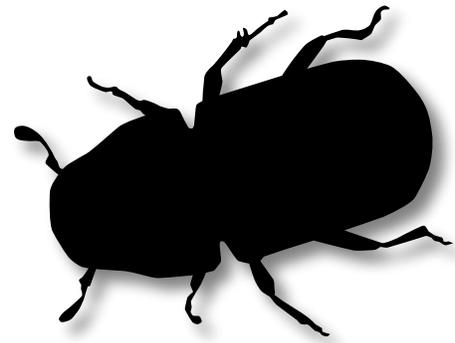


Dealing with Mountain Pine Beetle on Your Property



This brochure provides information and guidance to private landowners in British Columbia in better understanding and dealing with mountain pine beetle on their properties.

This brochure outlines factors to consider, and potential options for dealing with pine beetle. Suggestions are offered for choosing professional help, disposing of infested tree waste, and planning for after an infestation. Information about the beetle's environmental impacts provides context for BC's largest recorded infestation.

To avoid duplication, information about mountain pine beetle biology and identification has not been included. This information exists on the Internet, and through the Ministry of Forests and Range, and many municipalities and regional districts that are experiencing beetle infestations.

ENVIRONMENTAL IMPACTS OF MOUNTAIN PINE BEETLE

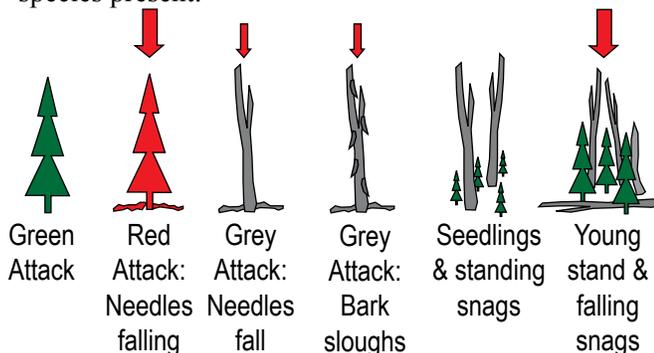
Fish and Wildlife

The current epidemic, while unusually large, is natural. The infestation may have a positive, negative or neutral effect on wildlife. How a particular animal is affected depends on its life needs. Most animals will adjust to the changes an infestation brings. Some species that depend on mature pine forests for food and shelter will be less able to adapt.

Fish are anticipated to be negatively affected by the infestation because of the expected impacts to water.

Fire

Fire may follow a pine beetle infestation at times because there is more fuel available. The pine beetle's impact on fire hazard is believed to be influenced by time following a beetle infestation, the number of dead trees in a stand, and the initial forest structure and tree species present.



Fire hazard varies as fuel material changes. Arrow size indicates relative amount of fire hazard with each infestation stage.

Water

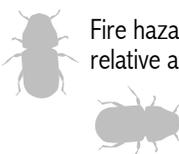
Understanding how water moves over land is a complex science using information about weather, climate, local vegetation, and topography and watershed conditions. Add mountain pine beetle to the mixture and things get more complicated. There are few studies on how the beetle will affect local water regimes, but researchers expect water run-off to increase, and these changes are expected to last more than 30 years.

Why more water? More rain and snow falls to the forest floor as beetle-killed pines lose their needles. Trees are no longer able to remove water through evapotranspiration. More precipitation reaching the ground and less evapotranspiration means more water reaches streams and rivers.

More water may seem like a bonus, but researchers are concerned about the expected effects more water will bring. Spring snowmelt is expected to arrive and dry up earlier. This may lead to water shortages in late summer because we start using stored water sooner.

Water levels are expected to rise more suddenly during spring snowmelt and storms. Overall water volumes will be higher, which may lead to flooding in some areas. More water may pose challenges for bridges and culverts that were engineered for lower water levels.

More details on the mountain pine beetle's environmental impacts are available in a report at sibacs.com/reports.



Dealing with pine beetle on your property

It may be necessary to remove green attack trees that still contain beetles to control their spread. However, red and grey attack ponderosa or lodgepole pines can be left standing as wildlife trees, if there are no safety or liability concerns. Your decision about how to deal with mountain pine beetle infested trees should consider the following factors:

- **The value of the trees** – Trees' aesthetic qualities offer social and emotional benefits. Well-placed and cared for trees enhance property values. Trees have many ecological roles, like controlling erosion, and providing habitat and food for animals.
- **The nature of the beetle attack** – Kamloops was hit by a very severe beetle attack that killed the majority of trees in 2007. In some areas the attack was patchy, allowing control efforts to be more effective and some trees survived.
- **The potential risks to people, property and infrastructure** – Following the Kamloops infestation, many ponderosa pines have been falling within a few years of attack. These can pose a significant risk to people or property. Fire hazard can rise with dense stands of beetle-killed trees because of fuel buildup.
- **The future desired condition of your property** – Do you want to retain as much mature tree cover as possible? Are you comfortable with dead pine in semi-natural forest conditions? Do you want to remove trees to promote other uses, like grazing, or restoring the local ecosystem or wildlife habitat?
- **Cost** – Efforts to protect trees are generally more costly than removing dead trees after infestation.

What are your options?

There are five options available to deal with pine beetle on your property. It is recommended to consult a professional to choose the best option for your property.

- **Do nothing** – This strategy focuses on the beetle's role in the forest and allows nature to take its course. This is a good option if you want to let natural functions continue and the dead trees pose no fire or falling threats to you or your neighbor's safety or property. A forest with young understory trees will eventually replace the dead trees. The standing and fallen dead ponderosa and lodgepole pines provide good wildlife habitat.
- **Spread control** – This strategy focuses on controlling beetle spread on large properties. This strategy is the most costly, and effectiveness may be limited if beetle attack is severe.

- **Protect living trees** – This strategy is best suited for smaller and municipal properties with one to several pines that you would like to protect from pine beetle. Kelowna's website (www.kelowna.ca/CM/Page1223.aspx) provides options, however, there are no guaranteed solutions for protecting your trees from a pine beetle infestation, and cost may be an issue.
- **Tree removal** – In this strategy, beetle-killed trees are removed during or following an infestation because the potential risks to people, property and infrastructure outweigh the value of leaving dead/dying trees. This strategy may be the only real alternative if there is severe attack near property or people. In some cases, you may wish to remove all affected trees at once.

If you are contemplating tree removals, but want to maintain habitat value, consider the following:

- Keep understory trees provides wildlife shelter and food, and shade cover for your home.
 - Where possible, leave large old trees for roosting sites and nest cavities. Leave large fallen log sections on the ground to replenish the soil, and for habitat for insects that attract birds and small mammals.
 - Plant seedlings in a natural setting is an option, but there is little research on success. Survival will depend on local environmental conditions. The small trees may become food for rodents and rabbits. If you live at lower elevations in the Okanagan-Similkameen, it may be best to promote open grasslands.
 - Remove trees when the ground is frozen to reduce soil disturbance and damage to understory vegetation.
- **Combined control and tree removal** – This strategy is practical for large properties. Trees can be removed in areas with high risk to people and property, but left where there are no hazards. This approach results in a more functioning forest remaining following beetle attack.

Actual size



Rob Long, Bugwood

Mountain pine beetle is about the size of a grain of rice. It lives most of its life under the bark of pine trees.

Which professional?

Working with professionals can help avoid long-term problems. A professional assessment will help determine what you're up against and suggest possible solutions. Here are some suggestions to remember when looking for a professional:

- Is the professional qualified to perform an assessment? The following lists possible professionals to approach and websites for more information:
 - Agrolgist (www.bcica.com),
 - International Society of Arboriculture (ISA) certified (www.isa-arbor.com),
 - Registered Forest Professional. See the Association of BC Forest Professionals website (www.abcfp.ca) for more details,
 - Registered Professional Biologist (RPBio) (www.apbbc.bc.ca).
- Is the professional working within their scope of practice? Are they qualified/certified to assess for danger/hazard trees, fuel hazards, and/or pine beetle and other insect pests?
- Have they provided references? Can you review sites they have worked on?
- Have they provided proof of insurance for the type of work, for example WorkSafe BC, general comprehensive and professional liability?
- Have they provided a site plan for larger jobs?

Project size?

Small projects will remove one to several trees. An arborist or tree removal company can do this work. Likely, no site plan will be needed but be clear on the service level. Will the tree(s) and debris be removed?

Large projects remove dozens to hundreds of trees. A small-scale salvage or fuel treatment company will do this work using professional tree-fallers and equipment. Site plans are recommended for large projects.

A project that is poorly planned and/or implemented can have the following negative effects on your property:

- Increased run-off and soil erosion
- Increased soil disturbance, which encourages invasive plants that can out-compete desired native plants
- Loss of habitat, like wildlife trees and coarse woody debris
- Wildlife habitat degradation or destruction
- Trees falling in windstorms, or wind throw
- Increased or changed fuel loads affecting fire risks



Paula Rodriguez de la Vega

Pine beetle young, or larvae, live under pine tree bark during fall and winter, emerging as adults in the spring.

Disposal of trees and debris

Green-attack trees with beetles still under the bark need to be debarked, finely chipped, or ground to control the beetle's spread. This wood should not be stored for later use as firewood unless fully debarked.

Red or grey-attack pines with no beetle can be treated in many ways:

- Sent to a mill for lumber. Markets conditions and government permitting requirements may make this option challenging.
- Chipped or ground for mulch, composting or energy generation.
- Taken to the landfill. Some landfills have removed tipping fees for pine beetle waste wood. Check with your regional district for more details.
- Used as firewood.
- Burning is an option but has impacts on air quality if poor burning practices are used. Check with Ministry of Environment and local governments for air quality regulations and permits.

Beetle waste wood treatments should be ecologically appropriate, operationally feasible, socially acceptable and economical.

Local bylaws and Provincial regulations

A professional should be aware of Provincial regulations dealing with considerations like air quality and riparian areas. Contractors from outside your area may not be aware of local bylaws affecting the project.

Ultimately, it's your property. Be sure to check with your municipality, regional district and provincial agencies for bylaws and regulations that may affect the project.



D. Blackfoot, Bugwood

White pitch tubes usually indicate the tree was successful at keeping the beetle out.

What happens after the beetles are gone?

Understanding your local ecology can help decide what to do once the beetle-infested trees have been removed or the infestation has subsided. Researchers have classified areas in BC based on climate, elevation, and the plants that grow in these conditions. These are called biogeoclimatic zones. More details on biogeoclimatic zones can be found at the following website: www.for.gov.bc.ca/hfd/library/documents/treebook/biogeno/biogeno.htm

Working within the environmental conditions of your biogeoclimatic zone may reduce your workload, and can help improve the success of your efforts. For example, a moisture-loving spruce seedling does not grow well in the drier conditions where Douglas-fir or ponderosa pine may be more suitable. Instead of planting trees in grassland areas, your efforts may be best rewarded by planting native grassland shrubs and grasses to restore wildlife habitat.



K. Gibson, Bugwood

Reddish pitch tubes usually indicate that the beetle was successful at penetrating the tree's bark.

DEFINITIONS

Evapotranspiration: a biological process where water moves from a plant or tree's roots to evaporate from the leaves.

Green-attack tree: Pine tree showing signs of early stages of a pine beetle infestation. The tree's needles are still green and there are live beetles, eggs and larvae in the tree.

Grey-attack tree: Pine tree in the late stages of a pine beetle infestation. The tree's needles have fallen, leaving the grey trunk and branches.

Red-attack tree: Pine tree in the mid stages of a pine beetle infestation. The tree's needles are red but there are no insects in the tree.

Wildlife tree: Living or standing dead trees with special characteristics vitally important to wildlife conservation or enhancement. For more information visit the website: www.wildlifetree.org.



Paula Rodriguez de la Vega

Woodpeckers excavate nest cavities in large dead pines. Flying squirrels, bats, owls and some ducks may use the cavity after woodpeckers have gone.

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