

An Assessment of Mountain Pine Beetle Implications to the Kamloops Land and Resource Management Plan

Project Overview

Introduction

The mountain pine beetle (MPB) is affecting British Columbia's forests in an unprecedented way. The impacts of the beetle create risk for land use plan values and compromise the ability to meet some of the plans' strategic direction (objectives and strategies).

The Integrated Land Management Bureau (ILMB) has recently completed a strategic assessment to determine whether mountain pine beetle is likely to impact the ability of society, government and plan stakeholders to achieve the Kamloops Land and Resource Management Plan's (KLRMP) strategic land use plan vision, goals and objectives. The cumulative impacts of recent fires were also incorporated into the assessment, because fire has similar effects to MPB on forest stands. Currently, the ILMB is working to understand what actions need to be taken to conserve the long-term values and strategic direction identified in the plan. This document is part of an effort to communicate the changes, impacts, risks, and opportunities posed by mountain pine beetle in the plan area, as well as lay out possible next steps. These proposed next steps and potential management options will need to be explored by natural resource managers, First Nations, LRMP Monitoring Table representatives, other stakeholders and the public.



Photos: Ministry of Forests and Range

Mountain pine beetles kill trees by burrowing in the living layer under the bark. These photos show an affected tree (left) and an emerging adult beetle as well as larva (right).

Current and Future Impacts of Mountain Pine Beetle

Fires and forest insects are natural disturbances that shape forests. However, forest managers have never seen such widespread changes to BC's forests like those being caused by the current MPB epidemic. Experts predict at least 80 percent of all mature lodgepole pine, as well as many of the less abundant pine species like ponderosa pine, will be killed before the epidemic runs its course. Vast areas of mature and old forest will be converted to young forest. The wildfires of 2002 and 2003 have had similar effects on forest stands, though on a smaller scale.

These major forest changes affect aquatic and terrestrial ecosystems in many ways. Mountain pine beetle (MPB) and fires affect ecosystems by changing water quality and quantity, altering timing of flows, shifting water temperatures, and changing sediment delivery to streams. Serious reductions in the amount of mature and old forest habitat, and decreasing connectivity of older forest habitat across landscapes can also occur. In addition to these direct impacts, indirect impacts can occur due to salvage harvesting. An example would be increased road access, associated with widespread salvage harvesting to recover the economic value of the dead and dying trees. Depending on the methods used, the impacts of increased road access and harvesting efforts include loss of valuable wildlife habitat, damage to understory regeneration and mixed species stands, and increased spring run-off that can harm aquatic values.



Photo: Ministry of Forests and Range

Aerial photo from the Kamloops area, of beetle-affected forestry 'leave strips'. Extensive mountain pine beetle infestations such as these have negative effects on terrestrial and aquatic ecosystems. Forest harvesting to recover the economic value of the affected trees can increase these effects.

Communities that rely on forest harvesting and wood processing will feel the effects of MPB when the current harvest upsurge begins decreasing. The forest industry currently has as much or more wood as it can harvest, but a shortage is expected once the MPB epidemic has run its course, the remaining dead trees no longer have economic value, and the long-term sustainable harvest level is known. Tourism and recreational activities

could also be affected by MPB if viewsapes and trails are surrounded by dead pine, or if such stands are inappropriately salvage harvested.

The agricultural sector will likely feel the affects of mountain pine beetle – ranching opportunities will probably increase with the more open areas and road access created by MPB and associated salvage harvesting. Range managers will also need to deal with the loss of natural range barriers and cattle access into sensitive areas. Agriculture that relies on irrigation may also experience changes, as water quality and timing of spring runoff will be affected.

Forecasted Impacts to Plan Values

In the Kamloops Land and Resource Management Plan area, 20 percent of the timber harvesting land base contains pine forests that will probably be affected by MPB, as well as a further 17 percent of mixed forests that include pine. Effects of mountain pine beetle on plan values were forecast using information on tree species and ages, and predicted mountain pine beetle spread. Effects on water-related values were measured using predicted ‘equivalent clearcut area’ (ECA, which is an indicator of changes to water run-off), while effects on other values were predicted using percent area affected – in other words, the percent of the resource management zone(s) in question that will be covered by dead pine stands.

The mountain pine beetle epidemic is well underway, and is predicted to run its course by 2020, though some forecasts indicate this may happen much sooner. Current forest conditions (ECA or percent area affected) and forecasts for 2010, 2015 and 2020 were shown on color-coded maps generated by a computer model. Using these maps, project consultants were able to predict the final effects of MPB on plan values, objectives and strategies. It is important to note that it is possible for KLRMP objectives and strategies to be met while risk to values remain, and project consultants provided an interpretation regarding where this might happen.

Any additional effects of salvage harvesting (such as new roads) on plan values were not predicted beyond general comments on potential effects – it was not possible to include harvesting effects on specific areas at this strategic level. Additionally, salvage harvest planning is still underway. However, salvage harvesting of MPB-affected timber, as well as areas affected by wildfire, means that forest harvest levels were raised in the Kamloops Timber Supply area by 1.6 million cubic meters in 2004. This is an increase of 62 percent over former harvest levels.

Effects on Water and Fish

Of all the values in the KLRMP, water-related values such as drinking water, flood control, and fish habitat are likely to be the most affected by mountain pine beetle. The large areas of the landscape that are or will be covered by dead pine trees will increase spring run-off, as the dead trees change snow melt and do not transpire water as do living trees. Roads that originate from salvage harvesting will also increase run-off, unless they are quickly decommissioned or carefully maintained. Increased run-off damages stream

channels and lowers water quality. Once watersheds are affected in this way, recovery does not begin to happen for 10 to 20 years, with full recovery taking longer.

The modeling exercise done for this project showed two community watersheds with a very high equivalent clearcut area (Skowootum and Leonie Creek), in addition to

Three community watersheds are highly affected, and another nine may experience problems.

The Mahood, Deadman and Mann Rivers are Fish Resource Management Zones at high risk of failure to achieve fisheries objectives.

Peterson Creek, which has an even higher ECA due to the combined effects of MPB and recent fires. Another nine community watersheds have predicted ECAs that may be cause for concern.

In addition to community watersheds, all watersheds were assessed for their anticipated equivalent clearcut area, including watersheds for Fish Resource Management Zones (RMZs). In the plan area, the most severe MPB impacts are on the west side of the North Thompson River, from as far north as Mahood Lake to Kamloops, on the north side of the Thompson River below Kamloops Lake (Tranquille, Deadman, and Bonaparte watersheds), and along the southern edge of the KLRMP area in the Nicola Valley. The majority of the watersheds in these areas have predicted ECAs of concern, with perhaps a third of those with ECAs at a level that will likely cause major negative impacts. For Fish Resource Management Zones, significant portions of the Mahood, Mann and Deadman River are of very high concern/risk. Another four Fish RMZ watersheds are also at high risk of failure in achieving fisheries objectives.

Effects on Biodiversity, Wildlife and Parks

Old Growth Management Areas (OGMAs) are a primary tool for biodiversity management in the KLRMP. In addition to being conservation reserves for older forest on the landscape (outside of Parks), they assist in delivering objectives and strategies for certain wildlife species dependent on older forests, and provide protection for rare ecosystems, viewsapes, and sensitive riparian corridors. KLRMP objectives and strategies related to Old Growth Management Areas do not appear to be affected at this strategic scale of analysis. However a ground survey to confirm OGMA status is recommended. This appears to be a situation where KLRMP objectives and strategies are met, while risks to values remain. At this strategic level of analysis, it appears that two landscape units (Bonaparte and Upper Guichon) are at high risk of loss of old forest biodiversity, and another four (Nehalliston, Lower Bonaparte, Tranquille, and Hat Creek) are or will become high risk. This means that there are likely to be extirpations (i.e. local extinctions) of some species that rely on older forest habitat, until old forest habitat recovers.

Objectives and strategies related to habitat and wildlife are generally unaffected by MPB, though the ability to achieve objectives and strategies related to moose (related to cover, screening, and access management) will be affected unless careful operational planning for salvage harvesting is done. Increased road access will negatively affect the moose population and access management or other tools will be required to manage this risk.



Photo: Ministry of Forests and Range

Riparian corridors and wildlife tree reserves are two ways of maintaining forest biodiversity and ensuring older forest habitats are connected and available across a landscape. Older forests and forest connectivity are threatened by the beetle outbreak.

Objectives and Strategies for most Parks and Protected Areas will be met, but there is still a significant amount of forest affected by MPB in these areas. New forestry roads surrounding some parks are likely to create a need for additional access management strategies

The ability to meet KLRMP objectives and strategies for most Parks and Protected Areas (Protection Resource Management Zones) does not appear to be at great risk from mountain pine beetle. Access management strategies in three of the Resource Management Zones that will be more highly affected (Cornwall, Emar Lakes and Bonaparte) will probably be difficult to meet because of anticipated new forestry roads in adjacent areas. While plan objectives and strategies will be met with the potential exception of access, mountain pine beetle still has a significant effect on the Protection RMZs. Close to half of the RMZs have a moderate (10 percent) or higher amount of area affected and 13 different Protection RMZs will have a relatively high amount of MPB activity by 2020. Fire hazard may need to be assessed in some RMZs, particularly those near communities. The condition of OGMAs in Protection RMZs may also need to be addressed to meet biodiversity-related objectives and strategies in the longer term.

Effects on Visual Quality, Lakeshores and Communities

Mountain pine beetle will affect the visual landscape. Retention visual quality objectives will be difficult to maintain in some of the Recreation Tourism Resource Management Zones (Taweel and Lac Le Jeune) if the dead pine is salvaged logged. Objectives and strategies to maintain and enhance recreational and tourism values, specifically within Blustery and Lac Le Jeune Resource Management Zones, are likely not achievable due to large areas of pine mortality predicted by 2020.

Recreational values associated with lakes are managed via a number of objectives and strategies in the KLRMP. One strategy relates to lakeshore management with emphasis on managing forested buffer zones. Lakeshore visual quality objectives will likely be an issue for some lakes, particularly with respect to salvage harvesting. Walk-in lakes for angling opportunities were not modeled by the consulting team, but were brought up as a concern by a number of interviewees related to the need for access management.

Settlement Resource Management Zones (areas of Crown Land surrounding communities) are largely unaffected by MPB relative to plan objectives and strategies.

Effects of Forestry Roads on Plan Objectives and Strategies

The harvest of MPB-attacked pine stands will necessitate the building of new roads, which in some areas will significantly increase road access and road densities. Access management and access impacts are addressed in objectives/strategies in most RMZs throughout the KLRMP. In many, strategies recommend tools that can be used to address access risks but do not compel action. If extensive salvage proceeds without the use of tools recommended in the KLRMP, KLRMP objectives and strategies for values like water quality and fish will be placed at greater risk.

Management Options

There are at least five options available to resource managers to increase the likelihood of meeting KLRMP objectives/strategies, and to reduce risk to KLRMP values. Each of these options has associated costs and benefits. These options may be best assessed after a review of KLRMP objectives/strategies for intent, clarity and relevance, and some of these options can be applied simultaneously. These options are:

- 1) Maintain the current situation as is (no change to the KLRMP or to sections of the KLRMP);
- 2) Make minor strategic changes to the KLRMP (e.g., revise wording) to maintain plan balance and relevance, and manage risk to plan values.
- 3) Make significant changes to the KLRMP to address risk and changes posed by MPB and maintain plan balance and relevance;
- 4) Undertake minor initiatives outside the KLRMP to sustain plan objectives, for example increase government coordination; and,
- 5) Undertake major initiatives outside the KLRMP to sustain plan objectives, for example carry out coordinated harvest or access planning.

These scenarios are presented as a starting point to guide possible next steps.

As per options 2 and 3, KLRMP values at high risk may be addressed through changing plan direction, or in some cases by removing or changing some objectives that can't be met. Other objectives may need to have their timeframe extended with interim objectives to take their place. Government will implement the direction set by the KLRMP, and will choose which 'tools' to use (legal tools, policy direction, voluntary compliance) based on

various factors, including the risk of non-compliance. In general, greater government coordination and assistance (options 4 and 5) could have a large positive effect on plan values at risk.

Conclusions and Next Steps

Based on information provided through computer forecasts and interviews with agency representatives, it appears that some level of management action will be required to maintain the KLRMP balance between economic, social and environmental values.

This strategic-level analysis identifies KLRMP objectives and strategies that may not be met. However, the analysis describes risks and potential management solutions in broad terms. More information is required to understand and manage risk to some of the KLRMP values and objectives/strategies, and to support minor or major changes to the KLRMP. For example, assessment, planning and monitoring work would help guide management decisions for those community and other watersheds that are predicted to have equivalent clearcut areas higher than 25 percent by the year 2020. A ground survey of actual conditions in Old Growth Management Areas would also be extremely valuable. Better information will help decision-makers make the social choices regarding balancing levels of risk to water, fish, biodiversity and other KLRMP values.

Potential next steps and management options need to be explored by natural resource managers, First Nations, LRMP Monitoring Table representatives, other stakeholders and the public. Tools for achieving the KLRMP's strategic vision will need to be further developed prior to making any changes to the plan. Time is of the essence in proceeding with this work, as the MPB infestation is increasing in the southern interior along with salvage harvest planning to capture the economic value of the beetle-killed trees.

Resources for More Information

Much more detailed information and maps for all the values assessed are available in the consulting report done for this project, which is entitled "*An Assessment of Mountain Pine Beetle Implications to the Kamloops Land and Resources Management Plan.*" This report is available from the ILMB by contacting either Rachael Pollard (Rachael.Pollard@gov.bc.ca) or Ernie Maynard (Ernie.Maynard@gov.bc.ca).

Much information has been developed regarding the mountain pine beetle and its effects in British Columbia. The provincial website for mountain pine beetle is:

http://www.for.gov.bc.ca/hfp/mountain_pine_beetle/

British Columbia's Mountain Pine Beetle Action Plan is found at the following link:

http://www.for.gov.bc.ca/hfp/mountain_pine_beetle/actionplan/2005/

Federal information and initiatives regarding MPB are found at the following link:

http://www.pfc.cfs.nrcan.gc.ca/entomology/mpb/index_e.html