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FOREST PROTECTION

Mountain Pine Beetle

Okanagan timber supply area

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B.C. MINISTRY OF FORESTS.
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**Province of
British Columbia**

**Ministry
of Forests**

The mountain pine beetle is perhaps the most destructive of all the forest pests in British Columbia. It is present in every region of the province and, now, one of the most serious attacks is in the south Okanagan.

The Okanagan timber supply area, administered by the Forest Service's forest districts Salmon Arm, Vernon and Penticton, covers about 1.4 million hectares of Crown that is, public forested land. Roughly 320 000 hectares of this area have mature lodgepole pine stands that are easily attacked by the mountain pine beetle.

At present, about 18 000 hectares are infested. The largest and most severe attacks have occurred in the Penticton forest district.

B.C. has had mountain pine beetle outbreaks since 1910. The Okanagan was one of the early affected areas.



Mountain pine beetle in larve stage.

Past beetle attacks and forest fires have created large expanses of 'pure' pine stands, or stands with a high percentage of lodgepole pine.

Because of the age of the trees, many stands are now susceptible to the beetle and the extensive areas of younger stands ensures that the beetle can be a problem far into the future.

The beetle's life cycle

The mountain pine beetles (*Dendroctonus ponderosae*) overwinter as larvae in trees attacked during July

and August and emerge as adults the next July and August to attack new trees.

The first choice is the larger diameter trees. As the infestation spreads, they work their way down to the smaller trees.

The trees attempt to deter the beetles by releasing large amounts of resin, in an effort to 'pitch' out the pest. However, older trees under heavy attack are seldom successful and generally succumb.

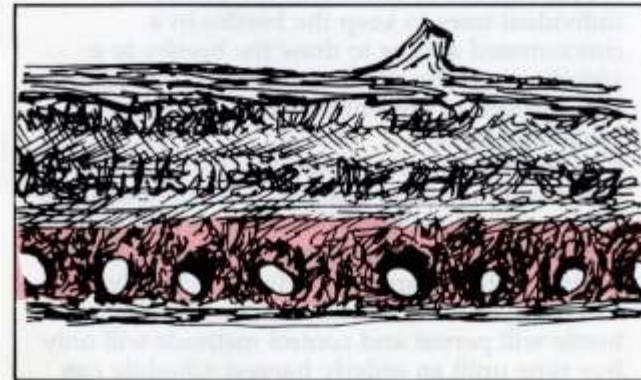
You can identify a beetle attack by the soft white or reddish mass of resin around a bore hole, called a 'pitch tube'. This is formed by the tree's resin mixing with the wood dust created when the beetle bores into the tree.

Fungi, bacteria and yeast spores, carried by the beetle into the tree start growing in the living tissue of the sapwood and phloem. Within two weeks the fungi begin to form pigments and the affected wood is stained blue.

The fungi invade and kill cells, interrupt water conduction and cause a rapid reduction in the sapwood's moisture.

Once inside the tree, the female beetle constructs a gallery, or tunnel, in the phloem-cambial layer under the bark and lays eggs along the gallery's sides.

Larvae hatch from the eggs and feed in the inner bark. They are inactive during winter, but resume feeding in spring and complete their transformation, from larvae to pupae to adult, by July, when the cycle starts again.



Gallery where female lays eggs.

Within a few weeks of being infested, the trees usually begin dying from the actions of the blue-stain fungi and the girdling of the living bark by the beetle.

Forest management effects

- Epidemics disrupt management plans and affect local, regional and national economies.

- Fallen dead trees hamper access for game, livestock and humans and they increase fire hazards.
- Salvage and control operations require 'haul' roads to be built quickly and they are used heavily soon after construction and before the roadbed can settle naturally. This may result in increased slumping of fill slopes, inadequate or damaged drainage patterns and surface erosion.
- Skidroad layout may be hastily planned and the timber harvested; systems are less than ideal due to the urgency of harvesting under severe time constraints. The loss of time for planning has a significant affect on short-term management.

Impacts on other forest resources

Tourism and recreation opportunities may be affected indirectly by changes in the landscape's aesthetic value, killing trees in campsite and picnic areas, and forest closure for fire protection. Trees killed by the beetle are a hazard in campsites and public areas and must be removed.

Stream water and fisheries can be affected by the killing of trees modifying the water flows of a watershed by changing snowmelt and water transportation patterns. Treatments of infested areas by control measures, such as timber harvesting and other treatments to rehabilitate areas, can further affect streamflow and water-quality. These changes can affect fisheries values and domestic use.

Wildlife habitat will be affected by large clearcuts and more access development. Hunting pressures could increase in areas previously isolated and game management will have to increase. While harvesting may improve habitat for some species, such as deer, elk and moose, other species, such as cavity-nesting birds, will be adversely affected.

Controls for mountain pine beetle

There are ways to help control the mountain pine beetle.

- harvesting—clearcut, selective or single tree removal;
- baiting or using pheromones (chemicals to attract beetles to certain trees or areas where they can be dealt with);
- falling and burning individual infected trees or using the chemical monosodium methanearsenate to kill the tree and the beetles within it; and
- removing individual trees or small groups of infested trees that are accessible enough to be felled and used.

Three categories of infestations can be addressed:

Epidemic level:

an emergency level where harvesting is the primary tool for reducing populations. Harvesting is concentrated on the trees containing the beetle. They are cut before the adults fly in July.

Baiting with pheromones is usually used to hold the beetle until the trees are cut or to concentrate the beetle in the cutblock to be harvested. Other controls, such as single-tree disposal or MSMA, are used to a lesser extent at epidemic levels.

Maintenance level:

when there are low or normal populations, the chief strategy is to control them so that resource planning and timber extraction can be done normally. Tactics used are single-tree disposal, small-patch clearcut or single-tree removal. Baiting is used to concentrate beetles for removal or disposal.

Susceptible with no infestation:

the south Okanagan has significant areas of mature pine with little or no access at present. Here the strategy is to ensure that access exists for eventual control activities and to initiate planned harvesting to extract the most susceptible stands.

The management and control of the beetle requires a concentrated, co-operative effort by all

resource users and agencies. Annual action plans—which include responsibilities, tactics, timing and schedules for activities—are being developed so that resources are used efficiently and effectively.

Questions and answers

What effect does mountain pine beetle attack have on other resource users?

The beetles' ability to kill large areas of lodgepole pine over vast areas in a short time can have a significant affect on other resource users.

Salvage harvesting can result in larger-than-normal clearcuts, which may affect water quality and quantity. Large openings may also disrupt normal routes and habitat for wildlife.

Range values and management can be affected through changes in grazing patterns and elimination of natural boundaries.

Aesthetic values can be affected by large clearcuts or areas of dead standing timber.

Unsalvaged dead pine creates a fire hazard that can fuel devastating fires in sensitive areas.

What controls do we have besides harvesting the pine?

To buy time until normal planned harvesting can take place;

- Pheromones or attractants are placed on individual trees to keep the beetles in a concentrated area or to draw the beetles to a specific area. The attacked trees are then removed or destroyed to prevent infestation of the remaining trees.

- If the attacked trees cannot be used, they are felled and burned or injected with monosodium methanearsenate to kill the tree and the beetles.

Access to susceptible stands is needed if these control methods are to be efficient and effective.

As long as there are mature pine available, the beetle will persist and control methods will only buy time until an orderly harvest schedule can occur and the susceptible stand is replaced.

Okanagan timber supply area affected by the mountain pine beetle

