



**Forest
Practices
Board**

Fire Hazard Assessment and Abatement

Special Investigation

FPB/SIR/24

December 2008

Table of Contents

Executive Summary	1
Introduction	2
What is fire hazard assessment and fire hazard abatement?	2
Why assess and abate fire hazard?	2
Sample Selection	3
Method	5
Results	5
Are licensees assessing fire hazard?	6
Is fuel hazard an issue?	6
If licensees assessed fire hazard, what was the result?.....	7
Is the assessment process valid?.....	7
Are licensees abating fire hazard within the required timeframe?	8
Are fire hazard abatement practices effective?	8
Conclusions	9
Recommendations	10
Exemptions.....	10
Fire hazard assessment process.....	10
Practices.....	11

Executive Summary

In this special investigation, the Board examined 111 cutblocks to determine, in part, whether or not licensees assessed and abated fire hazard as required by the *Wildfire Act*. The Act requires that both the fuel hazard and the risk of a fire starting or spreading on a site be assessed. Fuel hazard was assessed on 41 percent of the cutblocks, but the risk of a fire starting or spreading on a site was not assessed on any cutblock sampled. The result is that none of the licensees complied with the fire hazard assessment requirements of the Act.

Despite complete non-compliance with assessment requirements, fire hazard was often abated satisfactorily through routine practices such as piling and burning roadside debris. However, in some cases, licensees did not recognize higher risk situations such as the fuel hazard created by processing trees at the stump.

The result on the ground is what matters, and considering the move towards professional reliance and a focus on results instead of process, it is conceivable that government may repeal the requirement to assess fire hazard and simply require that if a fire hazard is created, it must be abated. Even so, a licensee needs to recognize whether or not it has created a fire hazard and that means some form of fire hazard assessment is required. Further, to demonstrate due diligence in the event of a fire, a licensee needs to show that it has taken reasonable steps to identify and abate any fire hazard.

The Board recommends that:

- 1. Licensees consider requesting exemptions from fire hazard assessment requirements where it can be demonstrated that circumstances, conditions and practices make the request appropriate.**
- 2. A simpler fire hazard and risk assessment process be developed to accurately assess fire hazard and risk under a wide range of field conditions. This process should include a clear definition of what constitutes a “fire hazard.”**
- 3. Best management practices to abate fire hazard be developed and shared with licensees and professionals.**

The Association of BC Forest Professionals has agreed to coordinate the efforts of licensees and government in addressing these recommendations.

Introduction

In early 2007, the Forest Practices Board began a special investigation into fire hazard assessment and abatement practices as applied by licensees around the province. As a first step, the Board surveyed licensees to understand how they currently meet their fire hazard assessment and abatement obligations under the *Wildfire Act*, looking specifically at assessment methods and abatement practices. The Board found that there was no standard approach among different licensees. An interim report about the findings of the first part of the Board's special investigation can be found on the Forest Practices Board website, at www.fpb.gov.bc.ca.

The second part of the special investigation took place in Fall 2007. The Board examined a sample of practices on the ground to determine whether or not fire hazard assessments reflected actual field conditions, and whether abatement practices were effective.

This report reflects the results of the fieldwork done during the second part of the special investigation.

What is Fire Hazard Assessment and Fire Hazard Abatement?

Fire hazard assessment is an assessment of potential fire behaviour based on physical fuel characteristics, and the risk of a fire associated with that fuel igniting and/or spreading.

Fire hazard abatement is the practice of reducing potential fire behaviour. Abatement practices, such as piling and burning slash, generally reduce both fuel hazard and fire risk by modifying fuel characteristics and reducing the probability of ignition.

A similar definition is provided by the Canadian Interagency Forest Fire Centre, which defines hazard reduction as, "treatment of living or dead forest fuels to diminish the likelihood of a fire starting and to lessen the potential rate of spread and resistance to control."¹

Why Assess and Abate Fire Hazard?

Fire hazard assessment and abatement is required by law. The *Wildfire Act* requires those who carry out industrial activities to assess and abate fire hazard in accordance with the *Wildfire Regulation*. Government's intent is that when an assessment identifies that a fire hazard is present, it must be abated.

A fire hazard assessment must assess the fuel hazard and also the risk of a fire starting or spreading on a site. The legislation does not specify a particular fire hazard assessment method—that decision is left to professionals.

¹ Canadian Interagency Forest Fire Centre. 2002. The 2002 glossary of forest fire management terms. Canadian Interagency Forest Fire Centre, Winnipeg, Man. <<http://www.cifc.ca/>>

Abatement must ensure that the risk of a fire starting on a site does not increase after industrial activities such as logging. Also, if a fire did start, fire behaviour or fire suppression associated with the fire must not increase.

Fire hazard abatement can also help to protect investments. Treatments can modify fuel characteristics and consequently reduce the probability of loss of adjacent forested areas and infrastructure in the event of an aggressive wildfire.

Assessing and abating fire hazard can also demonstrate due diligence. In other words, it is a reasonable step to take to determine if an industrial activity has created a fire hazard. If a hazard is identified and then abated, it could demonstrate to government that a person carrying out an industrial activity has been diligent. This is consistent with government's interest in relying on professionals rather than prescribing exactly what to do.



Assessing fuel hazard near Strutell Creek, west of Lumby.

Sample Selection

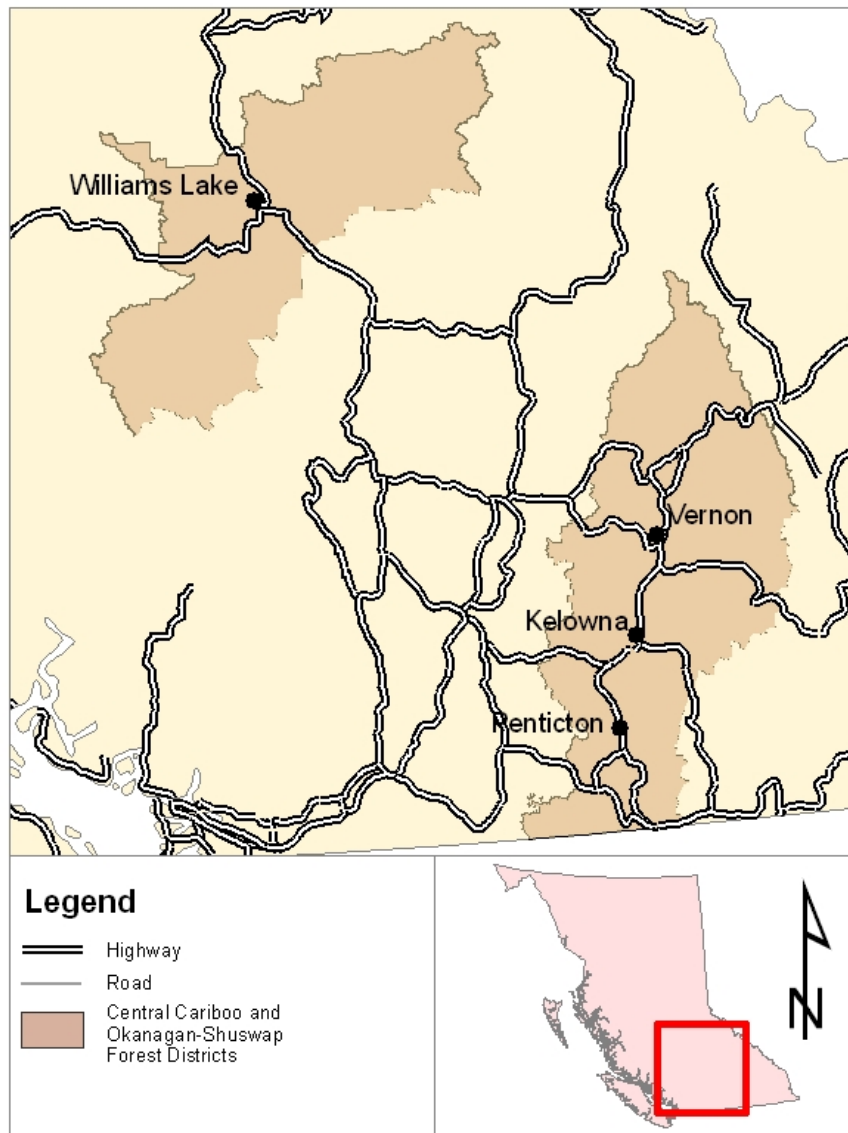
Based on past Board work, geographic risk factors and the operating environments, the Board selected the Okanagan-Shuswap and Central-Cariboo Forest Districts as areas of interest. Within these two districts, the Board selected four licensees and two British Columbia Timber Sales (BCTS) business areas with allowable annual cuts greater than 100,000 cubic metres. The licensees were Tolko Industries Limited, Gorman Brothers Lumber

Limited, West Fraser Mills Limited and Federated Cooperatives Limited. The two BCTS² business areas were Cariboo-Chilcotin and Okanagan-Columbia.

² In the BC Timber Sales (BCTS) program, responsibilities for forest planning and harvesting and related activities are split between BCTS and timber sale licence (TSL) holders. In the context of the *Wildfire Act*, TSL holders conduct "industrial activities" such as harvesting and are responsible for fire hazard assessment and abatement.

The Board then randomly selected 111 cutblocks harvested in 2005, 2006 and 2007. This ensured that the investigation looked at cutblocks where abatement was carried out, as well as more recent activity where abatement was not yet complete. Overall, the activities of 31 licensees were sampled – four major licensees and 27 timber sale licence holders.

Special Investigation of Fire Hazard Assessment and Abatement



Method

Before visiting the selected sites with licensees, the Board gathered background information on each site, including site plans and completed fire hazard assessments, if available. An investigative team, including at least one expert in fuel hazard assessment and abatement, then travelled to each site and completed a hazard assessment based on Schedule 7 of the 1995 *Forest Fire Prevention and Suppression Regulation*.

Completion of this assessment provides a numerical rating for fuel hazard and fire risk. In other words, how would a fire behave on a site, and what is the risk of a fire starting and spreading on the site? Using Schedule 7, if the fuel hazard is greater than 14 and the fire risk is greater than 24, the hazard must be lowered to 14 or less. Risk can also be assessed by considering site and risk factors, including the size of the site, slope, aspect and the history of lightning and people-caused fires in the area, among others.

The Board chose the Schedule 7 method because it addresses the requirements of the *Wildfire Regulation* in that it provides a means of assessing fuel hazard and the risk of a fire starting or spreading. It is also widely available to licensees in British Columbia as a “legacy standard” that had been a benchmark for hazard assessment and abatement under previous legislation. Over half of licensees surveyed in the first part of this investigation reported using Schedule 7, or a variation of it, to assess fire hazard.

The investigation teams carried out the assessments according to the instructions and without applying specific expert judgment. This ensured that the results would reflect those of a conscientious field worker with limited fire management experience.

The teams also took photos of each site sampled and compared the assessment results with those of the licensees, if available.

Results

Table 1. Fire hazard assessments by licensee.

Licensee	Number of Sites	Fuel Hazard Assessments Completed	Assessment of the risk of a fire starting or spreading
Federated Cooperatives Limited	13	10	0
Gorman Brothers Lumber Limited	14	14	0
TSL Holders – Cariboo-Chilcotin business area	24	2	0
TSL Holders – Okanagan-Columbia business area	17	2	0
Tolko Industries Ltd.	24	0	0
West Fraser Mills Limited	19	18	0
TOTALS	111	46	0

Are licensees assessing fire hazard?

Fire hazard assessment includes an assessment of fuel hazard and the risk of a fire starting or spreading on a site.

Table 1 shows that overall, licensees assessed fuel hazard on 46 of 111 blocks (41 percent). Of these assessments, 4 of 41 (10 percent) timber sale licensees' cutblocks and 42 of 70 (60 percent) of the major licensees' cutblocks were assessed.

No licensees fully assessed the risk of a fire starting or spreading on a site. Six of the 46 assessments considered the ease of access to a site as a risk factor. In other words, if a site was difficult to access, the risk of a fire starting or spreading was considered lower than a site with excellent access. Although access to a site is a risk factor, it alone does not constitute an assessment of the risk of a fire starting or spreading on a site.

Is fuel hazard an issue?

Forty-six of the 111 blocks (41 percent) we assessed had hazard rating greater than 14, indicating a hazard. However, many of these blocks had overly-high ratings due to a problem with the assessment form (see *"Is the Assessment Process Valid?"* below) and did not merit further treatment. In the Board's opinion, however, roughly 20 percent of blocks had sufficient fuel loading to warrant some type of additional hazard abatement, and roughly 10 percent had levels of fuel loading that would require aggressive or multiple treatments to sufficiently abate the hazard.



Piled debris from roadside logging in the Cariboo-Chilcotin.

Post-harvest slash loading has become less of an everyday concern to licensees since the widespread adoption of roadside logging. With roadside logging, trees are limbed and topped at the road. As most of the slash accumulates at the road, where it is piled and burned, substantially less slash is left in the blocks. Many of the timber sale licence holders told us that it is standard practice to pile and burn slash at the roadside, and that doing so is sufficient to abate fire hazard.

However, the investigation found almost universally high slash volumes on the small number of blocks that were processed at the stump. With this system, trees are limbed, topped and cut to length at the stump, and a high volume of slash is dispersed throughout the block, creating a fuel hazard.

If licensees assessed fire hazard, what was the result?

The Board carried out the assessments according to the instructions in Schedule 7 without applying expert judgment, to ensure that results would reflect those of a conscientious field worker with limited fire management experience.



Fuel remaining after a mountain pine beetle salvage operation in the Cariboo. Trees were processed at the stump.

For 36 of the sites assessed, licensees used the same Schedule 7 fuel hazard assessment process as the Board; therefore it was possible to compare results.

Licensees rated the fuel hazard on 2 sites the same, 19 sites lower, and 15 sites higher than our results.

Is the assessment process valid?

The investigation found that the Schedule 7 fuel hazard assessment method overestimated ratings in the case of low overall fuel loads with fine fuels present, and underestimated ratings in the case of high overall fuel loads with fine fuels absent. This appears to be the result of the assessment being extremely sensitive to the presence of fine fuels, regardless of overall fuel load.

Previous legislation provided a link between the assessment process and the definition of fire hazard. In the current regulatory environment, however, licensees are expected to assess hazard in the absence of clear direction on what actually constitutes “fire hazard.” For example, should licensees be concerned with:

- Fine fuels, which provide a high short-term hazard?
- Heavy fuels, which are less flammable but provide a high long-term hazard?
- Overall levels of fuels regardless of size class or flammability?

Further, Schedule 7 fire hazard assessment method and its standard of “14 and 24” are not established in legislation and are not universally known to licensees. Are licensees responsible for determining what constitutes a fire hazard in their own areas, and, if so, what process should be used to settle disagreements with regulators and what should be the rationale for that process?

Are licensees abating fire hazard within the required timeframe?

Sections 11 and 12 of the *Wildfire Regulation* set out the requirements for when fire hazard assessment and abatement must be done. Generally, in areas outside municipalities or fire protection districts, fire hazard must be assessed at the completion of activities and if a hazard is identified, it must be abated within 12 months.

Several cutblocks in the sample were scheduled for hazard abatement after our field visit in September 2007, but still within the 12 month abatement window. Some licensees have since informed us that abatement is complete.

At the time of our field visit, only two of the 111 cutblocks in our sample had fuel hazards greater than 14 and fire risk greater than 24, yet fire hazard was not abated within 12 months of harvest.

Are fire hazard abatement practices effective?

Evidence of burned slash was noted on 69 of the blocks examined by the Board. The fuel hazard was reduced to 14 or less on 49 of those blocks. In the Board’s opinion, roadside logging combined with prompt burning of debris piles resulted in satisfactory hazard abatement on about 70 percent of sampled blocks.



Burning slash piles in the Cariboo-Chilcotin.

Twenty-one blocks were treated in some manner in addition to burning landing and roadside debris. These treatments included windrowing, spot piling, disc trenching, and mounding, and were all silvicultural in nature. In most cases, it was not possible to precisely quantify the effect of the treatments on fire hazard, as rating forms for both before and after treatment do not exist. The Board believes that these blocks

were originally all above 14, as the fuel loads that made silviculture treatments attractive also generated high ratings.

The majority of these 21 treated blocks were rated less than 14, but 6 remained above 14. In the Board's opinion, the hazard ratings on these blocks could have been satisfactorily reduced at little or no additional cost if fire hazard had been recognized as an issue. Unfortunately, fire hazard was not considered during post-harvest planning.

A number of licensees raised the issue of predator habitat management being in conflict with fire hazard treatments; while this may be an issue in rare situations, the Board did not see any instances where the need for perch trees for raptors and hide habitat for ground-based predators could not be readily accommodated within hazard reduction prescriptions at little or no extra cost.

Conclusions

One of the four major licensees and 90 percent of the timber sale licence holders did not assess fuel hazard as required by the *Wildfire Act*. No licensees assessed the risk of a fire starting or spreading on a site as required by the *Wildfire Act*. In the event of a fire, it could be very difficult for a person conducting an industrial activity to demonstrate due diligence if they did not present evidence that they assessed fire hazard as required.

When licensees did assess fuel hazard, the results often did not reflect the fuel hazard on the site and some licensees did not recognize high risk sites where abatement was necessary (e.g., where timber was processed at the stump). This could be explained in part by a lack of expertise in assessing fire hazard or a lack of formal regulation of the hazard assessment method. The most widely used assessment method (Schedule 7 of the 1995 *Forest Fire Prevention and Suppression Regulation*) is not a regulated standard, but, even if used, overestimates fuel hazard in blocks with low overall fuel loads with fine fuels present and underestimates fuel hazard in blocks with high overall fuel loads with fine fuels absent.

There is no clear and defensible standard for measuring success in fire hazard assessment and abatement. The hazard assessment form (Schedule 7) and process are based on the judgment of experienced professionals, but are not linked to the measurement or description of actual fuel loads. The reduction of hazard following treatment is similarly based on assumptions rather than measurement. Further, there is no actual description of what constitutes hazard (e.g., fine fuels, coarse fuels, total fuels, and accumulations) other than the numbers on the form, which are not clearly linked to field conditions. Licensees and others conducting industrial activities need to know what the goal posts are.

When fire hazard abatement was attempted, it was completed within 12 months in 98 percent of the cutblocks sampled.

Fire hazard abatement practices could be more effective for little additional cost if fire hazard is recognized by licensees as an issue. For example, on some of the sites encountered, a minor amount of spot-piling or a localized adjustment in treatment intensity would have satisfactorily reduced fire hazard.

Recommendations

Exemptions

Despite the high rate of non-compliance with fire hazard assessment requirements, fire hazard was often abated satisfactorily on the ground. To comply with the law, a licensee must either assess fire hazard or be exempt. A government official may exempt a licensee from fire hazard assessment requirements if they are satisfied that the requirement is inappropriate given the circumstances or conditions of the area, or the practices of the person to be exempted.

Government told the Board that it will consider requests for exemptions where, for example, licensees develop and implement a comprehensive fuel management plan.

The Board recommends that licensees consider requesting exemptions from fire hazard assessment requirements where it can be demonstrated that circumstances, conditions and practices make the request appropriate.

There is a role for forest professionals, licensees and government to address the issues surrounding fire hazard assessment and abatement. Government is committed to relying on professional expertise rather than prescribing requirements in legislation. The Association of BC Forest Professionals has agreed to take the lead and initiate discussions with licensees and government to address the following Board recommendations:

Fire Hazard Assessment Process

It is critical that those assessing fire hazard have appropriate experience and an understanding of fire behaviour, particularly in relation to silvicultural activities. The reality today is that the knowledge and expertise in fire management within the forest industry is diminishing and will get worse as experienced staff retire. One short-term approach to deal with this diminishing expertise is for qualified professionals to design a fire hazard and risk assessment process that could be used effectively by those less-experienced.

The Board recommends that a simpler fire hazard and risk assessment process be developed to accurately assess fire hazard and risk under a wide range of field conditions. This process should include a clear definition of what constitutes a “fire hazard.”

Practices

Opportunities to abate fire hazard start with the initial planning of a cutblock and continue through harvest and site preparation. Licensees could demonstrate due diligence by employing best management practices to abate fire hazard through all phases of development.

One potential avenue for the development of best management practices is FPInnovations' Woody Debris Management Program. This program is funded by the BC Government to encourage the development of new techniques and technologies to manage woody debris from logging or land development without compromising air quality.

The Board recommends that best management practices to abate fire hazard be developed and shared with licensees and professionals.

The Board requests that the Association of BC Forest Professionals report back on its progress in addressing these recommendations by November 30, 2009.