



# A Guide to Managing Douglas-fir Beetles on Private Property

## FACTS ABOUT THE DOUGLAS-FIR BEETLE

Populations of Douglas-fir beetles (*Figure 1*) are currently very high in the Cariboo Region. This beetle infests and kills Douglas-fir trees wherever they grow in British Columbia, especially in the dry interior regions of the province. Douglas-fir beetles normally attack small groups of trees, but it's not uncommon for 100 trees to be affected at the same time during significant outbreaks.

These beetles generally prefer trees that:

- » are over-mature (i.e. veterans)
- » have fallen or been blown down in storms (blowdown trees)
- » have been injured (by fire or by machine damage)
- » are stressed (defoliation, root disease, drought)

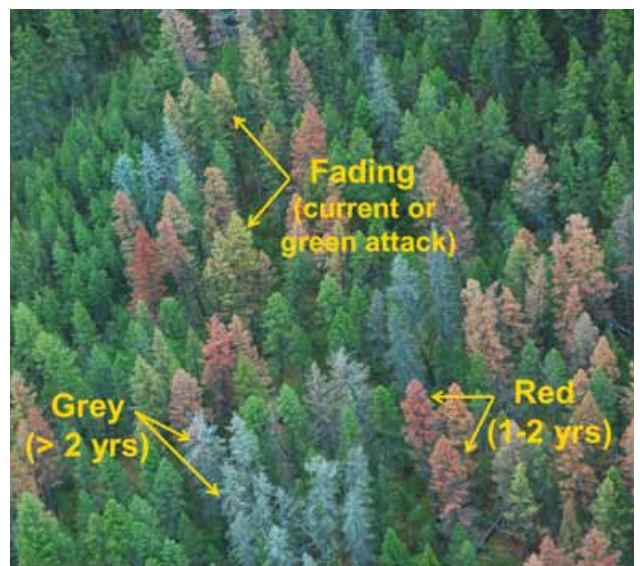
Douglas-fir beetles usually prefer to attack trees with a diameter over 20 cm, but they will attack smaller trees when the beetle population is high. They are also attracted to high stumps and slash piles.



*Figure 1: Adult Douglas-fir beetles are dark brown and black and are 4.5 mm to 7 mm long.*



*Figure 2: Douglas-fir beetle larvae.*



*Figure 3: When Douglas-fir beetles attack, the needles of affected trees change colour in stages. A pale green or yellow colour indicates that the tree is currently under attack. A colour range from sorrel (red) to dark brown means that the attack is one to two years old and beetles could still be feeding on the tree. A grey colour means that the attack is older than two years and beetles are no longer attacking the tree.*

## IDENTIFYING A “CURRENT” DOUGLAS-FIR BEETLE ATTACK

Several months after Douglas-fir beetles infest a tree (referred to as a “current” attack) the tree’s foliage becomes discoloured (*Figure 3*). The needles turn yellow, bright pink-red and then a dark rust colour.

Although some infested trees may become discoloured as early as August, others may remain green until the following June. The time of year when discolouration becomes noticeable varies with the tree’s location, date of attack, intensity of the infestation, elevation and seasonal weather.

A Douglas-fir tree that is experiencing a current attack may maintain a green, healthy-looking crown for many months, but it’s important to understand that live beetles emerge the following year and infest nearby trees.

If you see a pale green, yellow, red, brown or grey Douglas-fir tree on or near your property, check the surrounding trees to determine if they have also been infested with Douglas-fir beetles. Attacks frequently occur well above eye level, so you must examine the trees carefully to determine if beetles are present. (Note that not all beetle attacks are successful, especially in living trees.)

## EXTERNAL SIGNS OF A DOUGLAS-FIR BEETLE ATTACK

- » The tree has a pale green, yellow or red crown (*Figure 3*).
- » Red-orange “frass” (fine sawdust) appears on the tree’s bark (*Figure 4*). Note that wind or rain may displace some of the frass, which can make it harder to spot on the bark’s surface. Look for frass all around the tree trunk at eye level and above.
- » An excessive amount of fresh sap is running down the tree trunk (*Figure 5*).
- » Woodpeckers have been feeding up and down the tree trunk (*Figure 6*).

## INTERNAL SIGNS OF A DOUGLAS-FIR BEETLE ATTACK

- » Beetle galleries (the shallow tunnels that beetles create while feeding) are etched into the underside of the bark (*Figure 8*).
- » Live beetles or larvae are present (*Figure 1 and Figure 2*). If it’s cold out and you’re not sure if an adult beetle is alive, warm it up in your palm to see if it starts wriggling. (You could also try the “squish test”. A dead beetle will be dry and crumbly.)

- » The cambium (the layer of tissue between the bark and the wood) is brown and crumbly (*Figure 7*). The cambium of a tree that was only partially attacked (for example, where the flow of the tree’s sap successfully dislodged the beetles) will be pink. Carefully use an axe to peel back a small section of bark to determine if the cambium is alive or dead.



*Figure 4: Frass (fine sawdust) on a tree trunk, an indication that beetles have bored into the tree.*



*Figure 5: Sap streamers on the upper portion of a tree (sap streamers lower on a tree trunk or tree limb may have been triggered by another type of injury).*





Figure 6: Damage caused by a woodpecker feeding on beetles on a fire-damaged Douglas-fir tree.



Figure 7: Brown cambium on a tree that's been attacked (which will die even if the crown is still green) and pink cambium on a healthy tree.



Figure 8: Douglas-fir beetle "galleries" under the bark, indicating that the tree is infested and should be removed from the property to minimize the beetles' spread the following year.

## REMOVING A DOUGLAS-FIR TREE THAT IS UNDER CURRENT ATTACK

If you confirm that infested Douglas-fir trees are on your property, the best way to stop the beetles from spreading is to remove the affected trees before the beetles emerge in the spring. At lower elevations, this usually happens around the third week of April.

After the current attack trees have been identified and marked for removal, please follow the guidelines below:

- » Cut down the trees in a way that does not allow them to fall against or scar nearby healthy trees, since the resulting injuries could attract beetles the following year.
- » To avoid damage to healthy trees, hire experienced fallers and only use small equipment to extract the cut trees.
- » Keep the height of stumps as low as possible (less than 30 cm above ground level).
- » Remove or destroy all infested trees (felled and blowdown trees) from the property **before** the annual beetle flight occurs in the spring (typically in mid to late April).
- » Burn or chip all debris piles completely **before** the annual beetle flight occurs in the spring (typically in mid to late April).
- » Remove, peel or burn all pieces of wood debris with a diameter greater than 20 cm or a length greater than one metre. When the bark is peeled off logs, the beetles, larvae and/or pupae are exposed to the weather and predators, which usually kill them over the winter.
- » Before lighting any open fire, visit the Wildfire Management Branch website for information about open burning, burn categories and current fire bans: <http://bcwildfire.ca/hprScripts/WildfireNews/Bans.asp>
- » Burn piles should be located in clearings to ensure that nearby Douglas-fir trees are not scorched or scarred. The bark of young trees is not as thick as that of mature trees, so younger trees can be easily damaged. Fire injury significantly increases the risk of attack by Douglas-fir beetles.
- » If you want to use the infested trees for firewood, peel off all the bark and leave the cut wood exposed over the winter to kill the beetles. Douglas-fir beetles can survive in wood that has been sheltered from the elements and they could emerge to attack nearby trees the following spring.

- » Remove the bark from any stumps higher than 30 cm.
- » Nearby healthy trees should be monitored the following spring. Any newly infested trees should be removed.

## REMEDIAL MEASURES

Anti-aggregation pheromones can successfully repel Douglas-fir beetles from vulnerable areas and can be used to help protect small, high-value stands of trees near parks, protected areas, campgrounds, residential properties or old growth management areas.

The anti-aggregative pheromone MCH (methylcyclohexenone) is used to disrupt or prevent beetle attacks. Through the application of this pheromone, Douglas-fir beetle attacks have been reduced by over 90% in some cases.

This pheromone is most effective when the number of infested trees or susceptible trees is low and it's applied before the annual beetle flight occurs (typically in mid to late April) on: blowdown trees; large, susceptible trees (veterans); and damaged or severely stressed trees (e.g. with thin foliage in the tree's crown due to the feeding of western spruce budworms).

To find out if MCH is an appropriate tool to use on your property (and to learn how to use it correctly), contact the Cariboo Region's forest entomologist.

## FOR MORE INFORMATION

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