed description of the steps taken to achieve the results please contact me.

*Brad Tyssen*



*Sample MPB priority output laid over satellite imagery. Red indicates high priority pine stands.*



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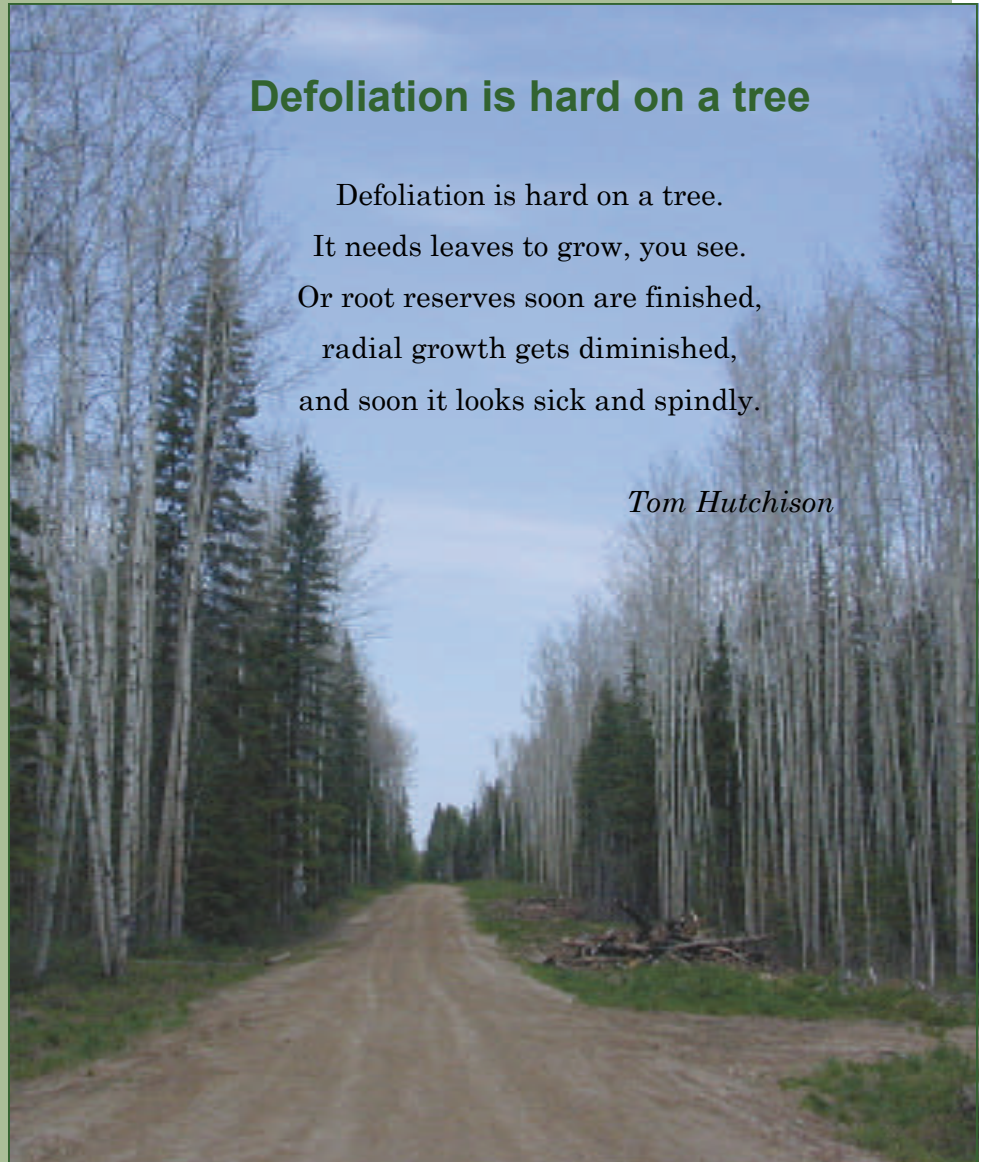
Bugs & Diseases informs  
forestry-related personnel about  
current forest health issues.  
Articles are welcome.

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Resource Development

## Defoliation is hard on a tree

Defoliation is hard on a tree.  
It needs leaves to grow, you see.  
Or root reserves soon are finished,  
radial growth gets diminished,  
and soon it looks sick and spindly.

*Tom Hutchison*



*Severely-defoliated trembling aspen caused by the forest tent caterpillar.*