Section 4 - Wildfire Management PRINT Binder

Fire Hazard Abatement BCTS Bulletin 30Apr2019

Fire Hazard Asses & Abate Guidance Doc FINAL with all Links April 2012

Fire Hazard Assessment FPB Volume 18

Fire Preparedness FPC Feb2011

TSL Wildfire Regulation Interpretive Bulletin 2011

Ministry of Forests,
Lands, Natural Resource Operations
& Rural Development

File: 19400-00

Advisory Bulletin No. 2019/04/30 – "Timber Sale License - Fire Hazard Assessment and Abatement"

This advisory bulletin is intended to outline expectations for BCTS Timber Sale Licence (TSL) holders regarding fire hazard assessment and abatement requirements contained in BC Wildfire legislation and regulations and BCTS agreements. The *Wildfire Act* requires a person who is carrying out high risk industrial activities within a cut block, for example harvesting, to assess and abate fire hazards, Wildfire Regulation Section 11 & 12.

WHAT IS A FIRE HAZARD ASSESSMENT?

Assessing fire hazard is analysing the ignition potential and predictable fire behaviour based on fuel hazards (i.e. physical fuel characteristics) and site-specific and probable weather conditions. It includes a consideration of the risk of a fire starting or spreading, the difficulty of controlling the fire, and potential impacts on identified values (Wildfire Regulation Section 11(4)).
CLICK HERE FOR A GUIDE TO FUEL HAZARD ASSESSMENT AND ABATEMENT IN BC

WHEN IS A FIRE HAZARD ASSESSMENT REQUIRED?

A fire hazard assessment is required when carrying out an industrial activity such as land clearing or other prescribed activity that is likely to create or increase a fire hazard within one kilometer of forest or grassland *(Wildfire Act* section.7*)*, or when an official notifies a person carrying out an industrial activity that a fire hazard exists (Wildfire Regulation 11(1) (b) (ii)). An industrial activity is defined in Section 1 of the *Wildfire Act*. In accordance with the Wildfire Regulation Section 11 (3.1) a qualified holder must carry out a fire hazard assessment at the following prescribed intervals after the start of industrial activities;

- ✓ **3 months** intervals during the period in which the persons carrying on the industrial activity, if the activity is inside or within two kilometers of a local government area or a regional district fire protection district (Wildfire Regulation Section 11(2(a)).
- ✓ **6 months** intervals during the period in which the persons carrying on the industrial activity, for all other areas (Wildfire Regulation Section 11(3)).
- ✓ Or as specified by a professional forester or a registered forest technologist (Wildfire Regulation Section 11(3.1(b)).

If operations are going to be inactive for more than 3 or 6 months as applicable, a fire hazard assessment is required prior to shut down.

WHAT IS FIRE HAZARD ABATEMENT?

Fire hazard abatement includes activities carried out to reduce the ignition potential and the fire behaviour by reducing the fuel hazard as a result of industrial activities. Qualified holders must reduce the fire hazard on the site of industrial activity as necessary to ensure that it does not increase the risk of a fire starting and if a fire did start it would not increase the fire behaviour or fire suppression activity. The qualified holder must engage a forest professional to incorporate into a strategy, procedure or hazard assessment the levels of fuel abatement or other measures necessary to reduce the fire hazard.

Fire hazard assessment and abatement plans must be considered prior to commencement of industrial activities options may include burning, non-burning activities or a combination of reducing fuel loading, rearranging fuel, removing ignition sources, creating fuel breaks and limiting access. In general, all roadside and landing piles should be abated.
In accordance with Section 12.1 Wildfire Regulation abatement period begins from the date of commencement industrial activity (for example harvesting);

- 24 months for interface, an area inside, or within 2m of , the boundaries of;
    i. A fire protection district in a regional district;
    ii. an improvement district;
    iii. a water improvement district;
    iv. a prescribed organization
- 30 months for non-interface, or as specified by a forest professional for non-interface areas.

WHO CAN CARRY OUT FIRE HAZARD ASSESSMENTS AND PRESCRIBE ABATEMENT STRATEGIES? Conducting fire hazard assessments and prescribing abatement strategies falls within the scope of practice of a forest professional as per the *Foresters Act.* It is required that TSL holders engage qualified forest professionals for the purposes of conducting fire hazard assessments and prescribing abatement measures.

A ***Qualified Holder*** is a person who has a valid cost sharing or service agreement in place with BC Wildfire Service or is the holder of a specified licence under the *Forest Act* and is required to pay annual rent under the Annual Rent Regulation.

FOREST PROFESSIONALS
Forest professionals are responsible for prescribing work to be carried out to mitigate the fire risk to the client. Forest professional must ensure they are competent to prescribe the required work and comply with all legislation, including the Association of BC Forest Professionals (ABCFP) bylaws and policies. Because knowledge and experience can vary from client to client, forest professionals must ensure they have the necessary information to undertake the service.

Forest professionals practising in the area of fire and fuel management need to have in-depth understanding of the following components of fire and fuel management:

- ✓ An understanding of fire and fuels management goals and objectives,
- ✓ Understanding wildfire suppression principles in BC,
- ✓ Understanding of wildfire behaviour principles,
- ✓ Ability to appropriately assess wildfire and fuel hazards, and
- ✓ Familiarity with BC ecosystems
- ✓ For additional information on forest professional refer to the Association of BC Forest Professionals website https://abcfp.ca/web/ABCFP/About_Us/What-is-a-forest-professional.aspx

WHAT ARE TSL HOLDER'S RESPONSIBILITIES?

- ✓ **Be familiar** with the potential fire hazard risk for your applicable operating area. CLICK HERE to refer to BC Fire Hazard Assessment and Abatement Risk Map
- ✓ **Engage support from forest professionals** when conducting fire hazard assessments and prescribing abatement measures.
- ✓ **Complete Fire Hazard Assessments** at prescribed intervals.
- ✓ **Document and retain records** results of all assessment and abatement activities.
- ✓ **Provide copies** of all completed fire hazard assessment(s) to BCTS.
- ✓ **Conduct abatement activities** as identified by assessment results or as required in accordance with the *Wildfire Act* and Regulations.
- ✓ If burning is part of the plan for abatement:
    - Ensure required notification is made and approvals received from BC Wildfire Service
      (Burn Registration Line 1-888-797-1717),
    - **Ensure open burning requirements/restrictions are followed.** Refer to the Industrial and Resource Management Burning Category 3 Guide: CLICK HERE FOR GUIDE
      and venting index http://www.env.gov.bc.ca/epd/bcairquality/readings/ventilation-index.html
- ✓ Take necessary steps to **ensure open burning activities are extinguished** (e.g. scanning).

Receipt of hazard assessments and completion of abatement activities is associated to BCTS deposit release procedures.

Be advised that under Section 79 of the Forest Act a holder of a timber sale licence will have a continuing liability to perform obligations.

For further information about fire hazard assessment and abatement, refer to the following:

- ✓ Forest Practice Board "Board Bulletin, Volume 18, Fire Hazard Assessment" https://www.bcfpb.ca/wp-content/uploads/2016/10/Volume-18-Fire-Hazard-Assessment.pdf
- ✓ BC Wildfire Industry Website https://www2.gov.bc.ca/gov/content/safety/wildfire-status/for-industry-commercial-operators

BRITISH COLUMBIA
The Best Place on Earth

Ministry of
Forests, Lands and
Natural Resource Operations

WILDFIRE MANAGEMENT BRANCH

A Guide to Fuel Hazard Assessment and Abatement in British Columbia

April 2012

Disclaimer

This document contains material to assist a person in identifying values at risk, fire risk categories, fuel hazard for dispersed fuels and piled fuels, and finally the table providing the calculations in determining whether abatement is required. This is in accordance with the *Wildfire Act* and regulation. This document does not contain legal advice, it is provided as guidance.

Warranty

While every effort has been made to ensure the accuracy of the information herein, no warranties of any kind are made as to the precision or longevity of the contents. Readers are advised to refer to the wording of the legislation and regulations themselves, and obtain legal advice from their own sources.

This information is provided as a public service by the Ministry of Forests, Lands and Natural Resource Operations, Wildfire Management Branch (WMB). This document and all of the information it contains are provided "as is" without warranty of any kind, whether express or implied. All implied warranties, including, without limitation, implied warranties of merchantability, fitness for a particular purpose, and non-infringement, are hereby expressly disclaimed.

Limitation of Liabilities

Under no circumstances will the Government of British Columbia be liable to any person or business entity for any direct, indirect, special, incidental, consequential, or other damages based on any use of this information or any other document or material to which this document is linked, including, without limitation, any lost profits, business interruption, or loss of programs or information, even if the Government of British Columbia has been specifically advised of the possibility of such damages.

Copyright

Copyright © 2012, Province of British Columbia

All rights reserved

This material is owned by the Province of British Columbia and protected by copyright law. It may not be reproduced or redistributed without the prior written permission of the Province of British Columbia. To request permission to reproduce all or part of this material, please complete the Copyright Permission Request Form at http://www.gov.bc.ca/com/copy/req/

Questions or Concerns?

For more information, please contact the Intellectual Property Program by:

e-mail: ipp@mail.qp.gov.bc.ca, or fax: (250) 356-0846.

Table of Contents

Table of Contents **3**
Glossary **4**
General Abbreviations, Definitions and Acronyms 4
About This Guide **6**
Purpose 6
Updates and Feedback 7
Section 1: Introduction and Explanation **8**
Introduction **8**
Professionally Prepared Abatement Assessments and Strategies 8
The Legislation **9**
Who can carry out this work? **10**
The Benefits to Abating Fire Hazards **10**
Fire Hazard Assessments **11**
Fire Hazard Abatement **11**
SECTION 2: **12**
Determining Whether to Abate **12**
1. STEP 1: DETERMINE THE LOCATION OF THE POTENTIAL FIRE HAZARD .. 12
Map 1 – British Columbia Fire Risk Map as it relates to hazard abatement 12
2. STEP 2: DETERMINE THE FUEL HAZARD RATING 14
NOTE FOR CHART 1 - DISPERSED FUELS ONLY: 14
NOTE FOR CHART 2- PILED DEBRIS ONLY: 15
3. STEP 3: CONSULT HAZARD ABATEMENT TABLE BELOW: 16
APPENDIX 1 – 17
CHART 1: FUEL HAZARD CHART FOR DISPERSED FUELS ONLY 17
APPENDIX 2 18
CHART 2: FUEL HAZARD CHART FOR DEBRIS PILED FUELS 18
Links to Other Information Sources **19**

Glossary

General Abbreviations, Definitions and Acronyms

For the purposes of this Guideline, the following are defined:

Definition / Acronym	**Explanation**
Guide	A Guide to Fire Hazard Assessment and Abatement in British Columbia (the title of this document)
DHAAS	Defined Hazard Assessment and Abatement Strategy meaning the procedures in Section 2 of this document that meet the requirements for hazard assessment and abatement as required by section 7 of the Wildfire Act.
Fire hazard	means (a) the risk of fire starting, and (b) the hazard associated with an industrial activity; and (c) if a fire were to start, (i) the volatility of the fire's behaviour, (ii) the difficulty of controlling the fire, and (iii) the potential threat to values at risk;
Fuel hazard	Means the potential fire behaviour, without regard to the state of weather or topography, based on the physical fuel characteristics, including fuel arrangement, fuel load, condition of herbaceous vegetation and the presence of ladder fuel; [section 1, Wildfire Regulation]
Forest land	Includes land that previously supported trees and is not in other use, but does not include land excluded from this definition by regulation; [section 1, Wildfire Act]
Forest Professional	Means a professional forester or a registered forest technologist as defined in section 1 of the *Foresters Act*, S.B.C. 2003, c. 19, and any amendments thereto.
Grass land	Includes land that previously supported grass and is not in other use, or is in use for the production of forage or is lying fallow, having previously been used for the production of forage, but does not include land excluded from this definition by regulation;[section 1, Wildfire Act]
High risk activity	Means activities as defined in section 1 (1) of the Wildfire Regulation.
Industrial activity	Means activities defined in section 1 (3) of the Wildfire Regulation.

Definition / Acronym	**Explanation**
Interface	An area inside, or within 2 km of, the boundaries of (i) a fire protection district in a regional district; (ii) an improvement district; (iii) a water improvement district; or (iv) a prescribed organization. Items (ii) to (iv) are contained in the definition of "local government" under paragraphs (d) to (f) of section 1 of the Wildfire Act. For the purposes of complying with subsection 11(2)(a) of the Regulation, the British Columbia Fire Risk Map as it relates to hazard abatement, updated from time to time, may be used by persons to determine the relative proximity of their industrial activity to the Interface, however, it is the responsibility of industry to determine the exact proximity of their operations to interface in close adjacency situations.
Non-interface	Means the remaining land which is not included in the interface area defined above.
Prescribed activity	Means activities as defined in section 11 of the Wildfire Regulation.
Qualified holder	Meaning is the same as defined in section 1 of the Wildfire Regulation.
Slash Fuel Types	Means fuel types as defined in the *Field Guide to Canadian Fire Behaviour Prediction System*.
WMB	Wildfire Management Branch, Ministry of Forests, Lands and Natural Resource Operations

About This Guide

Purpose

This Guide has been created to provide a default procedure for determination of the fire hazard created by the carrying out of an industrial or prescribed activity on forest land and the degree of abatement needed to reduce fire hazard if the hazard has been increased by the activity. The objective of legislation is to ensure that fire hazards are identified and abated in an appropriate time and manner and to a level that ensures fuel hazards do not increase the potential fire behaviour and suppression effort associated with a fire start. It is particularly important to ensure that fires do not threaten communities, critical infrastructure or other significant values.

This Guide is not intended to provide legal advice, nor is it intended to fetter the discretion of the minister or delegated decision-makers in making statutory decisions. It does provide a generalized methodology or default procedure that may be used to estimate fuel abatement thresholds. It is important to note that given the variation in conditions across British Columbia it cannot properly represent all areas, thus modifications may be warranted to reflect regional conditions and specific localized circumstances.

This Guide takes into account different thresholds, extent and timing for interface areas and other areas and is to be used by persons required to conduct fire hazard assessments under Wildfire Regulation s. 11 to determine the fire hazard abatement needed. Qualified holders may also follow this Guide, or alternatively may follow a strategy, procedure, or recommendation developed by a forest professional.

Organization and Format

The Guide is designed to be used on-line or printed. References are cited throughout with underlined hyperlinks to websites where available.

Section 1 provides the context for a defined hazard assessment and abatement system (DHAAS) within the broader policy framework for preventing wildfires and the damage they may cause. Section 2 of this document is provided for those persons conducting an industrial or prescribed activity that wish to follow a simple, default procedure that meets the requirements for hazard assessment and abatement as required by the Wildfire Act. Persons who are qualified holders of a forest tenure agreement have the option of retaining a forest professional to develop an alternative professionally-designed hazard assessment and abatement system.

Supplemental information regarding the derivation of the British Columbia Fire Risk map and the Fuel Hazard charts in Appendix 1 and 2 that may be useful for persons following the DHAAS, or for forest professionals completing a site assessment or designing a modified or alternate hazard assessment and abatement procedure or strategy is provided in the “Links to Other Information Sources” on page 19.

Updates and Feedback

This Guide will be updated as needed to reflect policy changes, new legislation and periodic review. The latest version will be available from the WMB website: http://bcwildfire.ca/Industry_Stakeholders/industry/Assessment_Abatement.htm

Questions, suggestions for new content, or corrections should be directed to:

Senior Legislation and Policy Analyst
Wildfire Management Branch.
Ministry of Forests, Lands and Natural Resource Operations,

Section 1: Introduction and Explanation

Introduction

Fire hazard assessments and hazard abatement are key activities in reducing the potential threat of wildfires arising from fuels left on the land base following industrial activities. The objective of legislation is to ensure that fire hazards are identified and that fuel hazards are abated in an appropriate time and manner and to a level that they do not increase the potential fire behaviour and suppression effort associated with a fire start. It is particularly important to ensure that fires do not threaten important values associated with: rural-urban interface such as communities and buildings; critical infrastructure such as transmission infrastructure; or other significant values. This guide provides direction that a person may use to assess whether fuel hazard abatement is required or not.

Professionally Prepared Abatement Assessments and Strategies

Amendments to the Wildfire Regulation allow for a qualified holder, on the recommendation of a forest professional, to deviate from the prescribed intervals for conducting hazard assessments, and to vary the timing, extent and fuel thresholds for hazard abatement. This Guide may assist forest professionals in the practice of fuel management, specifically assessing fire hazards associated with industrial or prescribed activities, and creating hazard abatement strategies for a forest licensee or other stakeholders that have obligations to assess and abate.

The Wildfire Regulation requires that a person provide a copy of a fire hazard assessment to an official upon request. Assessments consider the fire hazard in the context of the significance and proximity of values at risk to prescribe recommendations to mitigate the fire hazard through fuel management. As a standard component of professional practice, a rationale is prepared to support a professionally-designed assessment and abatement strategy or other variance from a DHAAS and the rational may be used in the determination of due diligence in the event of alleged contravention of abatement requirements.

Note that the responsibility lies with the person that carries out the industrial or prescribed activity to ensure that abatement is carried out following the recommendation stemming from: (1) assessment according to Section 2 of this Guide, (2) a professionally-designed procedure or strategy, or (3) the abatement prescription of a forest professional.

This Guide is provided as guidance only. Considering the variability of conditions and circumstances around the Province, it may not represent best practices for all locations. Every site of an industrial or prescribed activity requires analysis of numerous site specific factors, some of which are not fully captured or discussed within this Guide. The fire risk map, threshold table, and fuel hazard charts set out in Section 2 are intended for guidance purposes only, and do not cover all of the factors that a forest professional may consider. The views expressed in this Guide

are those of the WMB and it is the responsibility of the person carrying out the industrial activity or prescribed activity to meet the legislative requirements in specific circumstances.

This Guide is also intended to assist government officials with their assessment of fire hazards associated with industrial or prescribed activities when they are encountered during routine inspections of activities conducted by persons who are not qualified holders.

Qualified holders may retain a forest professional to develop an assessment strategy or operating procedure for assessment of fire hazard at the site(s) of their industrial or prescribed activity within their operating area(s). A localized strategy or procedure would identify and consider the main elements including fuel types and loading, ignition probability, spread potential, and the proximity of interface and other values, as well as those conditions and circumstances specific to the operating area that may increase or decrease risk and the abatement effort undertaken.

WMB staff are committed to working collaboratively with forest professionals, qualified holders, and other stakeholders to provide further guidance or clarification regarding factors that might be considered in a fire hazard assessment and/or abatement recommendation.

The Legislation

It is a legislative requirement that the person carrying out the industrial activity or prescribed activity assesses and abates fire hazards as necessary. When an assessment identifies that a fire hazard is present, abatement must take place within a time frame, and to a level specified by the assessment.

The *Wildfire Act* is the governing legislation in British Columbia created specifically for wildfire protection. The Act stipulates that hazard assessments and abatement must be carried out. Section 7 of the *Wildfire Act* requires a person conducting an industrial activity or a prescribed activity on forest or grass land or within one kilometre of forest land or grass land to conduct fire hazard assessments and abate as needed or prescribed.

The Wildfire Regulation draws its authority from the *Wildfire Act* and implements and interprets the *Wildfire Act*. The *Wildfire Act* and Regulation are intended to be results-based and incorporate the concept of professional reliance.

Section 11 and section 12 of the Wildfire Regulation sets out the prescribed activities and the circumstances where fire hazards created by an industrial or prescribed activity must be abated. These sections also define the time limits and abatement levels that must be followed for both interface and non-interface areas. Interface areas are required to be assessed in shorter time periods than that of the non-interface areas, because of the higher values at risk (see Map on page 13 and interactive map: British Columbia Fire Risk Map as it relates to hazard abatement). Time limits to abate fire hazards for interface areas are also shorter, to recognize the higher threat to human life, dwellings and infrastructure than in non-interface areas.

Who can carry out this work?

Hazard Assessment
Conducting a fire hazard assessment and the development of a fire hazard abatement strategy falls under the scope of practice of a professional (see definition) as part of fuel management work. A professional can also prepare, review, amend and create hazard abatement strategies in accordance with "professional document" as defined in the *Foresters Act*. Qualified holders may retain a forest professional to develop an assessment strategy or operating procedure for assessment of fire hazard at the site(s) of their industrial or prescribed activity within their operating area(s) or they may also use this guide.

For persons who are not forest professionals or qualified holders, Section 2 of this Guide provides a default assessment process and identifies when fuel hazard abatement is to be completed. Retaining a forest professional to recommend or oversee hazard abatement would provide further due diligence.

Hazard Abatement
Fuel hazard abatement must be done by the person that carries out an industrial or prescribed activity that creates a fuel hazard. This guide identifies a default process for the determination of when abatement is required.

It is recommended that in areas where it can be anticipated that fuel hazard abatement will be required, that an abatement plan be determined prior to harvest so that post harvesting debris can be managed to accommodate the most efficient disposal option. Disposal options can include burning, but non burning options such as biofibre utilization to maximize carbon offsets, or biofuel utilization to reduce smoke emissions should be considered, where appropriate.

The Benefits to Abating Fire Hazards

Abating the fire hazard helps to protect values at risk. Fuel management can have a positive effect on fuel characteristics and as a result, will mitigate the risks and minimize wildfire suppression costs and losses, both at the site of the industrial or prescribed activity and in the surrounding vicinity.

Further, silvicultural benefits accrue from the removal of piles and accumulations thereby making valuable growing sites available.

The Wildfire Management Branch regards all stakeholders on the land base as responsible partners. When industrial or prescribed activities are undertaken it is expected that due diligence will be applied to ensure that the activity has not increased the fire hazard, and if it has, the hazard is abated to an acceptable level within an identified time period.

Fire Hazard Assessments

Assessing fire hazard is the exercise of analysing the ignition potential and predictable fire behaviour based on fuel hazards (i.e. physical fuel characteristics) and site-specific and probable weather conditions. It includes a consideration of the risk of a fire starting, the difficulty of controlling the fire and the potential impact on identified values.

Fuel hazards are defined as the potential fire behaviour, without regard to the state of weather or topography, based on the physical fuel characteristics including fuel arrangement, fuel load, condition of herbaceous vegetation and the presence of ladder fuel; (section 1, Wildfire Regulation). A person is required to abate the fire hazard created by the carrying out of an industrial or prescribed activity on forest land if the hazard has been created or increased by the activity.

Carry out the hazard assessment considering the factors set out in this Guide or other factors identified by a forest professional. If using Section 2 of this Guide to conduct hazard assessment, follow the steps noted below and calculate whether fuel hazard abatement should be carried out. Although in some cases the table may show that fuel abatement is not a requirement, a person may need to consider other factors such as the proximity to other values at risk, before a decision is made whether or not to abate.

Fire Hazard Abatement

Fire hazard abatement includes activities carried out to reduce the ignition potential or the fire behaviour by reducing the fuel hazard after an industrial activity or prescribed activity has taken place.

A person who conducts an industrial activity must ensure that any industrial or prescribed activity does not increase the risk of a fire starting on the site, and if a fire were to start, would not increase the fire behaviour or the fire suppression requirements associated with the fire. This can often be accomplished through fuel hazard reduction. Qualified holders may rely on a forest professional to incorporate into a strategy, procedure or hazard assessment the levels of fuel abatement or other measures necessary to reduce the fire hazard below critical threshold levels.

WMB recognizes that in some timber harvesting circumstances, it will be impracticable to reduce fuel loads sufficiently so that potential fire behaviour is not increased relative to pre-harvest conditions, and therefore expects that fuel loads will be reduced or minimized either: to the extent practicable; to the fuel thresholds set out in the fire risk table; or, in the case of a qualified holder, to levels specified by a forest professional in consideration of the relevant factors contributing to fire hazard and abatement success. Where abatement measures are not practicable and have not been specified by a forest professional, a person may have to seek an exemption from the local fire centre under sections 25 or 26 of the Wildfire Regulation.

SECTION 2:
Determining Whether to Abate

By following the DHAAS process noted below, a person can determine whether or not a fire hazard needs to be abated. A fire hazard that needs to be abated is the result of any industrial or prescribed activity that increases the risk of a fire starting on the site and if a fire were to start, increases the fire behaviour or the fire suppression requirements associated with the fire. It is particularly important to ensure that fuel hazards do not threaten communities, critical infrastructure or other significant values by contributing to volatile fire behaviour and control difficulty. It is not WMB's intention to prescribe all of the elements that a professional must consider during fuel hazard assessments or abatement activities; however this Guide will discuss the three main elements: fire risk; proximity to interface; and, fuel loading and arrangement.

While broad scale mapping provides a general outline of fire risks in relation to urban interface, it does not take local dispersed values into account and these should also be assessed. Assessment of threat to values such as public and private infrastructure, sensitive community watersheds, identified critical wildlife habitat, and developed recreation areas may also be required.

Conversely, local topographic features and their modifying effect on fire spread and direction may also be considered as factors that reduce potential wildfire impacts. Other considerations for non abatement of fuels may include no or highly limited access and/or low ignition probability due to constant wet conditions (e.g. coastal hyper-maritime and other very wet areas).

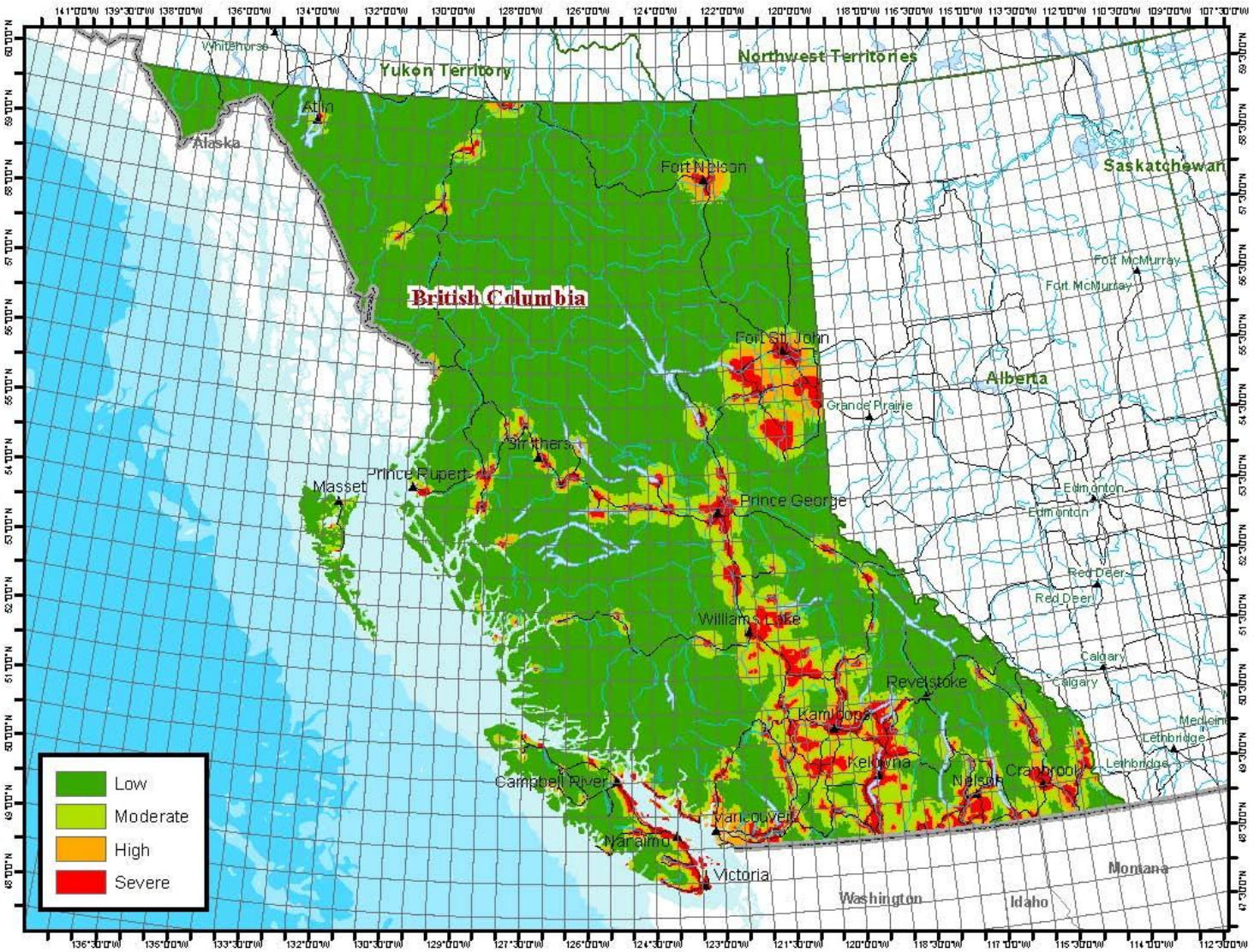
1. STEP 1: DETERMINE THE LOCATION OF THE POTENTIAL FIRE HAZARD

Determine the location of the potential fire hazard on the British Columbia Fire Risk Map below. Use the electronic version found on the BC Wildfire website to zoom in for greater clarity: British Columbia Fire Risk Map as it relates to hazard abatement.

Note that there are two versions of the map available on the website; one using Google Earth (note: Google Earth has to be downloaded before using this version), and the other is a webpage that does not require Google Earth.

Map 1 – British Columbia Fire Risk Map as it relates to hazard abatement

This map shows the fire risk in relation to distance to interface values. The map is also available on the BC Wildfire Internet site for use in determining the location of the fire hazard as it relates to interface areas.



The colour coding is a combination of interface and fire risk, expressed in four different classes: low, moderate, high and severe.

A person may rely on this map for relative compliance purposes, but where refinement is desired due to close proximity to boundaries, the person may wish to check with the local government regarding municipal or fire protection area boundaries for further clarification.

This map is available on the BC Wildfire website, found here:

Once the potential fire hazard at the location of the site of the industrial or prescribed activity has been identified, go to Step 2.

2. STEP 2: DETERMINE THE FUEL HAZARD RATING

A. Using the fuel hazard charts found in either:

Appendix 1 – Chart 1: Fuel Hazard Chart for dispersed fuels only (Page 17), or
Appendix 2 - Chart 2: Fuel Hazard Chart for piled fuels ONLY

B. Determining the fuel factor number:

1. Select appropriate dominant woody species using the four tables provided;

2. Select type and amount of debris;
   i. For scattered debris, select the appropriate tonnes per hectare of debris using an average of tons per hectare for relatively uniform areas, or, stratified sampling for highly variable areas;
   ii. For Piled Debris: determine the number of piles per hectare;

3. Select appropriate slope as a percentage;
   i. For uniform slopes use an average slope;
   ii For highly variable areas with greater than 30% of the area in variance, stratify the area and use appropriate average slopes for stratified sites.

4. Select appropriate aspect (i.e. north, south, east or west);
   i. For uniform sites use an average aspect;
   ii. For highly variable areas with greater than 30% of the area in variance, stratify the area and use appropriate average aspects for stratified sites.

Note: Mixed wood slash and piles are defined as containing 50% volume or greater of hardwood species such as poplar (aspen), birch, cottonwood or maple

C. Once the table provides the fuel factor number based on all of the above, go to Step 3.

NOTE FOR CHART 1 - DISPERSED FUELS ONLY:

Fine fuels (<7 cm in diameter or thickness) are the fuels that contribute the most to rapid fire spread. Since it may not practical to separate dispersed fuels by size, hazard abatement of dispersed fuels will likely involve larger fuels as well. The objective will be to reduce dispersed fuels to levels below those noted in the tables. The most accurate way to determine

fuel load is using fuel sampling mensuration methods (FRDA 001 Handbook), however, a forest professional may wish to use an alternative approach.

Alternatively, slash photo guides may be applied to select the representative fuel load for the dominant slash species on site. Where there is no break in the fuel continuity **then Chart 1 (Appendix A) is the default**. For areas where different harvesting methods are used, (combinations of some dispersed and some piled within the same area) then areas of dispersed could use Chart 1 and **areas of piled debris would use Chart 2 (Appendix 2)**, treating each type of debris separately.

To determine the dominant woody species utilize the greatest estimated amount of volume of slash for a given species for the cutblock. For cutblocks with significant variability, the block can be stratified according to the process established by a forest professional.

Considerations for non abatement of dispersed fuels may include no or highly limited access and/or low ignition probability due to constant wet conditions (e.g. coastal hyper-maritime and other very wet areas). In all cases, the potential for fire spread to adjacent areas should be considered and documented by a forest professional in a hazard abatement strategy when determining the level and timing of abatement. Where abatement measures have not been specified by a forest professional, a person may seek an exemption from the local fire centre under sections 25 or 26 of the Regulation.

NOTE FOR CHART 2- PILED DEBRIS ONLY:

Chart 2 is for debris piled fuels only. Debris piles are considered to be piled material that is greater or equal to $5m^3$ in terms of the air volume occupied by the pile. In general, all roadside and landing piles should be abated because roadside piles are often a higher hazard due to the potential for human caused ignitions.

Considerations for non abatement of roadside and landing piles may include no or highly limited access and/or low ignition probability due to constant wet conditions (e.g. coastal hyper-maritime and other very wet areas). In all cases, the potential for fire spread to adjacent areas should be considered and documented by a forest professional in a hazard abatement strategy when determining the level and timing of abatement. Where abatement measures have not been specified by a forest professional, a person may seek an exemption from the local fire centre under sections 25 or 26 of the Regulation.

The number of piles created will be considered as debris piled fuels for the purposes of Chart 2. For determining the numbers of piles per hectare in an area which has been windrowed, calculate the volume of the windrow and divide by $5m^3$ (minimum pile size is considered $5m^3$).

3. STEP 3: CONSULT HAZARD ABATEMENT TABLE BELOW:

1. Values at Risk are determined by the location of fuel hazard found in the Risk Map in Step 1.

Risk Map Class	Fuel Hazard Threshold (Charts 1 or 2)
Low	100
Moderate	70
High	40
Severe	25

2. Fuel Hazard Threshold is found by determining the corresponding fuel factor from Step 2.

3. If the number from the Charts (Step 2) is higher than the number displayed on this Table, then abatement is required in accordance with the legislation.

4. Fuel should be abated to less than the number provided above in the table.

APPENDIX 1 –

CHART 1: FUEL HAZARD CHART FOR DISPERSED FUELS ONLY

NOTE: Interpolation of values for intermediate slopes, slash loadings, aspects and fuel types can be conducted by a forest professional

Dominant Woody Species - Lodgepole, Ponderosa or Jack pine (S - 1 Slash / Fuel Type)

Tonnes/Ha	1-5 t/ha				6-19 t/ha				20-49 t/ha				50-99+ t/ha			
Slope (%)	North	East	West / Flat	South	North	East	West / Flat	South	North	East	West / Flat	South	North	East	West / Flat	South
0-15	23	23	25	30	30	30	33	35	40	40	43	50	63	63	68	80
16-30	28	30	35	40	35	40	45	50	48	55	63	70	75	85	100	110
31-45	30	40	55	63	40	50	70	80	55	70	98	113	85	110	155	175
46%+	48	55	78	90	60	70	100	115	83	100	135	160	130	155	213	250

Dominant Woody Species – Spruce and Balsam Fir or Larch (S - 2 Slash / Fuel Type)

Tonnes/Ha	1-5 t/ha				6-19 t/ha				20-49 t/ha				50-99 t/ha			
Slope (%)	North	East	West / Flat	South	North	East	West / Flat	South	North	East	West / Flat	South	North	East	West / Flat	South
0-15	18	18	20	25	23	23	30	35	28	28	35	43	40	40	50	60
16-30	20	25	30	35	30	35	40	45	35	43	50	58	50	50	70	80
31-45	23	33	43	50	33	43	58	68	40	53	73	85	55	75	100	120
46%+	30	43	60	70	40	58	80	95	50	73	100	118	70	100	140	165

Dominant Woody Species – Cedar / Hemlock / Douglas Fir (S - 3 Slash / Fuel Type)

Tonnes/Ha	1-5 t/ha				6-19 t/ha				20-49 t/ha				50-99 t/ha			
Slope (%)	North	East	West / Flat	South	North	East	West / Flat	South	North	East	West / Flat	South	North	East	West / Flat	South
0-15	35	35	43	58	40	40	50	65	50	50	63	83	60	60	75	100
16-30	35	50	58	75	40	55	65	85	50	70	83	108	60	85	100	130
31-45	35	50	80	130	40	55	93	140	50	70	118	188	60	85	140	225
46%+	35	58	113	158	40	65	130	180	50	83	163	225	60	100	195	270

Dominant Woody Species – Mixedwood / Broadleaf Species (S - Mw Slash / Fuel Type)

Tonnes/Ha	1-5 t/ha				6-19 t/ha				20-49 t/ha				50-99 t/ha			
Slope (%)	North	East	West / Flat	South	North	East	West / Flat	South	North	East	West / Flat	South	North	East	West / Flat	South
0-15	5	5	8	10	8	8	10	13	10	10	13	15	15	15	20	25
16-30	5	8	10	13	8	8	13	18	10	15	18	23	15	20	28	33
31-45	5	8	13	18	8	13	13	25	10	15	25	35	15	25	38	50
46%+	8	10	18	23	10	15	28	33	15	20	35	45	20	30	55	68

APPENDIX 2
CHART 2: FUEL HAZARD CHART FOR DEBRIS PILED FUELS

Dominant Woody Species - Lodgepole, Ponderosa or Jack pine (S - 1 Slash / Fuel Type)
Dominant Woody Species – Spruce and Balsam Fir or Larch (S - 2 Slash / Fuel Type)
Dominant Woody Species – Cedar / Hemlock / Douglas Fir (S - 3 Slash / Fuel Type)

	1-5 Piles/ha				6-10 Piles/ha				11-24 Piles/ha				25+ Piles/ha			
Slope (%)	North	East	West / Flat	South	North	East	West / Flat	South	North	East	West / Flat	South	North	East	West / Flat	South
0-15	18	18	21	26	22	22	26	32	28	28	33	41	38	38	45	56
16-30	19	25	29	35	25	30	35	42	31	39	46	55	43	51	63	75
31-45	19	29	42	57	25	35	52	67	32	45	67	90	44	63	92	121
46%+	26	36	59	74	33	45	51	91	43	60	93	117	61	83	128	160

Piled S-Mw - Mixed Wood and Broadleaf Fuels

	1-5 Piles/ha				6-10 Piles/ha				11-24 Piles/ha				25+ Piles/ha			
Slope (%)	North	East	West / Flat	South	North	East	West / Flat	South	North	East	West / Flat	South	North	East	West / Flat	South
0-15	4	4	6	7	6	6	7	9	7	7	9	11	11	11	14	18
16-30	4	6	7	9	6	6	9	13	7	11	13	16	9	14	20	23
31-45	4	6	9	13	6	9	9	18	7	11	18	25	11	18	27	35
46%+	6	7	13	16	7	11	20	23	11	14	25	32	14	21	39	48

Links to Other Information Sources

Countryman, 1966, Pyne *et al*, 1996.

Lawson, B.D. and O.B. Armitage. Canadian Forest Service, Northern Forestry Centre, 2008, Natural Resources Canada, *Weather Guide to the Canadian Forest Fire Danger Rating System*

McCrae, D.J., *"Prescribed Burning of Boreal Mixedwood Slash in the Ontario Clay Belt Region,"* Great Lakes Forest Research Centre, Canadian Forestry Service, Government of Canada, 1985.

National Wildfire Coordinating Group (NWCG), *PMS 475 – Basic Land Navigation – June 2007 – Chapter 2 – "Estimating Slope"* [Note this is a US publication and measurements are in feet and inches]

Natural Resources Canada, Canadian Forestry Service, 1984, *Canadian Forest Fire Danger Rating System*

Trowbridge, R, B. Hawkes, A. Macadam and J. Parminter, "*Field Handbook for Prescribed Fire Assessments in British Columbia: Logging Slash Fuels*", April 1989 Reprint.

UBC, Faculty of Forestry, 2005, *Forestry Handbook for British Columbia*, 5th ed., published by the Forestry Undergraduate Society.

UBC Press, 1997, *Field Guide to the Canadian Forest Fire Behaviour Prediction (FPB) System Canadian Forest Service, Forestry Canada Fire Danger Group Information Report ST-X-3., 1997*

Photo Guides and other useful information:

See website for Photo Guides and other useful information.

Forest Practices Board
BOARD bulletin

Board Bulletin, Volume 18
Fire Hazard Assessment

July 2016

Introduction

Logging and most other industrial activities on forested land can create or contribute to an existing fire hazard. In British Columbia, the *Wildfire Act* requires a person carrying out an industrial activity such as logging to assess and abate fire hazards.

A fire hazard assessment considers the risk of a fire starting, the hazard associated with the industrial activity, the difficulty in controlling a fire and the potential threat to values. A fire hazard assessment must also include an assessment of the fuel hazard, which is the potential behavior of a fire based on the arrangement, condition and amount of forest fuels such as branches, leaves and stems.

Why is fire hazard assessment important?

Assessing fire hazard is the law and therefore it must be done. But fire hazard assessment is also a critical step in demonstrating due diligence. Due diligence means taking all reasonable steps to comply with the law. Section 29 of the *Wildfire Act* states that a person may not be found to have contravened the Act if they can demonstrate due diligence. If a fire were to start on a cutblock and a licensee cannot demonstrate that it has assessed the fire hazard and abated any hazards identified, a contravention could prove difficult to defend.

It is important to assess potential fire hazards.

For example, in 2012 a licensee in northwest BC chose not to assess or abate the fire hazard on its cutblocks. An arsonist started a fire that eventually burned two hectares. In 2014 the fire centre manager determined that "It is critical that persons conduct hazard assessments in a timely manner and abate known hazards before they can start or contribute to the spread of a wildfire." He levied a $9500 penalty because the licensee did not comply with the fire hazard assessment and abatement requirements of the *Wildfire Act*.

Recent Board Audit Findings

As fire hazard assessments are legally required, Board auditors routinely ask to see them when they conduct compliance audits. In the past three years, Board audits found 16 licensees of all sizes that did not complete fire hazard assessments as required by the *Wildfire Act*.

Fourteen of the licensees abated the fire hazard by piling and burning slash as a standard practice. Even though the fire hazard was abated, the Board concluded that these licensees needed to improve their assessment practices to ensure they comply with the *Wildfire Act*. The remaining two licensees neither assessed nor abated the fire hazard and the Board concluded that they did not comply with the *Wildfire Act*.

Tel: (250) 213-4700 | 1-800-994-5899 | Fax: (250) 213-4725
PO Box 9905 | Stn Prov Gov't | Victoria BC | Canada | V8W 9R1
www.bcfpb.ca

Fire Hazard Assessment FAQs

When is a fire hazard assessment required?

A fire hazard assessment is required when carrying out an industrial activity such as land clearing or other prescribed activity[1] that is likely to create or increase a fire hazard within one kilometre of forest or grassland (*Wildfire Act* s.7), or when an official notifies a person carrying out an industrial activity that a fire hazard exists (*Wildfire Regulation* 11(1)(b)(ii)).

How often must fire hazard be assessed?

Every 3 months if the activity is inside or within two kilometres of a local government area or a regional district fire protection district (*Wildfire Regulation* 11(2)(a)).

Every 6 months for all other areas (*Wildfire Regulation* 11(3)).

If operations are going to be inactive for more than 3 or 6 months as applicable, a fire hazard assessment must be done at shutdown. "Qualified Holders[2]" may vary from these requirements if specified by a forest professional (*Wildfire Regulation* 11(3.1)).

What is required in a fire hazard assessment?

Fire hazard assessments must include an assessment of the fuel hazard and its associated risk of a fire starting or spreading (*Wildfire Regulation* 11(4)). Fuel hazard is the potential behavior of a fire based on the arrangement, condition and amount of forest fuels.

Where can I get information about fire hazard assessment?

The BC Wildfire Service's "Guide to Fuel Hazard Assessment and Abatement in British Columbia" is available on their website and is being updated in 2016.

Fire hazard assessment is one aspect of the practice of professional forestry, and the Association of BC Forest Professionals has provided guidance to its members. Guidelines for Fire and Fuel Management are available to members through its website www.abcfp.ca

Links to the *Wildfire Act* and *Wildfire Regulation* are available at http://bcwildfire.ca/LegReg/

What do Board auditors look for?

Auditors confirm that fire hazard assessments have been completed and documented when and where required. Auditors review assessments to ensure that they include an assessment of the fuel hazard and its associated risk of a fire starting or spreading.

If you have comments/questions on this bulletin, you can contact us at fpboard@gov.bc.ca*, or on* Facebook *or* Twitter.

[1] Section 11(1) of the *Wildfire Regulation* defines prescribed activities as operating a waste disposal site, dry land sort, a camp associated with an industrial activity, or an industrial activity that is likely to create or increase a fire hazard.

[2] A qualified holder is either: a party to a cost sharing agreement; or the holder of a forest licence, timber licence, tree farm licence, community forest agreement, woodlot licence or timber sale licence who has paid its annual rent.

Forest Practices Board

Fire Preparedness

Special Investigation

FPB/SIR/30

February 2011

Table of Contents

Fire Preparedness **1**

Introduction **1**

Background **2**

Regulatory Framework 2
What Are The Potential Consequences? 2

Approach **3**

Results **5**

Wildfire Regulation s. 4 – Contact Details 5
Wildfire Regulation s. 5 – Sufficient Fire Tools 6
Wildfire Regulation s. 6(2) – Determination Of Fire Danger For High-Risk Activities 6
Wildfire Regulation s. 6(3)(a) – Operations Must Be Consistent With Danger Class Restrictions 8
Wildfire Regulation s. 6(3)(b)(ii) – Adequate Fire Suppression System At The Activity Site 9
Wildfire Regulation s. 6(4) – Maintaining A Fire Watch 12
Wildfire Regulation s. 8 – Precautions To Ensure That An Engine Does Not Cause A Fire 12
Wildfire Act s. 9 – Railway Operations 13
Wildfire Act s. 10 – Utility Transmission Operations 13
Other Practices 14

Summary **14**

Good Practices 14
Non-Compliance 16

Conclusions **17**

Compliance 17
Representative Weather Information 17
Reliance on Professionals 18

Appendix 1: Fire-Preparedness Determinations **19**

Introduction

One of the risks that come with working in the bush is accidentally starting a fire. Since 1950, industrial activities have caused 12.5 percent of wildfires in BC, and all fires caused by humans are preventable.

Being adequately prepared for a fire can help to protect workers; minimize damage to equipment and infrastructure; safeguard neighbouring communities; and ultimately protect the forest and all its values. Being unprepared for a fire, or unable to demonstrate fire preparedness, can lead to financial ruin when all the costs and damages are added up.

Section 68 of the *Wildfire Act* (WA) permits the Board to carry out special investigations to determine compliance with parts 1 and 2 of the Act, which includes fire preparedness. The Board decided to do so, to learn how forest operators are addressing the fire-preparedness requirements of the WA and the *Wildfire Regulation* (WR).

This investigation identifies fire preparedness issues facing those subject to the WA; determines if there are differences in fire preparedness between various groups (e.g., small versus large forest licensees, certified versus non-certified); and highlights fire preparedness practices in the interest of contributing to fire prevention.

Background

Regulatory Framework

Before 2005, the *Forest Fire Prevention and Suppression Regulation* (FFPSR) specifically described the numbers and types of equipment needed to be prepared for a fire. However, when the WA and the WR were introduced, government moved to a less prescriptive approach to fire prevention and preparedness, with a greater reliance on forest professionals to decide what preparation is appropriate for their specific operation. For example, while the FFPSR required a "water delivery system" with specific capabilities be on a site in certain conditions, today an "adequate fire suppression system" is required, and it is up to a licensee to decide what "adequate" means.

It was not long before licensees and others subject to the Act and regulation asked for clarification—for example, what is "adequate"? In May 2007, and again in June 2008,[i] government released interpretive bulletins to the forest industry providing general guidance to help demonstrate how activities conform to legal requirements. At the same time, industry partners collaborated through a "wildfire guidelines committee" to produce guidelines for fire suppression systems and fire-fighting hand tools.[ii] The Board understands that further guidance from the Ministry of Forestry and Range's (now Ministry of Natural Resource Operations, or NRO) Wildfire Management Branch (WMB) is under development.

Despite this guidance, however, it is ultimately the responsibility of those subject to the WA to decide the most appropriate fire-preparedness approach to take for their specific circumstances. But licensees have different personalities and tolerance for risk. Some want government to tell them exactly what is required to comply with the law, while others are comfortable with the responsibility for deciding what is reasonable in the circumstances. In the event of a fire, fire preparedness and due diligence—which means taking all reasonable care to comply with the law—will be critically examined by government, and potentially the courts.

What Are The Potential Consequences?

When a forest burns, the Crown loses the value of the timber along with other forest resources such as wildlife habitat and recreation areas. In turn, forest companies can lose valuable equipment, and the safety of workers and neighbouring communities can be put at great risk.

A person responsible for starting a fire can be subject to compliance and enforcement actions if they are found to have contravened the WA, and government may levy administrative penalties and recover fire suppression costs and damages. The WMB has stated that it will aggressively

[i] Available at http://bcwildfire.ca/Industry_Stakeholders/industry/Interpretive_WildfireReg.pdf
[ii] Available at http://www.wsca.ca/index.php?Page=265.0&Key=690

pursue penalties for contraventions,[iii] and administrative penalties can range up to $100,000. Fire suppression costs and damages to Crown timber can add up to millions of dollars.

For example, in April 2008, a contractor was clearing a hydro right-of-way and burning debris piles on the Sunshine Coast. The fire escaped from a pile and burned 14 hectares of free-growing plantation and 25 hectares of mature forest. The fire centre manager determined that there was no adequate fire-suppression system on site and ordered the contractor to pay $90,000 for damages to Crown timber and $196,000 for suppression costs.

As of February 2011, there have been 13 fire-preparedness determinations (decisions about contraventions) made under the WA that resulted in administrative penalties and/or recovery of costs and damages. These determinations show that the potential for a penalty and/or recovery of fire-fighting costs and damages to Crown timber is real. A summary of these determinations appears in Appendix 1.

However, the risk of being held responsible for suppression costs can be managed by entering into a cost-sharing agreement with government, where a licensee pays government a fee in exchange for government's agreement that it will either reduce or eliminate its fire suppression costs. Section 20 of the WR authorizes such agreements.

Approach

The Board is only mandated to investigate practices of holders of range or forest tenures, and government. Range tenure holders were excluded from this investigation because, in general, they do not conduct industrial activities as defined under the WA.

The Board selected the 100 Mile House and the former Arrow Boundary forest districts for the investigation based on fire risk, but also to avoid overlapping with other Board work planned for 2010. All the forest licensees in the two districts were potentially subject to investigation. To start, the Board mailed surveys to all woodlot licensees and conducted phone interviews with major licensees. The Board followed this with visits to active sites in the Arrow Boundary Forest District in late August, and in the 100 Mile House Forest District in late September 2010. To increase the sample size and geographic coverage of the investigation, the Board also included fire preparedness results from its annual compliance audit process. Any active sites encountered during these audits were included in the investigation.

[iii] 2009 Fire Season Review presentation available at:
http://bcwildfire.ca/History/ReportsandReviews/2009/Presentation.pdf

During site visits, the Board examined compliance with the following fire-preparedness requirements. The applicable section of the WR appears in brackets.

- Has the licensee provided a 24-hour contact number to an official? (s. 4)
- Is there one fire-fighting hand tool for each person at the site? (s. 5)
- If the activity is high risk:[iv]
  - Has the fire danger class been determined? (s. 6(2))
  - Is the reference weather station representative of the site? (s.6(2)(a))
  - Is there an adequate fire suppression system at the activity site? (s. 6(3)(b)(ii))
  - If a fire watch is required, does the watcher have adequate means of communication, a fire tool, a view of the site and is he actively patrolling the site? (s. 6(4))
  - Are activities consistent with the danger class (i.e. early shift and fire watch)? (s. 6(3)(a))

FIGURE 1. Shovel mounted on the top of a skidder.

FIGURE 2. Disc trenching is a high risk activity.

- Are "engines" in good repair and operating according to manufacturer's specifications? (s. 8)

For complete fire-preparedness requirements, please refer directly to the *Wildfire Act*[v] and the *Wildfire Regulation.*[vi]

The Board received 31 completed surveys from woodlot licensees, interviewed 11 licensees by telephone, and visited 34 active sites to interview licensees and examine fire preparedness. Nineteen active sites were sampled in the Arrow Boundary and 100 Mile House Forest Districts and 15 were sampled during Board audits throughout the province.

[iv] High-risk activities are defined in the regulation and include using a power saw, mechanical tree felling, mechanical brushing, skidding and cable yarding.
[v] Available at http://www.bclaws.ca/EPLibraries/bclaws_new/document/ID/freeside/00_04031_01
[vi] Available at http://www.bclaws.ca/EPLibraries/bclaws_new/document/ID/freeside/11_38_2005

Results

A common theme arising from interviews and surveys was that, in the absence of any explicit direction from government, many licensees rely on the old *Forest Fire Prevention and Suppression Regulation* to guide fire preparedness. "If it was good enough in 1995, it must be good enough today," was a common comment. Since the government will not endorse "best management practices" or constructively critique their actions, most licensees assume the old regulation is acceptable by default.

The following section summarizes both the fire-preparedness requirements of the WR and what the Board heard and saw during the course of the investigation with respect to fire preparedness. It is based on a combination of telephone and personal interviews, surveys and observations in the field. This section also includes determinations made by government officials that give some insight into what it means to be prepared. Finally, practices that contribute to fire prevention and preparedness and help to demonstrate due diligence are highlighted.

Wildfire Regulation s. 4 – Contact Details

If a forest licensee plans industrial activities during the fire season, he or she must provide 24-hour contact details to a government official. This information comes in handy if the official needs to know where the licensee is operating, what equipment and resources are available for fire suppression, or to inform the licensee of a fire.

Of the eight active sites sampled in Arrow Boundary, only two licensees provided contact information to the fire centre. In 100 Mile House, six of nine licensees provided contact information. It is easy to overlook this requirement, but in the event of a fire, this information could be crucial, and not providing it puts forest operators at risk. Providing accurate contact information is part of demonstrating that a licensee has been diligent in preparing for fires.

In a determination regarding a fire that occurred on a woodlot in July 2008, ministry staff argued that the woodlot licensee did not provide a 24-hour contact number before starting operations. The licensee argued that the information had been provided. In the face of conflicting evidence, the fire centre manager determined that there had not been a contravention of the WR, noting that there was no issue contacting the licensee on the day of the fire. In this case, where there was uncertainty, the result is what mattered to the fire centre manager—ministry staff were able to contact the woodlot licensee without difficulty.

Wildfire Regulation s. 5 – Sufficient Fire Tools

The WR requires a fire-fighting hand tool such as a shovel, Pulaski or hand-tank pump for each person on a site when there is a risk of a fire starting or spreading. All but four of the sites sampled met or surpassed this requirement.

FIGURE 3. Hand-tank pump mounted on a headache rack.

FIGURE 4. Shovel mounted directly to a feller buncher.

Good practices observed included attaching hand tools to each machine and having a shovel, Pulaski and full and functional hand tank pump in each pickup truck. This often meant there were more hand tools on-site than workers.

Wildfire Regulation s. 6(2) – Determination Of Fire Danger For High-Risk Activities

A person carrying out high-risk activities must determine the fire danger class by referring to representative weather data for the area. The fire danger class is a relative index of how easy it is to ignite vegetation, how difficult a fire may be to control and how much damage a fire may do. The government has set up a system of weather stations complemented by an easy-to-use website that provides fire danger class information for each weather station.

The danger classes are:

1. **Very Low**
2. **Low** - Fires may start easily and spread quickly but there will be minimal involvement of deeper fuel layers or larger fuels.
3. **Moderate** - Forest fuels are drying and there is an increased risk of surface fires starting. Carry out any forest activities with caution.
4. **High** - Forest fuels are very dry and the fire risk is serious. New fires may start easily, burn vigorously, and challenge fire suppression efforts. Extreme caution must be used in any forest activities. Open burning and industrial activities may be restricted.
5. **Extreme** - Extremely dry forest fuels and the fire risk is very serious. New fires will start easily, spread rapidly, and challenge fire suppression efforts. General forest activities may be restricted, including open burning, industrial activities and campfires.

In the past, government provided maps to licensees showing the applicable weather station for each area of a district. It no longer distributes those maps, although some licensees still have and use them. Today, licensees must decide on their own which weather station is representative of its particular work site, and it may not be the closest station. Government recognizes this and its guidance suggests that licensees may want to consider factors such as slope, aspect, elevation, date of snow melt, or the distance from the weather station. In addition to these factors, the wildfire guidelines committee suggests considering stand conditions, forest health, fuel type and fuel loading. Several licensees identified the need to have more explicit instructions on how to consider these factors in order to select the most appropriate weather station.

One practice observed during the investigation was that of averaging the danger classes of the three nearest weather stations, or three stations surrounding the activity site. However, this approach bears some risk because it means that the person is not thinking about whether or not the information from the three weather stations is representative of a particular work site. Also, averaging may lead a person to underestimate the fire danger, particularly if an extreme value is most representative of a work site. Three licensees averaged the danger class values of three weather stations to determine fire danger, and one licensee did not determine danger class at all.

Government restricts industrial activities based on danger class (see next section) and the Board heard anecdotes of persons picking one weather station over another because conditions indicated by that station would permit an activity to continue versus shutting the activity down. For example, in a March 2007 determination about a fire caused by a metal machine track on a rock, a fire centre manager noted that the licensee did not use the weather station closest to a work site. Instead it used a more distant weather station that indicated a lower danger class, and a fire resulted. The fire centre manager said that there should have been a clearer rationalization regarding the choice of weather station.

The example above demonstrates the risk in choosing one site over another because of a lower danger class—it is difficult to demonstrate that a station is representative of a site without a solid rationale. The flip side of this issue is that a conscientious licensee may needlessly shut down early if it uses information from a non-representative site with a higher danger class.

Ultimately, it makes sense that an on-site weather station would be the most representative weather station. Weather stations are available for purchase or rent and they provide the same quality of information as the government stations. However, they are expensive and vandalism is a concern when equipment is set up in remote locations. The user also needs the knowledge and tools to be able to convert the observed weather data into a danger class figure in order for the information to be useful.

Good practice – Tolko Cariboo Woodlands

Tolko has implemented a standard operating procedure for obtaining representative weather data. Supervisors, with input from contractors, consider the following when determining whether a weather station is representative of a particular site:

- Is the station at a similar or lower elevation?
- Does it receive similar weather? (e.g., similar exposure, is it an upslope area or in a rain shadow; does it experience high winds or is it sheltered?)
- Is the station operational and accurate?

Once the representative weather station is selected, Tolko's contractors record precipitation using rain gauges at the activity site. The rainfall amount is radioed to the office where the danger class is calculated based on the precipitation and temperature at the site and the relative humidity and wind speed data from the representative weather station. This calculation can be done using either computer software or tables.

FIGURE 6. A rain gauge.

Contractors work according to the site-specific danger class. Tolko supervisors may reconsider the danger class if the representative weather station is higher, taking into account weather trends, precipitation amounts and coverage, on-site winds and other risks.

Wildfire Regulation s. 6(3)(a) – Operations Must Be Consistent With Danger Class Restrictions

Government restricts high-risk activities based on danger class. For example, after three consecutive days of danger class 4, the WR requires that activities shut down from 1:00 pm to sunset each day and that there must be a two-hour fire watch after work. This is called "early shift." The complete WR requirements appear in Table 1.

TABLE 1. Schedule 3 of the *Wildfire Regulation* – restrictions on high-risk activities

Fire Danger Class (DGR)	Restriction	Duration
III (moderate)	After 3 consecutive days of DGR III or greater, maintain a fire watcher after work for a minimum of one hour.	Until after the fire danger class falls below DGR III.
IV (high)	Maintain a fire watcher after work for a minimum of 2 hours.	Until after the fire danger class falls below DGR III.
	After 3 consecutive days of DGR IV, cease activity between 1:00 p.m. PDT (Pacific Daylight Savings Time) and sunset each day.	Until after the fire danger class falls to DGR III for 2 consecutive days, or falls below DGR III.
V (extreme)	Cease activity between 1:00 p.m. PDT (Pacific Daylight Savings Time) and sunset each day and maintain a fire watcher after work for a minimum of 2 hours.	Until after the fire danger class falls below DGR IV for 2 or more consecutive days.
	After 3 consecutive days of DGR V, cease activity all day.	Until after the danger class falls below DGR V for 3 or more consecutive days, or falls below DGR IV.

The Board did not encounter any activities continuing past 1:00 pm where prohibited, nor any sites where a fire watch should have been present but was not. It was not practical to examine this requirement for any of the sites visited before 1:00 pm on days when early shift was required because activities had not shut down at the time.

Some licensees modify their practices to minimize risk through timing of operations and choice of equipment. For example, this summer Monte Lake Forest Products processors worked from 2:00 am until noon. They also avoided working on rocky terrain with tracked equipment and used hand-falling instead. Many woodlot licensees told us that they have the flexibility to avoid working during the heat of the summer.

FIGURE 7. A feller-buncher head. The rotating saw blade can create sparks when it strikes a rock.

The possibility of fire caused by feller-buncher heads was a concern voiced by almost every operator the Board interviewed. Fires start either by the buncher head striking rock and throwing a spark or by friction when small branches or debris get jammed in the felling head. One licensee manages risk by shutting down his feller-bunchers two hours before the rest of his equipment. In effect, this provides an additional two-hour fire watch as the rest of the operation remains active.

Tolko's Okanagan Regional Woodlands goes a step beyond the danger class ratings provided by government and completes a risk assessment matrix for high-risk activities. The assessment is a one-page form that assigns points to risk factors including stand type, fuel loads, duff moisture, slope, type of operation (e.g., bunching or processing) and the distance to water to refill portable tanks. Based on the total points, the supervisor may impose early shift and a fire watch, even if not required by the danger class. In high-risk situations, log loading is limited to early shift, and buncher and stump-side processing operations are suspended.

Wildfire Regulation s. 6(3)(b)(ii) – Adequate Fire Suppression System At The Activity Site

Persons conducting a high-risk activity when there is a risk of a fire starting or spreading must keep an adequate fire suppression system at the activity site. Without exception, all of the systems encountered consisted of a water source, pump, hose and accessories such as a nozzle, otherwise known as a water delivery system. Occasionally foam will be added to the water to stretch its fire-fighting power, doubling its effectiveness.

FIGURE 8. Water tank truck.

In general, licensees want to be able to get water to any part of the activity site to extinguish a fire. WMB guidance suggests that a suppression system using water should be nearby, operational and capable of being deployed in a reasonable amount of time, taking danger class into consideration. This suggests that readiness should escalate as danger class increases and that water should be closer when the danger class is higher. In practice, water tanks are often positioned on the road at the entrance to a cutblock, or in a central location when more than one site is active.

FIGURE 9. Retired municipal fire truck used as part of a fire-suppression system.

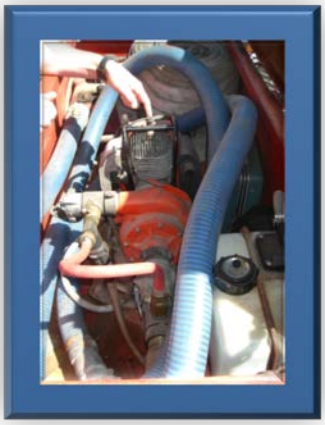


FIGURE 10. Pump, hose, fittings and a foam tank.

FIGURE 11 & 12. Portable water tank with a compartment for pump, hose and fittings (*left*). Close up of the pump in picture (*right*).

Determinations also give some indication of what is adequate or inadequate. Fire centre managers have made nine determinations involving fire-suppression systems, summarized below:

- Four sites had no suppression system at all.
- At four sites, the water delivery system was not at the activity site. Water was:
  - 1.4 kilometres distant in danger class 4;
  - 3.8 kilometres distant in danger class 4;
  - 18 kilometres distant in danger class 3; and
  - 15 minutes return travel time away. The fire centre manager did not have evidence to correctly determine the danger class.
- One suppression system at a site-preparation operation was considered inadequate. It consisted of a five-gallon hand tank pump and three ten-pound fire extinguishers. The danger class was 5 (extreme).

The Board found eight examples of apparent non-compliance related to adequate suppression systems:

- five sites had no suppression system at all;
- at one site the water tank was three kilometres away and there was not enough hose to deliver water to all parts of the block in danger class 4;
- at one site the water tank was three kilometres away in danger class 1; and
- at one site the tank, hose, nozzles and pump were incompatible and could not function together to deliver water to a fire.

Good practices observed

The Board observed the following good practices related to fire-suppression systems and preparedness:

- Consideration of the size and topography of the block before work began to ensure there was adequate hose to get water to any part of the block.
- More than one water tank on a site, placed to be near different activities.
- A pre-work meeting to check fire preparedness with weekly checks afterwards.
- Testing of equipment, including starting up the pump and holding regular fire suppression drills.
- Moving the water source around the site to keep it closest to the highest risk activity.
- Use of foam to extend the supply of water.
- Fire centre phone number painted on the water tank.

Some companies have standard operating procedures for adequate suppression systems. Here are two examples:

Ainsworth Engineered Canada LP

There must be enough hose to reach from the water supply to any part of a block—at a minimum, one pump and 1,500 feet of hose is required. If there is no water supply on the block then a water tank with at least 500 gallons, if using foam, and 1,000 gallons if not using foam is required.

Tolko Cariboo Woodlands

In order to be able to apply water to any part of a block within ten minutes, contractors must have 2,200 litres (500 gallons) of water and 250 metres (820 feet) of hose on site. Note that the activity site is not necessarily the cutblock—if there are different activities within the cutblock, the water-delivery system should be located closest to the highest-risk activity, but available to all activities. As well, no high-risk activities are to be conducted in danger class 5 conditions with only one person present, and special attention must be paid to feller-bunchers and tracked machinery.

Wildfire Regulation s. 6(4) – Maintaining A Fire Watch

After three consecutive days of danger class 3 or greater, licensees must keep watch on a site for one hour after work. This requirement is extended to two hours after work when operating in danger class 4 or greater. A fire watcher must be able to see the site of the high-risk activity, have at least one fire tool on hand, and must have the means to report a fire. In addition, he or she must actively watch and patrol for sparks and fires and immediately carry out fire control if practicable.

Sometimes an operator will service his or her equipment after work, but this practice does not satisfy the requirement for a fire watch. In a 2008 case, a feller-buncher operator stopped harvesting at 1:00 pm and walked his machine back to the road to refuel it. The operator was also the fire watcher. The machine's metal track contacted a rock and started a fire. The operator did not notice the fire until about 1:30 pm as he serviced the machine. The fire centre manager determined that the fire watcher did not have a view of the site of the high-risk activity and did not actively watch and patrol the site for sparks or fires.

At one site visited by the Board, an operator was processing trees in one corner of a block. He could not see the majority of the block and was concentrating on his work rather than actively patrolling for fires.

Good practice – Interfor Adams Lake Lumber

Interfor's Adams Lake Lumber operation has developed a fire watch checklist as part of its fire-preparedness plan. This checklist reminds the fire watcher to walk through the block and focus on the sites where high-risk activities such as falling, bunching and skidding took place and record where he or she patrolled, and at what time. The form also contains a place to record wind speed, temperature, weather and other details. By actively patrolling the high-risk areas and completing the form, the fire watcher demonstrates diligence in meeting fire-watch requirements.

Wildfire Regulation s. 8 – Precautions To Ensure That An Engine Does Not Cause A Fire

Skidders, excavators, feller-bunchers and other equipment used in industrial activities in the forest must be operated, equipped and maintained, so as not to cause fires. Engines must have spark arrestors and the exhaust system and muffler must be operating within manufacturer specifications.

There have been no determinations under the Act about the use of engines. On one site visited, the Board encountered a skidder operating without a muffler, which is a contravention of s. 8(e) of the WR.

Good practices

- Clean machines daily to remove needles, branches and other debris to reduce the risk of a fire.
- Ensure all equipment is equipped with a spark arrestor, and that the exhaust system and muffler are in good repair and operating within manufacturer specifications.

Wildfire Act s. 9 – Railway Operations

A railway company must maintain its equipment to prevent the start of fires, maintain the right-of-way so that it is mostly free of combustible material such as dry grass, and sufficiently patrol the right-of-way in order to detect fires.

The Board did not examine railway operations as part of this investigation because a railway is not considered a "party" as defined by WA. However, fire centre managers have made three determinations under the WA about railway-caused fires:

- In July 2005, a hot metal fragment from a train ignited a 5,560-hectare fire near Spences Bridge. The fire centre manager determined that the railway did not adequately maintain its equipment or its right-of-way.
- The same train ignited a 1.5-hectare fire further down the line. Again, the fire centre manager determined that the railway did not adequately maintain its equipment.
- In February 2010, a fire centre manager determined that a railway caused, or contributed to, the spread of 10 separate fires during the 2008 fire season.

Wildfire Act s. 10 – Utility Transmission Operations

Utility transmission equipment such as power lines and poles must be maintained to reduce the likelihood of starting a fire. Related sites, such as a right-of-way, must also be maintained to prevent fires from spreading.

The Board did not examine utility transmission operations as part of this investigation, but a fire centre manager made a determination about a fire caused by a transmission line.

In July 2006, a dead tree fell on a power line leading to a communications tower southwest of Kamloops, causing a 380-hectare fire. The fire centre manager determined that the utility company did not maintain its equipment and that it had contravened s. 10(a) of the WR. The determination was appealed to the Forest Appeals Commission, which also found that the utility was liable and that the utility company had failed to establish due diligence as a defense; in other words, it did not take reasonable steps to comply with the law. A vegetation management specialist who gave evidence at the appeal said that a regular cycle of vegetation assessment would have identified the dead tree as a hazard and, had it been identified, likely it would have been dealt with before it caused a fire.

Other Practices

Annual fire-preparedness planning and training

Many licensees, especially those that participate in voluntary forest certification initiatives, conduct annual fire-preparedness planning and training. Contractors and company employees meet before the fire season to review the requirements of legislation, practice using fire equipment and review past fires with an eye toward continuous fire preparedness improvement.

Before work begins at a site, contractors and licensees review all fire-preparedness requirements during a pre-work meeting and complete a fire preparedness checklist. Regular inspections of the site confirm that fire-preparedness requirements are being met, and, in addition to regular inspections, some licensees also conduct surprise audits.

While details may differ slightly between licensees, standard operating procedures and checklists clearly communicate a licensee's expectations around fire preparedness, and provide a record of inspections. Regular on-site monitoring further helps to demonstrate that a licensee has taken reasonable steps to ensure its contractors or crews are taking reasonable steps to prevent fires.

Summary

Good Practices

Suggestions for being diligent about fire preparedness:

General

Consider developing standard operating procedures and checklists. These clearly communicate a licensee's expectations around fire preparedness, and provide a record of inspections. Regular on-site monitoring further helps to demonstrate that a licensee has taken reasonable steps to ensure that its contractors or crews are taking reasonable steps to prevent fires.

Contact details

Provide 24-hour contact information to the fire centre before March 31 each year. Information about active operating areas and what equipment is on site is also useful to the fire centre.

Sufficient fire tools

Attach hand tools directly to machines and equip pick-ups with a shovel, Pulaski and a full and functional hand tank pump to ensure that there will always be enough tools for each worker even if individual tools are lost or broken.

FIGURE 13. Fire extinguishers mounted on an excavator.

Selecting a representative weather station

When determining whether or not a weather station is representative of a work site, consider slope, aspect, elevation (is the station at a similar or lower elevation than the work site), date of snow melt, distance from the weather station and topographical considerations (e.g., is the work site sheltered or subject to high winds?). The wildfire guidelines committee further suggests considering stand conditions, forest health, fuel type and fuel loading. If accessible, also consider the weather station maps previously available from the government. Selecting a number of nearby weather stations and averaging the danger classes is not recommended.

Document the reasons for selecting the representative weather station.

Operating in accordance with danger class restrictions

Operating according to the danger class restrictions is the law, but it should be viewed as a minimum requirement. Consider modifying activities as the danger class increases, for example:

- move to early shift before it is legally required;
- avoid tracked or chained equipment on rocky ground in high and extreme danger class; and
- avoid conducting high-risk activities when only one worker is present, when the danger class is very high or extreme.

Adequate suppression system

Before work begins, consider the size and topography of the work site to ensure that the suppression system can provide water to any part of the block should hand tools and fire extinguishers become ineffective. Identify on-site water sources and make sure everyone knows where they are.

Conduct a pre-work meeting to check fire preparedness, with weekly checks afterwards. Test equipment, including starting up the pump(s) and ensuring that parts are compatible and in good repair. Hold regular fire-suppression drills to test response time. Document these activities.

Consider having more than one water source on site, placed so as to be near different activities. Move the water around the site to keep it closest to the highest-risk activity.

Maintaining a fire watch

A fire watch must actively patrol the work site and be able to see the area where work took place. Performing other duties, such as maintaining a machine or processing wood while on fire watch does not satisfy the legal requirements for a fire watch. Ensure that the fire watch has the ability to call for help.

Document the fire watch start and finish times, areas patrolled, and the weather conditions.

Engines

Ensure all equipment has a spark arrestor, that the exhaust system and muffler are in good repair and that the machine is operating within manufacturer's specifications. Clean machines daily to remove needles, branches and other debris so as to reduce the risk of a fire.

Non-Compliance

Thirty-four active sites were sampled in the field—15 major licensees, 17 BC Timber Sales (BCTS) licensees and 2 contractors to BCTS. There were eight operations not compliant with the WA or WR—one major licensee, six timber sale licensees and one BCTS contractor.

1. Fire danger class 4 (high). Timber sale licensee operating under BCTS certification.

The operation was on early shift and had shut down at 1:00 pm. A processor operator was the fire watch. The operator was processing logs in one part of the block but was not actively patrolling the activity site and could not see most of the activity site. The suppression system consisted of 250 gallons of water, a nozzle and 100 feet of hose. There was no pump on site. The suppression system could not deliver water to every part of the block. As well, the water tank was located three kilometres from the processor. The Board found this suppression system to be inadequate. This is non-compliance with 6(4)(a), 6(4)(c) and 6(3)(b)(ii) of the WR.

2. Fire danger class 4 (high). Timber sale licensee operating under BCTS certification.

Falling and road construction were underway in a block. There were not enough hand tools for each worker on site and there was no suppression system on site. This is non-compliance with s. 5 and s 6.3 of the WR.

3. Fire danger class 4 (high). Timber sale licensee operating under BCTS certification.

Falling and road construction were underway in a block. There were insufficient hand tools for each worker on site and there was no suppression system on site. This is non-compliance with s. 5 and s 6.3 of the WR.

4. Fire danger class 2 (low). Major licensee not certified.

Logs were yarded to a road, bucked by hand and piled with a machine. There were two hand tools for three workers and no suppression system at the activity site despite the high-risk activity (yarding). The licensee did not determine fire danger class. This is non-compliance with sections 5, 6(2) and 6(3) of the WR.

5. Fire danger class 1 (very low). Timber sale licensee operating under BCTS certification.

A feller-buncher was cutting road right-of-way in a new block. A fire suppression system was located three kilometres away at the previous block, which was still active. Falling is a high-risk activity and there was no suppression system at the activity site. This is non-compliance with 6(3)(b)(2) of the WA.

6. Fire danger class 1 (very low). Timber sale licensee operating under BCTS certification.

A grapple skidder was skidding wood to roadside, which is a high-risk activity. The skidder had no muffler, and there was no suppression system or hand tools on site. This is non-compliance with section 8(e), 6(3)(b)(2) and 5 of the WR.

7. Fire danger class 1 (very low). Timber sale licensee operating under BCTS certification.

The suppression system at a logging site consisted of a water tank and 50 feet of hose. There was no nozzle, fittings or a pump. A second water tank was empty. The suppression system was not adequate. This is non-compliance with section 6(3)(b)(ii) of the WR.

8. Fire danger class 1 (very low). Contractor working under BCTS certification.

The contractor was doing mechanical-site preparation with a disc trencher, which is a high-risk activity. There was no suppression system on site. This is non-compliance with section 6(3)(b)(ii) of the WR.

Conclusions

Compliance

With only one exception, all of the major licensees sampled complied with the fire-preparedness requirements of the *Wildfire Act*. Most major licensees had some form of standard operating procedures for fire preparedness and monitored operations on a regular basis to ensure compliance.

The fire preparedness of timber-sale licensees and BCTS contractors was variable, ranging from excellent to poor. Of the 19 worksites visited, 7 did not comply with the WA. Despite the consequences of an industrial fire, some licensees and contractors are taking significant risks.

Representative Weather Information

Under the current system, weather information from network weather stations is applied to industrial operations that are often many kilometres away. This information is often not corrected for slope, aspect, elevation or rainfall. In some cases licensees are simply averaging the danger classes of three nearby weather stations without considering whether it is appropriate.

A lot of effort is spent on using remote fire weather information to try to predict fuel moisture and danger class at a particular site rather than simply measuring fuel moisture on site. Many licensees told us that they would appreciate more direction from government on how to ensure that weather data is representative of a particular work site, and a simple and cost effective way of measuring fuel moisture would support that. At least one licensee is already doing so by collecting precipitation information on site and combining it with data from a representative weather station to calculate an on-site danger class.

Reliance On Professionals

Relying on professionals in the context of fire preparedness is not working as well as it could and one reason is the lack of availability of wildfire management expertise.

In the case of harvesting or engineering, there are many knowledgeable and experienced professionals, well-established best management practices, and a robust communications network between academia, industry, consultants, regulating bodies and government. The same cannot be said for wildfire management—outside of government, there is an ongoing shortage of knowledgeable and experienced forest professionals. As a result, the probability of being unprepared for a fire is much higher.

A lack of detailed guidance from government is also an issue. Industry requires a level of assurance that its actions are reasonable, but in the absence of specific government guidance, licensees often default to the requirements of the old legislation. In the longer term this will likely increase costs to both government and industry, as best management practice will be developed by the courts rather than by professional fire managers. Timber-sale licensees in particular generally do not have in-house fire management expertise and they have limited capacity to obtain that expertise from elsewhere. They need guidance, coaching and mentoring from government.

Several licensees told the Board that they are taking on the brunt of the risk, but government is not providing the guidance to manage that risk. While the Board understands that government wants to encourage innovation and some licensees may appreciate the opportunity to innovate, government still needs to provide leadership and clear standards that will be used to judge performance. Many licensees suggested that the pendulum may have swung too far from prescriptive requirements to reliance on professionals, and that perhaps there is a place in-between where government can provide some direction and assurance while still encouraging innovation.

Government has listened to the concerns of industry and is developing industry guidance on wildfire prevention and suppression response. Licensees will have a choice—they can either use their own prevention and response system or they can use a system as defined in the guidance. The guidance is expected to be in place before the 2011 fire season.

Appendix 1: Fire Preparedness Determinations

Determination	Description	Suppression Cost and Damage Estimate	Penalty levied	Damages / Costs levied	Comments
DCH 24064 March 2007	A contractor's feller-buncher track ran over a rock and the resulting sparks ignited a 2.4 hectare fire. The weather station used was not representative of the site. The licensee and contractor contravened sections 3(1)(b) and 6(2) of the *Wildfire Act* (WA).	$2,190.60 suppression cost.	0	0	The district manager noted that a weather station close to the work site was not used, and that it showed a higher danger class rating than the station that was used. There should have been a clearer rationalization on the choice of weather station. The licensee is responsible for establishing a free-growing stand on the burned area.
DCH 25287 August 2007	A contractor had an agreement with a private landowner to remove beetle-killed timber. The site was rocky and a feller-buncher track ignited a fire. The fire danger was 5 (extreme) and had been for 7 days (i.e., no high-risk activities were permitted at all). There was no suppression system on site. The fire centre manager determined that the contractor contravened 3(1)(b) and 6(2)(a) and (b) of the WA and 6(3)(a) and (b)(ii) of the WR.	$41,000 in suppression costs.	$2,310	$34,758 in costs charged to the contractor.	Penalty breakdown: $1,600 (contractor) $240 (supervisor) $120 (operator) $350 (landowner)
DCS 24770-1 June 2008	A hot metal fragment from a train ignited a 5,560 hectare fire. The railway did not sufficiently patrol the line and did not adequately maintain its equipment or its right-of-way. The railway contravened WA 3(1), WR 9(a), 9(b) and 9(c).	$5.7 million suppression cost and $340,000 in damages.	$11,000	$255,000 for damage to Crown timber.	The province did not seek suppression costs because it had a Fire Control and Cost Sharing agreement in principle with the railway.
DCS 24770 June 2008	A hot metal fragment from a train ignited a 1.5-hectare fire. The railway did not adequately maintain its equipment. The railway contravened WR 9(a).	$7,237 suppression cost.	$1,000	0	The province did not seek suppression costs because it had a fire control and cost sharing agreement in principle with the railway.

Determination	Description	Suppression Cost and Damage Estimate	Penalty levied	Damages / Costs levied	Comments
DOS 25265 August 2008 and October 2009	A contractor was working for a licensee. A feller-buncher ignited a 134-hectare fire. The contractor did not have an adequate suppression system on site, did not maintain an adequate fire watch and did not adequately patrol. The contractor contravened WR 6(3)(b)(ii), 6(4)(a), 6(4)(c). The licensee was deemed to be vicariously liable.	$1.26 million in damages to Crown timber and $726,000 in suppression costs.	$20,000 for contractor and $0 for licensee.	$122,000 in damages billed to contractor, none billed to licensee.	The licensee appealed the determination to the Forest Appeals Commission but before the appeal was heard, the parties reached an agreement and the determination against the licensee was rescinded.
DOS 25294 September 2008	A contractor's feller-buncher started a fire which eventually grew to 1,811 hectares. A water tank was 1,400 metres away. The fire centre manager found that there was no adequate suppression system on site. Contractor and licensee both contravened section 6(3)(b)(ii) of the WR.	$6.7 million in damages to Crown timber and $1.77 million in suppression costs.	$10,000 for contractor and $10,000 for licensee.	A decision on cost and damages was to come later.	The licensee and contractor appealed the determination to the Forest Appeals Commission. Before the appeal was heard, the parties reached an agreement and the determination against the licensee was rescinded. The government is now suing the licensee for damages. The contractor's estate and the government reached an agreement and the estate withdrew its appeal.
DHW 26454 December 2008	A licensee's feller-buncher started a 70-hectare fire. A water tank and pump were 3.8 kilometres away and the fire watcher had no means to report a fire. The fire centre manager found that there was no adequate suppression system on site and no means to report the fire. Licensee contravened 6(3)(c) of the WA and 6(3)(b)(ii) and 6(4)(e) of the WR.	No estimate of damages or cost provided.	$5,000	0	
K20280 May 2009	A snag fell on a power line and started a fire that grew to 380 hectares. The fire centre manager determined that the utility did not maintain its equipment. The utility contravened WR 10(a).	$1.27 million suppression cost and $868,000 in damages to Crown timber.	0	$2.14 million	The utility appealed to the Forest Appeals Commission. The Forest Appeals Commission determined that the utility was liable, consistent with the fire centre manager's determination and the appeal was dismissed in Oct. 2010. The utility has appealed to the BC Supreme Court.

Determination	Description	Suppression Cost and Damage Estimate	Penalty levied	Damages / Costs levied	Comments
DCC 26216 July 2009	A contractor's feller buncher started a 29.5-hectare fire. A water delivery system was 18 kilometres away. The contractor and licensee used information from a weather station 25 kilometres away. A nearby weather station indicated a higher danger class and operations should have shut down at 1:00 pm. The fire centre manager determined that the weather station used was not appropriate and that there was no adequate suppression system on site. The contractor contravened 6(2) and (3) of the WR. Licensee also liable.	No estimate provided.	$0 for contractor and $4,700 for the licensee.	0	$300,000 in equipment was burned in the fire.
DAB 26543 August 2009	A tracked excavator was doing site preparation and started a fire which grew to 190 hectares. The licensee had difficulties reporting the fire to government. The suppression system on site was a five-gallon back pack tank and three ten-pound fire extinguishers. The fire centre manager determined that this was insufficient for the conditions and the licensee contravened WR 6(3)(b).	$93,000 in damages to Crown timber.	$5,000	0	Government did not seek suppression costs because BCTS had paid the fire protection levy. The determination was appealed to the Forest Appeals Commission but upon agreement of the parties, the Forest Appeals Commission rescinded the order.
February 2010	A railway caused or contributed to the spread of 10 fires.	$42,700 in suppression costs.	0	$42,700 for costs.	
DSC 26763 March 2010	A contractor clearing a hydro right-of-way burned a slash pile. The fire escaped and burned 14 hectares of free-growing plantation and 25 hectares of mature forest. The fire centre manager determined that there was no adequate suppression system on site. The contractor contravened s. 6(1) WA.	$90,000 in damages and $196,000 in suppression costs.	0	$286,000 in costs and damages.	
DOS 26935 April 2010	A fire started on a woodlot the day after the licensee was logging. The suppression system was located 15-minutes return travel time away. The fire centre manager determined that the licensee did not have an adequate suppression system on site and did not determine the fire danger class. The woodlot licensee contravened 6(2) of the WA and 6(3)(b)(ii) of the WR.	No estimate provided.	$1,250	0	The fire centre manager could not determine the cause of the fire based on the evidence.

PO Box 9905 Stn Prov Govt
Victoria, BC V8X 9R1 Canada
Tel. 250.213.4700 | Fax 250.213.4725 | Toll Free 1.800.994.5899
For more information on the Board, please visit our website at: www.fpb.gov.bc.ca

BRITISH COLUMBIA

File: ARCS-00350-25/15208F

June 23, 2011

To: All Forest Industry Licensees
Regional Executive Directors
District Managers
Fire Centre Managers

From: Gary Townsend
Assistant Deputy Minister
Integrated Resource Operations

Re: Update on Recent Wildfire Regulation Amendments and New Interpretive Bulletin

This letter provides an update to the forest industry on recent amendments to the Wildfire Regulation and includes a revised interpretive bulletin on the application of the wildfire regulation for fire prevention and suppression response.

The regulation amendments specify an option for the use of professional reliance for the purposes of fire hazard assessment and abatement. The Order in Council for the regulation amendment is attached, and the Wildfire Regulation will be updated online to include these amendments.

The revised interpretive bulletin on the application of the Wildfire Regulation for fire prevention and suppression response is also attached and it replaces a previous bulletin that was issued on June 12, 2008.

May 2011 Overview of Regulation Amendments

- The definition of "fire suppression system" has been amended to clarify that a water delivery system may be required as part of an adequate fire suppression system.
- A new definition of "qualified holder" has been established to be able to define the requirements to carry out hazard assessments and hazard abatement by the category of persons.

Ministry of Forests, Lands And Natural Resource Operations

Office of the Assistant Deputy Minister Integrated Resource Operations Division

Mailing Address: PO Box 9352 Stn Prov Govt Victoria BC V8W 9M1

Phone 250-356-1874 Fax 250-387-2335

- A professional reliance option has been recognized for qualified holders to conduct hazard assessments.
- A professional reliance option has been recognized for qualified holders to determine abatement levels based upon hazard assessments. In addition, the abatement period for qualified holders now beings at the start of an industrial activity and is 24 months in prescribed areas (equivalent to interface areas), and 30 months for areas outside of the prescribed areas (equivalent to non interface) from the start of the industrial activity in which to abate. Professional reliance may also be used to prescribed alternative periods for non-interface areas.

Interpretive Bulletin – Forest Industry Guidance

An updated interpretive bulletin (Interpretive Bulletin on the Application of the Wildfire Regulation for the Forest Industry) is intended to bring clarity around a wildfire prevention and suppression response associated with industrial activities as a result of some key issues raised by the forest industry.

This bulletin replaces all previous bulletins and provides guidance to the forest industry on a results based approach and the use of professional reliance for the determination of an appropriate fire prevention and suppression response. In addition an attached Appendix A to the guidance document provides a description of a default wildfire prevention and suppression response system that would apply in most given situations to meet legislative requirements.

The elements of the Wildfire Regulation as discussed have been developed in consultation with industry and we look forward to continuing our ongoing partnership with all stakeholders as we work together in managing the land base.

If you have any questions or concerns, please contact Lyle Gawalko (Lyle.Gawalko@gov.bc.ca) (250-387-5782) or your local Fire Centre.

Sincerely,

J Maxwell

for **Gary Townsend**
Assistant Deputy Minister

Attachment:
cc: Brian Simpson, Director, Wildfire Management Branch
Lyle Gawalko, Manager, Fire Management, Wildfire Management Branch

Ministry of
Forests, Lands and
Natural Resource Operations

WILDFIRE MANAGEMENT BRANCH

Interpretive Bulletin

on the Application of the Wildfire Regulation

for the Forest Industry

June 2011

Table of Contents

Objective and Scope 3
Background 3
Due Diligence 4
Results Based Approach and Professional Reliance 5
Fire Hazard 5
Hand tools 6
Fire suppression system 6
Fuel breaks 8
Work Restriction 9
Fire watcher 9
Site of the industrial activity 10
Representative Weather Data 11
Log forwarding 12
Log loading 13
Resources Available 13
Fire Hazard Assessment and Abatement 13
Hazard Assessment Period 14
Hazard Abatement Period 14
References: 15

APPENDIX A: DEFINED WILDFIRE PREVENTION AND RESPONSE SYSTEM 16
Part 1: Purpose 16
Part 2: General Requirements 16
Part 3: Industrial Activities 17
1. Fire fighting tools must be available on site 17
2. Operation of engines must be done safely 18
Part 4: High Risk Activities 19
Requirements for High Risk Activities: 19
1. Determine Danger Class 19
2. Follow Danger Class Restrictions and Durations 19
3. Keep Fire Fighting Tools and An Adequate Fire Suppression System At The Activity Site 19
4. Maintain Fire Watcher and Communication Requirements 21
5. Other Types of High Risk Industrial Activities 22
Part 5: Determination of Restrictions on High Risk Activities 22
1. Acquire Local Weather Data 22
2. Weather Resources available: 23
3. Determining the Restrictions on high risk activities 23
A. Determine Fire Danger Region 24
B. Determine the Danger Class: 25
C. Follow the Applicable Restrictions on High Risk Activities 28
Part 6: Definitions 29

Note: This bulletin replaces all previous bulletins on this topic. This guidance is not intended to provide legal advice, nor is it intended to fetter the discretion of the minister or delegated decision-makers in making statutory decisions. The views expressed in this bulletin are those of Wildfire Management Branch, and it is the responsibility of the person carrying out the industrial activity to meet the legislative requirements in all circumstances.

Objective and Scope

This bulletin is intended to provide guidance to forest industry and government staff who are seeking to comply with or assess compliance with provisions of the *Wildfire Act* and Wildfire Regulation for wildfire prevention and suppression response associated with industrial activities. This bulletin offers guidance on two ways to comply with regulatory requirements either through the use of:

1) a professionally designed wildfire prevention and suppression response; or,
2) a defined prevention and suppression response as set out in the attached Appendix A and based upon the previous Forest Fire Prevention and Suppression Regulation (FFPSR) and the current Wildfire Regulation.

The expected outcome of the *Wildfire Act* and Regulation is that fire starts are prevented, but, if a person causes a fire, they are required to extinguish it if practicable, or control the fire to limit fire spread and damage until additional resources arrive or the person is relieved by an official. The person must have enough resources available to ensure that the response to a fire is adequate, timely and commensurate with the fire hazard, in accordance with the legislation.

Background

The *Wildfire Act* and the Wildfire Regulation have provisions for results-based management and they incorporate the concept of professional reliance. The drafting of the Wildfire Regulation moved the legislation to a less prescriptive framework than had been the case under the former *Forest Practices Code of British Columbia Act* (FPC) and the Forest Fire Prevention and Suppression Regulation (FFPSR). This has resulted in a shift from prescribed requirements for all circumstances under the FPC to a requirement under the regulation to assess the fire hazard and prevent fire starts and if a fire starts, to limit fire spread and damage until additional resources arrive or the person is relieved by an official.

Note that the replacement of the FPC wildfire provisions with the results-based approach of the Wildfire Regulation did not signal that the old provisions were inadequate, but were meant to add flexibility for industrial users to adapt their fire preparedness and suppression response to local conditions and circumstances, so long as fire prevention and suppression results were maintained or improved relative to past practice.

In recognition that not all forest operations wish to utilize a professionally designed wildfire prevention and suppression response, and would instead prefer to use a defined prevention and suppression response option, this information is included in Appendix A (page 12). Appendix A provides guidance on basic fire fighting tools, water delivery systems, equipment and fire prevention that can be used to comply with legislation and fulfill the requirements of the Wildfire Regulation. A wildfire prevention and suppression

response option that varies from Appendix A would be considered to be a results-based approach in which reliance on professional advice and the exercise of due diligence would be key.

For a person responsible for complying with the Wildfire Regulation, the challenge is in determining – in advance and in their particular circumstances – when they have, for example, an 'adequate fire suppression system' (sections 6, 21, 22) or a sufficient 'water delivery system…to effectively fight a fire of reasonably foreseeable size' (section 1). Similarly the sufficiency of fire fighting hand tools and fuel breaks needs to be considered (sections 5, 7). When making these self-assessments, a person needs to consider the fire hazard and exercise reasonable care. It is intended that this bulletin will bring clarity to such issues.

The requirements of the Wildfire Regulation, such as for fire suppression systems, fire fighting hand tools or fuel breaks, are examined in detail during an inspection or a fire investigation. The examination will determine if the level of prevention is appropriate to limit the risk of a wildfire start (prevention) and extinguish if practicable, or contain the fire and limit fire spread and damage (suppression) in consideration of the fire hazard and the ability to respond.

Further, it is the intention of the WMB to relieve a person from carrying out voluntary firefighting within 48 hours subject to legislated priorities such as fire activity, workload demand and available resources. Voluntary firefighting will be compensated for in accordance with section 17 of the *Wildfire Act* and policy 9.1.

Due Diligence

Even if a fire starts or escapes, two defences may be raised including: due diligence and officially induced error. The concept of "*due diligence*" is central to the structure of the results-based forest practices legislative regime. Due diligence means exercising all reasonable care commensurate with the fire hazard. Reasonable care is assessed objectively based on what a prudent person acting reasonably would do in the same circumstances.

Under section 29(a) of the *Wildfire Act*, due diligence is a defence to an alleged contravention of the Act or the Wildfire Regulation. Establishment of a due diligence defence is up to the person conducting an industrial activity and this guidance is not intended to instruct how to do so.

It is recognized that not every fire will be prevented or contained. If a fire starts, or escapes initial attack efforts, an assessment of compliance with the *Wildfire Act* and Regulation will be conducted. If reasonable precautions were taken to prevent a fire from starting and spreading commensurate with the fire hazard and industrial activity, and those precautions would have been sufficient under normal or reasonably foreseeable circumstances to extinguish or suppress the fire until back-up resources arrived, then those precautions will be important considerations in a determination of compliance. In the event that circumstances that were reasonably unforeseeable (e.g. accident, extreme weather event) occur and allow a fire to escape suppression response, due diligence may be a defence against non compliance if it is determined that the measures in place would normally have prevented fire escape.

Results Based Approach and Professional Reliance

Under a results-based approach, professional reliance can be used by a person carrying out industrial activities to assess the risk of a fire start caused by each activity, the potential fire behaviour at the site of the industrial activity[1] at the times when fire starts are most likely, the expected response times, and the likely consequences should a wildfire occur. In this context, the person or their professional needs to determine what constitutes an adequate and sufficient wildfire prevention and suppression response.

Typically the person would rely on a forest professional to identify adequate and sufficient prevention and suppression response measures. If lacking the knowledge, experience, and expertise to identify and fully assess the relevant factors, the advising professional would be compelled to seek the advice of specialists or experienced peers with knowledge of fire behaviour, fuel management, fire response, etc. Wildfire Management Branch staff may provide assessment and peer review of proposed prevention and suppression response in general terms, however, this should not be interpreted as endorsement. The responsibility of meeting legislated requirements remains with the person carrying out the activity.

A professional may utilize a defined wildfire prevention and suppression response (noted in Appendix A) for some or many activities or circumstances. A professional may also utilize alternate measures to meet operational considerations that are expected to lead to the same or better prevention and suppression outcomes.

When varying from the defined prevention and suppression response, Industry is advised to employ due diligence in the development and deployment of alternate measures commensurate with the risk or degree of variation. Evidence of due diligence might include a written rationale or assessment of factors considered, emergency response plans for wildfire, deployment and inventory of suppression resources, fire weather monitoring activities, the opinions of qualified forest professionals, and other considerations.

In a results-based context, terms like “adequate” and “sufficient” may be satisfied when a person has to the extent practicable:

i. considered and mitigated the circumstances and conditions including the fire hazard that may result in the person’s industrial activity or activities causing a wildfire (prevention), and,

ii. in consideration of the fire hazard and the ability to respond (suppression), for a particular situation, taken reasonable steps to extinguish or control the fire to limit fire spread and damage until additional resources arrive or the person is relieved by an official.

Fire Hazard

For the purposes of this document, fire hazard is defined as:

[1] For a discussion of the “Site of the Industrial Activity” see page 7.

- ***the risk of a fire starting*** which relates to the risk conditions associated with fuel condition and weather (moisture content, arrangement, and type of fuel as well as past, current and predicted weather conditions);
- ***the hazard associated with an industrial activity*** (high risk activities are particularly hazardous but other activities can be hazardous in high risk conditions), and,
- if a fire were to start,
    - ***the volatility of the fire's behaviour*** meaning the rate of spread in consideration of the fuel characteristics, topography and weather (slope, aspect, wind, temperature, etc.) and,
    - ***the difficulty of controlling the fire*** (distance from other fire control resources, depth and arrangement of fuels, weather, etc.) and,
    - ***the potential threat to values at risk*** (probability and consequence of other values being impacted by the fire including interface, major infrastructure, and other values).

Hand tools

Under section 5 of the Wildfire Regulation, "if there is a risk of a fire starting or spreading … a person who carries out an industrial activity…" requires "…hand tools…to properly equip each person…" The intent is that when a fire starts, every worker at the site will actively participate in the suppression of the fire and will be suitably equipped to do so.

For the purposes of section 5 of the Wildfire Regulation, one of the first considerations is identifying that there is a risk of a fire igniting and then spreading to cause damage. If there is no risk of a fire starting or spreading (e.g. snow is covering the cutblock and it does not melt) there would be no need to have fire fighting hand tools on site.

It is intended that the number of tools required would be dictated by the number of workers assigned to the site during normal work. It is not intended that each site must have adequate tools to equip each and every person who may subsequently come on site to undertake fire control actions, since additional resources should arrive with their own tools.

Each worker should have access to a tool with which to carry out fire suppression work. "Fire fighting hand tools" are defined in regulation to include shovels, mattocks, pulaskis, fire extinguishers and hand tank pumps, and the components of a water delivery system can also be considered tools. A person working at the end of a nozzle, pulling hose in support or operating a pump would not require an additional hand tool, whereas a person building hand guard would be expected to have a hand tool such as a shovel, mattock or pulaski suitable for the ground conditions. Other tools such as a McLeod tool, hazel hoe or other effective fire fighting tools might be an effective alternative to a mattock or pulaski, if appropriate for the conditions and type of fire suppression expected.

Fire suppression system

The "fire suppression system" obligation does not apply to every industrial activity. The obligation applies to "high risk activities" as defined in section 1(1) of the Wildfire Regulation which are a subset of "industrial activities" as defined in subsection 1(3). In addition to the hand tool requirements, high risk

activities carry additional responsibilities including the obligation under subsection 6(3) (b) (ii) to keep an "adequate fire suppression system" on site when there is a risk of a fire starting or spreading.

Under section 1(1) of the regulation:

> ***"fire suppression system"*** *means a system for suppressing fire by delivering*
>
> > *(a) water,*
> > *(b) a suppressant,*
> > *(c) a surfactant, or*
> > *(d) any combination of the substances listed in paragraphs (a) to (c)*
> > *and may include a water delivery system*
>
> *"**water delivery system**" means a system that can*
>
> > *(a) deliver a sufficient volume of water to effectively fight a fire of a reasonably foreseeable size, taking all factors into consideration, including the conditions of any area where the water delivery system may need to be used, and*
> >
> > *(b) deliver water to any place*
> > > *(i) at the site of an industrial activity,*
> > > *(ii) on the burn area or site of the high risk activity, or*
> > > *(iii) reasonably adjacent to the burn area or the site of a high risk activity;*

Note that a water delivery system is a fire suppression system by definition, but that a fire suppression system need not necessarily include a water delivery system. It could be, for example, a system capable of delivering a chemical retardant or even a backhoe capable of covering a fire with soil (a suppressant) for rapid initial attack.

A fire suppression system can potentially take many shapes and forms as dictated by the type of high risk activity and the fire hazard. It may involve any of the application of: water alone, water mixed with a surfactant, a suppressant (e.g. soil, retardant, or foam), or a combination of all three. The system should be practical and reasonable for the activity being carried out, and capable of extinguishing or controlling the fire to limit fire spread and damage until additional resources arrive or the person is relieved by an official. If the fire suppression system involves the delivery of water, it should be nearby, operational and capable of being deployed in a length of time commensurate with current fire hazard.

The proximity and capacity of the fire suppression system should take into consideration the time to arrive to support the operation. As the fire danger rating increases, the available time to deploy a fire suppression system to support the suppression operation decreases. Larger more mobile systems may be located in a central area and serve several high risk activities, while smaller, less mobile fire suppression systems may be located in a strategic position or on the machine itself, for use by the operator.

Along with the fire hazard and values at risk, some other considerations for a fire suppression system may include:

- the ability to be activated quickly;
- the number of high risk activity sites to be serviced;

- the presence or absence of potential fire suppressant materials such as soil

While a fire suppression system could include, for example, a system capable of delivering a chemical retardant or even a backhoe capable of covering a fire with soil (a suppressant) for limited initial attack, for adequate suppression and control as the fire hazard increases, the fire suppression system at the site of the industrial activity should be supported up by a water delivery system that can be quickly deployed to the site to provide a full suppression response if required.

If water is in limited supply, a suppressant or surfactant may be added to the water in a water delivery system to improve its effectiveness. Use of a suppressant or surfactant reduces the rate or volume of water delivery expected from a water delivery system.

A component of a fire suppression system for initial attack may also include an automatic fire suppression system installed in a machine powered by a large engine and designed to extinguish an engine fire if that is the predominant risk of a fire start for that industrial activity. Some mobile logging equipment may have built-in systems for carrying and delivering water; as response is effectively immediate, such systems may be more effective than relying on a larger water delivery system that would be some minutes away and for that situation may be adequate, depending on the fire hazard at the time. As the fire hazard increases, however, it would be expected that an independent water delivery system be available for a full suppression response.

When assessing whether a fire suppression system is adequate, the assessment should focus on whether the system was reasonable for the expected fire hazard of the site. For example, if a gravity-feed water delivery system or a helicopter bucket will provide enough water to effectively extinguish an operations-related fire of the kind that might be reasonably anticipated at the site of the industrial activity, then the system could be considered adequate. In some situations, a backpack water tank may be adequate for the fire hazard. A pump system historically prescribed under the FPC wildfire provisions is considered adequate for low risk situations, although a person carrying out a high risk or any industrial activity should tailor their fire suppression system to suit the expected fire environment for the site.

A reasonable risk of a fire starting and spreading should be assessed based on available information, for example, by using the Canadian Forest Fire Danger Rating System (CFFDRS), probability of ignition models or established local fire history for that industrial activity under the site and environmental conditions present (weather, fuels, topography). For convenience, some Licensees may choose to maintain a prolonged readiness level for a higher fire danger class, rather than consciously escalating or diminishing readiness as circumstances and conditions change.

Fuel breaks

Under section 1(1) of the regulation:

> *"**fuel break**" means*
>
> *(a) a barrier or a change in fuel type or condition, or*
> *(b) a strip of land that has been modified or cleared to prevent fire spread;*

It is important to note that a fuel break does not necessarily mean a bladed guard. Anything – natural, engineered or constructed – that alters, modifies or removes the fuel to limit the chance of a fire spreading ought to be sufficient. For example, snow, water, natural bare rock or high fuel moisture could be an adequate fuel break. A temporary fuel break may be created using a sprinkler system to increase the moisture content of the fuel above its ignition point. The complete removal of all fuel to mineral soil would constitute a fuel break, but its adequacy would be measured in context of the width and the fire environment anticipated. When conducting pile burns, the area around the piles would likely be considered a fuel break if the ignition characteristics of the materials surrounding the pile are significantly lower than the materials in the pile, will not support significant fire spread from the pile and will remain that way for the duration of the burn. The fuel break should ensure that fire spread from the pile remains within the fuel break and does not cause damages or require a suppression response. A fuel break should be within a reasonable distance from the intended pile burn, should be maintained for the duration of the burning, be of adequate scope to address the reasonable risk of the burn (e.g.: adjacent fuel, slope, winds) to escape, and should be properly monitored and maintained. Where the intent is to broadcast all or most of the unburned slash in a cutblock, a resource management open burn should be planned.

In a results-based regime, the sufficiency of a fuel break would be assessed as part of an incident, inspection, or investigation where a fire spreads beyond the fuel break. There may be conditions under which a fuel break may not completely prevent a fire from spreading. If a fire does spread, an investigation may be implemented, but, fire spread may not automatically infer non-compliance with the fuel break requirements. A fuel break will be considered insufficient where it is found that a fire would easily spread beyond the intended burn area under reasonably expected fire conditions and current and predicted weather conditions.

Work Restriction

"High risk activities" include the obligation under Schedule 3 of the Wildfire Regulation to alter activities during periods of moderate, high, and extreme Fire Danger Class.

The meaning of the term "after 3 consecutive days" in Schedule 3 means after the calendar days in which fire weather indices were calculated. In other words, it is sufficient to implement these provisions on the 4th day. For example, on the 3rd day of DGR III calculated at 1:00pm PDT a fire watcher is not required at the end of a normal daytime shift on the 3rd day, but is required after work on the 4th day. "After the fire danger class falls" on the other hand means as soon as the weather data (e.g. sufficient rain is recorded ahead of the 1:00 pm measurement) permits recalculation of the DGR to below the threshold.

Fire watcher

Schedule 3 and subsection 6(4) of the Wildfire Regulation set out the requirements for fire watchers on high risk industrial activities. Note that the fire watcher should not be engaged in other activities that compromise their ability to "actively watch and patrol" or "reasonably see the site of the high risk". If required, a fire watcher should also be able to carry out fire control activities either with a hand tool or other suppression equipment if practicable.

Site of the industrial activity

The Wildfire Regulation uses terms such as "a site in that area" (section 5); "activity site" (section 6(3)(b)); "site of …activity" (sections 1, 6(4), 11(1)(b)(ii), 12(2), 13(1)); "location of the activity" (section 6(2)); "site of …operation" (section 11(1)(b)(ii)). For convenience the term "site of the industrial activity" is used in this document to refer to the use of all of these terms in the regulation.

The site of the industrial activity is the location where the activity is taking place. It includes both stationary activities (i.e. milling, portable chipping and manufacturing) and mobile activities (i.e. mobile logging equipment).

For stationary activities, the site of the industrial activity would be the area in the immediate proximity of the industrial activity.

For mobile sites, the site of the industrial activity would be assessed in terms of the specific location where the industrial activity is taking place, or where the industrial activity has recently taken place on a given day. It is not intended to be the potential area where the industrial activity could take place.

In some circumstances it may not always be clear what the bounds of the site of the industrial activity actually are for interpretation of the regulation. For example, cutblocks are often broken up into multiple portions for biodiversity, riparian protection, appraisal, fuel management, or other reasons and may contain significant internal fuel breaks such as roads, large streams, and leave strips. A helicopter logging operation may involve dozens of widely separated openings or even single stem extractions.

It is important to keep in mind that the rules for industrial activities are intended to ensure that the person conducting the activity is able to provide an effective fire suppression system that extinguishes or contains the fire and limits fire spread and damage until additional resources arrive. It is not intended that the person be responsible for other fire starts in the vicinity not directly related to their own industrial activity (e.g. lightning, public, unrelated industrial activities). In this context, the site of the industrial activity should be thought of as the area in the immediately vicinity of the potential ignition sources (machinery, running cables, workers) associated with the activity.

The intent is that a person can extinguish a fire start quickly, or contain it until additional resources arrive. The minimum resources must be sufficient to carry out this fire suppression response, but does not need to be so robust as to ensure, for example, water delivery to the farthest corner of a large cutblock, unless that is where industrial activities are actually being conducted that day.

For a cable yarding operation, the site of the industrial activity should be thought of a relatively confined bubble zone or buffer area around the potential ignition sources into which fire spread could be anticipated so that fire suppression efforts can deliver a sufficient volume of water and/or suppressant to extinguish or control the fire to limit fire spread and damage until additional resources arrive or the person is relieved by an official. Whatever the activity, the site should be thought of in the context of the potential ignition point(s) and the initial attack of a fire growing from that ignition point with consideration of the conditions (slope, fuel, anticipated fire weather) at and adjacent to that ignition point.

Based upon the fire hazard, a professional may determine that a water delivery system can be shared between activity sites in close proximity to one another. Larger more mobile systems may be located in a

central area and serve several high risk activities, while smaller less mobile systems may be located in strategic positions or on the machine itself for use by the operator. Nevertheless, when covering two (or more) activities with a single system, a key consideration remains that as the fire danger rating increases, the available time to deploy a fire suppression system to any of the activity sites must meet the objective of extinguishing a fire if practicable, or, controlling the fire to limit fire spread and damage until additional resources arrive or the person is relieved by an official.

Representative Weather Data

Subsection 6(2) of the Wildfire Regulation requires the person conducting a high risk activity to determine the Fire Danger Class for the site of the industrial activity during the "fire season" period from March 1 to October 31, except for the days when the ground is covered by snow. The determination of Fire Danger Class relies on calculation of fire weather indices based on representative weather data, with reference to tables appended as Schedules 1 and 2 to the Wildfire Regulation that indicate the Fire Danger Class.

Outside of the fire season period, representative weather data is not generally available from field weather stations, so calculation of Fire Danger Class and related indices for the purposes confirming the assumption of no "risk of a fire starting or spreading" under subsection 1(5) is neither practicable nor expected unless WMB provides general notification that it is a year with unusual weather patterns. Thus neither are the provisions in section 6 for hand tools, fire suppression systems, fire watchers, or work restrictions necessary outside of the fire season.

During the fire season, persons conducting a high risk activity are required to use "representative" weather data for the area to determine the Fire Danger Class for their site of the industrial activity. The onus is on the person carrying out the activity to determine what the representative weather station is for the area. The source of this data could be from the person's own weather station(s), government weather stations, or from third party weather stations.

A person may need to adjust or adapt the available Fire Danger Class (DGR) estimates from an established weather station for the conditions specific to the site of the activity. If conditions at the site of the activity are similar to a reference weather station then no adjustment or adaptation should be needed. Major factors to consider when judging representativeness could include distance, BEC variant, and large elevation changes. Other potential considerations may include differences in prevailing wind direction and force (exposure), date of snow melt, aspect, or relative proximity to bodies of water (humidity).

Persons conducting high risk activities may wish to establish a portable weather station at or near the site of the industrial activity to determine the Fire Danger Class for the specific area. More information on the establishment of a portable weather station is available from a free publication entitled, "*Weather Guide for the Canadian Forest Fire Danger Rating System*".

Due to concerns with ongoing maintenance, theft, vandalism, maintaining data integrity, and management and initial calibration of stations following frequently re-located activities, it may be impractical for persons conducting multiple high risk activities in the same locale or vicinity to maintain a portable weather station at the specific site of each and every activity. Nonetheless, if intending to conduct high risk activities during prolonged periods of higher Fire Danger Class, it is a requirement to have accurate

weather information and to ensure FWI and DGR calculations are representative of the site of the industrial activity. This could include using hand held weather monitoring equipment to verify local FWI and DGR levels.

Where weather stations or instruments are temporarily located at a site of the industrial activity, DGR adjustments would be made by a professional, or a person under the guidance of a professional, in response to changing conditions at the site. When in an adjustment situation, the main condition to be aware of is the possibility that the DGR of the site of the industrial activity needs to be bumped up a Class relative to the reference weather station(s) due to more severe conditions (e.g. temperature, wind or RH) at the site of the industrial activity. An understanding of the effects of weather input data on fire weather indices and DGR is essential.

Periodic weather observations from the site of the industrial activity may be used to correlate with observations at the representative weather station to confirm its representativeness for the site of the industrial activity, or make DGR adjustments. If a professional, or a person under the guidance of a professional, conducting an industrial activity has access to FWI and DGR calculations for their operating area and can demonstrate awareness of the relative appropriateness of the DGR estimate to their site of the industrial activity(s) then the "representativeness" test should be met.

Fire Danger Class for government forestry weather stations is found under the heading 'Danger Class Report'. Accurate locations and elevations of the stations are to be found under 'Weather Stations'. Note that the government's forestry weather network was designed to support fire preparedness for the government's fire operations. This weather network was not designed or intended to accurately describe all potential, site-specific fire environments across the province.

More detailed information on fire weather codes and indices of the Canadian Forest Fire Danger Rating System, along with other weather information and fire weather forecast details are available through subscription. Important reference material is contained in the publication entitled "Weather Guide for the Canadian Forest Fire Danger Rating System (Armitage, 2008).

Log forwarding

"Log forwarding" is included as a high risk activity (section 1(1)), and should be interpreted as the use of a self-propelled machine designed to transport or move logs or trees across the ground of a cutblock to roadside. Often this is a self-loading, off-road transporter but may also include a backhoe swinging logs towards a road by "hoe forwarding" or "shovel logging".

The description of log forwarding contained within the definition of "high risk activity" in the Wildfire Regulation specifically excludes a logging truck being loaded or hauling on a road. Therefore, a self-loading logging truck on a road or landing would not be considered log forwarding. If however the self-loading logging truck drives off the road out into the cutblock, it could be considered log forwarding.

Forwarding (or skidding) operations that are conducted using puncheon or on thick forest floors, where sparks caused by metal parts of the equipment contacting rocks in or on the ground of the running surface are unlikely to occur, are not considered high risk.

Log loading

A log loader operating at roadside is not considered a high risk activity. A loader operating at roadside includes loaders that may be positioned over the roadside ditch, on debris, slash, or operating on undisturbed forest floor material adjacent to the road. Movements of the loader, such as from log deck to log deck, or repositioning between loading trucks, would not be considered a high risk activity.

Where a person decides to operate a tracked machine loading logs off the road in slash, there is an overarching obligation for the person to be duly diligent regarding section 6 of the *Wildfire Act*, which specifies that a person must do so "at a time and in a manner that can reasonably be expected to prevent fires from starting".

Resources Available

For the purposes of section 13(1)(a) of the Wildfire Regulation, it is important to note that a person conducting the industrial activity is required to make available the person's workers who are working within 30km by road and the person's fire fighting tools and heavy equipment if those resources are within 30km by road of the site of the industrial activity. The definition of "worker" in Section 1(1) specifically excludes from this requirement those working at a non-portable timber processing facility (e.g. sawmill), in a clerical or administrative capacity, or on a tug or barge. Note that it is not expected that all available resources be dispatched immediately on a report of a wildfire, but that such resources will be deployed 'as appropriate given the circumstances and conditions…' (section 13(2)) until the fire is extinguished, or it becomes impracticable to continue with fire control, or an official relieves the person in writing (*Wildfire Act*, section 6(3)(b)).

The intention of this provision is not to impact stationary processing facilities (mining operations or otherwise). Barge camps, the barge and its employees are not resources that the person must make available for fire control activity. If these facilities, other employees or equipment are required, section 16 of the *Wildfire Act* allows for an official to issue a requisition order that requires a person to supply facilities and equipment that the person owns or has use of and the person's direct employees for fire control.

Fire Hazard Assessment and Abatement

Fire hazard assessments and fire hazard abatement are key activities in preventing potential wildfire threats arising from fuels left on the land base from harvesting operations. It is essential to carry out assessment and abatement to reduce the risk of wildfires, not only to reduce the impact in the harvested area, but also the impact on adjacent or nearby interface areas, infrastructures, and other values at risk.

The *Wildfire Act* requires persons conducting an industrial activity or a prescribed activity (s. 7) on forest or grass land or within one kilometre of forest land or grass land to conduct fire hazard assessments and abate if required.

The *Wildfire Regulation* sets out the prescribed activity or industrial activity and states that if a hazard is made, it must be abated (s. 11 and s. 12).

Wildfire Regulation amendments now allow for professional reliance options for hazard assessments and abatement for a specific category or persons: "qualified holders". A qualified holder is a person who has a valid cost sharing or service agreement in place with Wildfire Branch or is the holder of a specified licence under the Forest Act and is required to pay annual rent under the Annual Rent Regulation.

The existing section 12 hazard abatement requirements will continue to apply for all persons who do not meet qualified holder requirements. Those persons will be required to abate to the extent prescribed in the Regulation.

To assist persons who have fire hazard assessment and abatement obligations, Wildfire Management Branch is preparing *A Guide to Fire Hazard Assessment and Abatement* that will specify how to assess hazards and when to conduct abatement. This guide can assist forest professionals in assessing fire hazards associated with industrial or prescribed activities, and in creating hazard assessment and abatement strategies for a forest licensee or other stakeholder that has an obligation to assess and abate. Note that the due diligence defence of a person that carries out the industrial or prescribed activity may hinge on having followed the professional's advice, direction and recommendations.

A forest professional working for a qualified holder may choose to use the guide to derive abatement recommendations, or may provide alternate recommendations based on professional consideration of the relevant factors and local application of them to the site of an industrial or prescribed activity. Professional recommendations would include due diligence such as a rationale supporting either an alternate recommendation or an alternate hazard assessment procedure and abatement approach.

Hazard Assessment Period

Section 11(3.1) of the Wildfire Regulation allows a "qualified holder" who carries out an industrial activity or prescribed activity to rely upon a forest professional to specify alternative interval periods for hazard assessments. A professional would consider the type of activity being carried out, the fire hazard and associated risks, the intervals in which the assessments must be completed and the time frames within which to abate once a fire hazard has been identified.

For persons that are not qualified holders assessment time periods specified by Section 11 apply.

Hazard Abatement Period

Section 12.1 of the Wildfire Regulation specifies an abatement period beginning from the date of commencement harvest of 24 months (for interface) and 30 months (for non interface) for a "qualified holder" or as specified by a forest professional for non interface areas. Professional reliance is also used to determine the extent in which to abate.

For persons that are not qualified holders Section 12 abatement time periods and extents apply.

Wildland urban interface areas are required to be assessed and abated in shorter time periods than that of non-interface areas because of the higher values at risk.

References:

Armitage, B. L. (2008). Retrieved April 8, 2011, from the Canadian Forest Service, Northern Forestry Centre: http://cfs.nrcan.gc.ca/pubwarehouse/pdfs/29152.pdfhttp://cfs.nrcan.gc.ca/pubwarehouse/pdfs/29152.pdf%20

Forest Practices Board report, February 2011, Fire Preparedness Special Investigation – Summary of Good Practices .

APPENDIX A: DEFINED WILDFIRE PREVENTION AND RESPONSE SYSTEM

Part 1: Purpose

This document provides guidance on a wildfire prevention and fire response system that would apply in most given situations, to meet the requirements of the *Wildfire Act* and the Wildfire Regulation. This guidance is based upon many of the requirements specified in the now repealed Forest Fire Prevention and Suppression Regulation (FFPSR) of the *Forest Practices Code of British Columbia Act* and the current Wildfire Regulation.

Some industrial operators may not have the capacity or resources to professionally design a prevention and suppression response system. The objective of this guidance document is to assist a person conducting industrial activities by providing a description of a default prevention and suppression response that could be used to meet the requirements of a fire preparedness and fire response system for levels of fire hazard typically encountered when conducting an industrial activity during the fire season.

Note that all persons using this guidance document are not relieved of the responsibility and obligations set out in the Wildfire Act and Regulation and any other relevant statutes that apply. This wildfire prevention and suppression response guidance should be used in consideration of the fire hazard and a person should consider all of the material factors to be considered when there is a high risk of a fire starting or spreading. For typical operations, these factors include:

- the foreseeable size of the fire, given the fuels, fire danger rating, weather, etc.,
- the quantity of water required to extinguish a fire at a site of the industrial activity ;
- the delivery method, effectiveness and deployment time of fire suppression and water delivery systems;
- access considerations to the site of the fire;
- conditions in the area where the water may be used;
- an adequate quantity of water at the site of the industrial activity.

The expected outcome of the Wildfire Act and Regulation is that fire starts are prevented, but if a person causes a fire, they are required to extinguish it if practicable, or control the fire to limit fire spread and damage until additional resources arrive or the person is relieved by an official. The person must have enough resources available to ensure that the response to a fire is adequate, timely and commensurate with anticipated fire hazards. If conducting a high risk industrial activity a person needs to monitor Fire Danger Class, maintain a fire watch and an adequate fire suppression system, and to follow work restrictions as required by regulation.

Note: Important definitions are included in Part 6 below and they should be reviewed and thoroughly understood.

Part 2: General Requirements

Prior to each fire season there is a requirement to provide contact details to the local Fire Centre.

Before March 1 of each year, a person who, under the *Forest Act*, is the holder of

(a) a major licence,
(b) a timber sale licence that is not a major licence,
(c) a community forest agreement, or
(d) a woodlot licence
(e) First Nations Woodland License

must provide an official with a 24 hour a day contact telephone number if the person proposes to carry out an industrial activity on or after March 1 and before November 1 of that year.

Fire Centre Contact Information:

Fire Centre	**Telephone Number**
Cariboo Fire Centre, Williams Lake	250-989-2600
Coastal Fire Centre, Parksville	250-951-4222
Kamloops Fire Centre, Kamloops	250-554-5500
Northwest Fire Centre, Smithers	250-847-6600
Prince George Fire Centre, Prince George	250-565-6124
Southeast Fire Centre, Castlegar	250-365-4040

Part 3: Industrial Activities

"**industrial activity**" is listed in section 1(3) of the Wildfire Regulation and includes:

(a) land clearing,
(b) high risk activities;
(c) operating equipment or machinery in relation to forest management during
- (i) road construction, road maintenance and road deactivation,
- (ii) timber harvesting, including sorting logs,
- (iii) mechanical modification of forest debris and debris piling,
- (iv) silviculture treatments, or
- (v) portable wood chipping, milling, processing or manufacturing;

(d) operating equipment or machinery in relation to activities other than forest management during
- (i) debris piling,
- (ii) road construction, road maintenance or road deactivation,
- (iii) rock drilling,
- (iv) mining operations,
- (v) railway operations,
- (vi) utility transmission operations, or
- (vii) portable wood chipping, milling, processing or manufacturing.

1. Fire fighting tools must be available on site

When conducting an industrial operation, sufficient fire fighting hand tools must be available on site during the fire season on or after March 1 and before November 1, if the area is snow free.

If there is a risk of a fire starting or spreading on an area that is

(a) forest land or grass land, or
(b) within 300 m of forest land or grass land,

A person who carries out an industrial activity at a site in that area must ensure that fire fighting hand tools are available at that site in a combination and type to properly equip each person who works at the site with a minimum of one fire fighting hand tool per person:

- one round-nosed shovel;
- one pulaski tool or mattock; or
- one hand-tank pump containing at least 18 litres of water.

2. Operation of engines must be done safely

All engines should be operated and maintained in accordance with the manufacturer's specifications in a manner that prevents fires from starting.

Operation of large engine (greater than 7.5 kw or 10 hp)
The person carrying out an industrial activity should provide and ensure that every large engine used in an industrial activity has attached to it, at least the following fire fighting tools:

- one round-nosed shovel; and
- one pulaski tool or mattock; and
- one fire extinguisher with a ULC rating of at least 3A 10BC or an integral vehicle fire suppression system for any engine fires; and
- one fire extinguisher with a ULC rating of at least 1A 5BC for any fire suppression required near the large engine at the activity site,

A person should not operate a large engine unless all of the following conditions are met:

- It is equipped with a safe and effective device for arresting sparks that is an integral part of the exhaust system, and is in good repair.
- A person should not operate a large engine that operates in a stationary capacity unless the site has a fuel break or it has been cleared of combustible material for a distance of at least 3 m in each direction from the large engine.

Small Engines (less than or equal to 7.5 kw or 10 hp)**:**
A person should not operate a small engine unless all of the following conditions are met:

- The muffler has an adequate spark arrester; and,
- The engine or the hot carbon emission being produced by the engine are prevented from coming in contact with combustible material, and there is available at the times when the engine is operated, a fire extinguisher charged with at least 0.225kg (0.5lb.) of fire extinguishing chemical.

Part 4: High Risk Activities

"high risk activity" as defined in section 1 of the Wildfire Regulation includes:

(a) mechanical brushing;
(b) disk trenching;
(c) preparation or use of explosives;
(d) using fire- or spark-producing tools, including cutting tools;
(e) using or preparing fireworks or pyrotechnics;
(f) grinding, including rail grinding;
(g) mechanical land clearing;
(h) clearing and maintaining rights of way, including grass mowing;
(i) any of the following activities carried out in a cutblock excluding a road, landing, roadside work area or log sort area in the cutblock:
    (i) operating a power saw;
    (ii) mechanical tree felling, woody debris piling or tree processing, including de-limbing;
    (iii) welding;
    (iv) portable wood chipping, milling, processing or manufacturing;
    (v) skidding logs or log forwarding unless it is improbable that the skidding or forwarding will result in the equipment contacting rock;
    (vi) yarding logs using cable systems;"

Requirements for High Risk Activities:

1. Determine Danger Class

A person who carries out a high risk activity on or within 300 m of forest land or grass land on or after March 1 and before November 1, unless the area is snow covered, must determine the Fire Danger Class.

(See Below - Part 5: Determination of Restriction on High Risk Activities).

2. Follow Danger Class Restrictions and Durations

(See Below - Part 5: Determination of Restriction on High Risk Activities).

3. Keep Fire Fighting Tools and An Adequate Fire Suppression System At The Activity Site

If there is a risk of a fire starting or spreading then fire fighting tools and an adequate fire suppression system must be kept at the activity site. During the fire season on or after March 1 and before November 1, this may occur anytime that an area is snow free.

A **"fire suppression system**" means a system for suppressing fire by delivering
(a) water,
(b) a suppressant,
(c) a surfactant, or
(d) any combination of the substances listed in paragraphs (a) to (c), and
may include a water delivery system [section 1, Wildfire Regulation]

Water Delivery System – ground based: a "water delivery system" is defined in section 1 of the Wildfire Regulation and means a system that can:

(a) deliver a sufficient volume of water to effectively fight a fire, taking all factors into consideration, including the conditions of any area where the water delivery system may need to be used, and,

(b) deliver water to any place
(i) at the site of the industrial activity,
(ii) on the burn area or site of the industrial activity, or
(iii) adjacent to the burn area or the site of an industrial activity

The water delivery system should be able to deliver water at a sufficient volume and pressure to effectively fight a fire of a reasonably foreseeable size, taking all factors into consideration, including conditions of any activity site where the fire suppression system may need to be used.

For the purposes of this guidance document, a water delivery system consists of a water supply, a water pump or equivalent means of pressurizing water plus the ancillary hoses, attachments and tools necessary for the operation and maintenance of the system if these can deliver, to any place on a worksite:

- water at an effective nozzle pressure of a minimum of 25 psi through a standard 9.50 mm straight bore nozzle opening for 50 minutes, or

- 2,500 litres of liquid, of which 0.5 per cent is a liquid surfactant concentrate that, when added to water and used with a pump, hose and nozzle, is capable of producing foam that will extinguish a fire in ordinary combustibles such as wood, paper or forest products.

A person carrying out an industrial activity that is a saw mill or dryland log sort should provide at least one water delivery system at the saw mill or log sort site.

If it is unreasonable to provide the water delivery system because of the terrain, or lack of available surface water on site, a portable pump unit and a water source of at least 4,500 litres or equivalent (aka use of a liquid surfactant noted above) may be substituted. Note that this could include the cumulative capacity of several smaller water sources, relay and/or other tanks, as alternative options.

"**Pump Unit**" means water pump including a gravity system that is capable of maintaining a minimum effective nozzle pressure of 25 psi from a standard 9.5 mm nozzle at any place on the site of the industrial activity.

Hand falling/Motor manual (i.e. brush saws) brushing: For hand falling and brush saw operation, each faller or operator should have, at a minimum, a personal fire extinguisher.

Cable logging
Cable logging is also included under the definition contained in section 1 of the Wildfire regulation of a “high risk activity”

A person carrying out an industrial activity that is a cable logging system should

(a) layout all running lines in straight lines,
(b) remove branches, brush and shrubs to a width of at least 75 cm on each side of the running line for a minimum distance of 4 m in either direction from each corner block, and
(c) and provide a hand-tank pump containing at least 18 litres of water and keep it immediately adjacent to each corner block that is in use.

Fire fighting tools - helicopters
If one or more helicopters are normally used in a timber harvesting operation to move personnel and equipment to and from the site of the industrial activity, the person carrying out the timber harvesting operation should keep at a landing spot near the site of the industrial activity, for the exclusive use of each helicopter, a water bucket that is

- of a type designed and adapted for aerial firefighting,
- capable of being attached to a helicopter,
- capable of being both filled and emptied from a helicopter while the helicopter is airborne
- of a capacity near the normal operating load for the type of helicopter used

4. Maintain Fire Watcher and Communication Requirements

Fire watcher
A person who, in accordance with section 6(4), section 6(3)(a) and Schedule 3 of the Wildfire Regulation, is required to maintain a fire watcher, must ensure that the fire watcher:

(a) can reasonably see the site of the high risk activity during the time the fire watcher is required,
(b) has at least one fire fighting hand tool,
(c) actively watches and patrols for sparks and fires on the site of the high risk activity,
(d) immediately carries out fire control and extinguishes the fire, if practicable, and
(e) has the means on site to report the fire.

(2) If the fire watcher reports a fire to a person carrying out an industrial activity, the person should immediately report the forest fire to a Fire Centre Manager or delegate, district manager, a designated forest official, peace officer or person answering a forest fire reporting number in accordance with the Wildfire Act and regulation.

Communications Equipment

A person who carries out an industrial activity, or who is a fire watcher, should have either an operational two-way radio or telephone so that if a fire starts, assistance may be immediately requested.

5. Other Types of High Risk Industrial Activities

Hot work - welding, cutting or using any other tool that may cause a fire or spark: Hot work activities are included under the definition contained in section 1 of the Wildfire regulation of "high risk activity" in the Wildfire regulation.

- Where there is a reasonable risk of a fire starting and spreading, a person should not perform hot work unless a fire watcher is present.
- Minimum fire watcher requirements following completion of the hot work are outlined in Schedule 3 of the Wildfire regulation

Fire fighting tools - hot work and use of explosives

A person should provide the following fire fighting tools at each activity site where hot work is performed, or if explosives are used at the place from which the blast will be controlled:

- 2 fire extinguishers each with a ULC rating of at least 3A 10BC;
- one round-nosed shovel;
- 2 hand-tank pumps containing at least 18 litres of water each.

Hot work is a "high risk activity" under section 1(1) of the Wildfire Regulation and where there is a risk of a fire starting and spreading, a person should not perform hot work unless a fire watcher is present. Minimum fire watcher requirements are outlined in Column 2 of Schedule 3 of the Wildfire regulation.

Part 5: Determination of Restrictions on High Risk Activities

1. Acquire Local Weather Data

Acquiring local weather data to comply with the Wildfire Regulation is the responsibility of the person conducting the high risk activity and is considered a cost of doing business. With the exception of the Danger Class, WMB does not provide unrestricted access to the weather data from government fire weather stations.

Weather data must be acquired from a representative weather station, whether established by the operator or another party.

The WMB weather network was not designed explicitly to support industrial operations. If in doubt, a person should consult a forest professional or other qualified person in order to determine whether or not a particular station is applicable to the work site, or whether adjustments should be made when considering a number of potential differences and the significance of each, including:

- distance from the weather station;
- elevation;
- date of snowmelt;
- aspect, etc.

For due diligence, persons conducting high risk industrial operations may wish to document how a particular station is and continues to be representative.

2. Weather Resources available:

A free publication entitled, "*Weather Guide for the Canadian Forest Fire Danger Rating System 2008*". [Lawson, B.D.; Armitage, O.B. Natural Resources Canada, Canadian Forest Service, Northern Forestry Centre, Edmonton, Alberta. 84p.] provides guidance on setting up a weather station.

Weather station information is available on the WMB website that provides the latitude and longitude of each weather station and also includes a map of the province showing the location of each weather station. Go to Weather Station page.

Finally, if a person does not possess weather monitoring equipment, then:

- This equipment may be purchased; or
- Weather data information can be provided by WMB by subscription. Weather data and calculated Fire Weather Index values are available from this service. A BCeID will be required, https://www.bceid.ca/. Please contact the nearest Fire Centre for more information

3. Determining the Restrictions on high risk activities

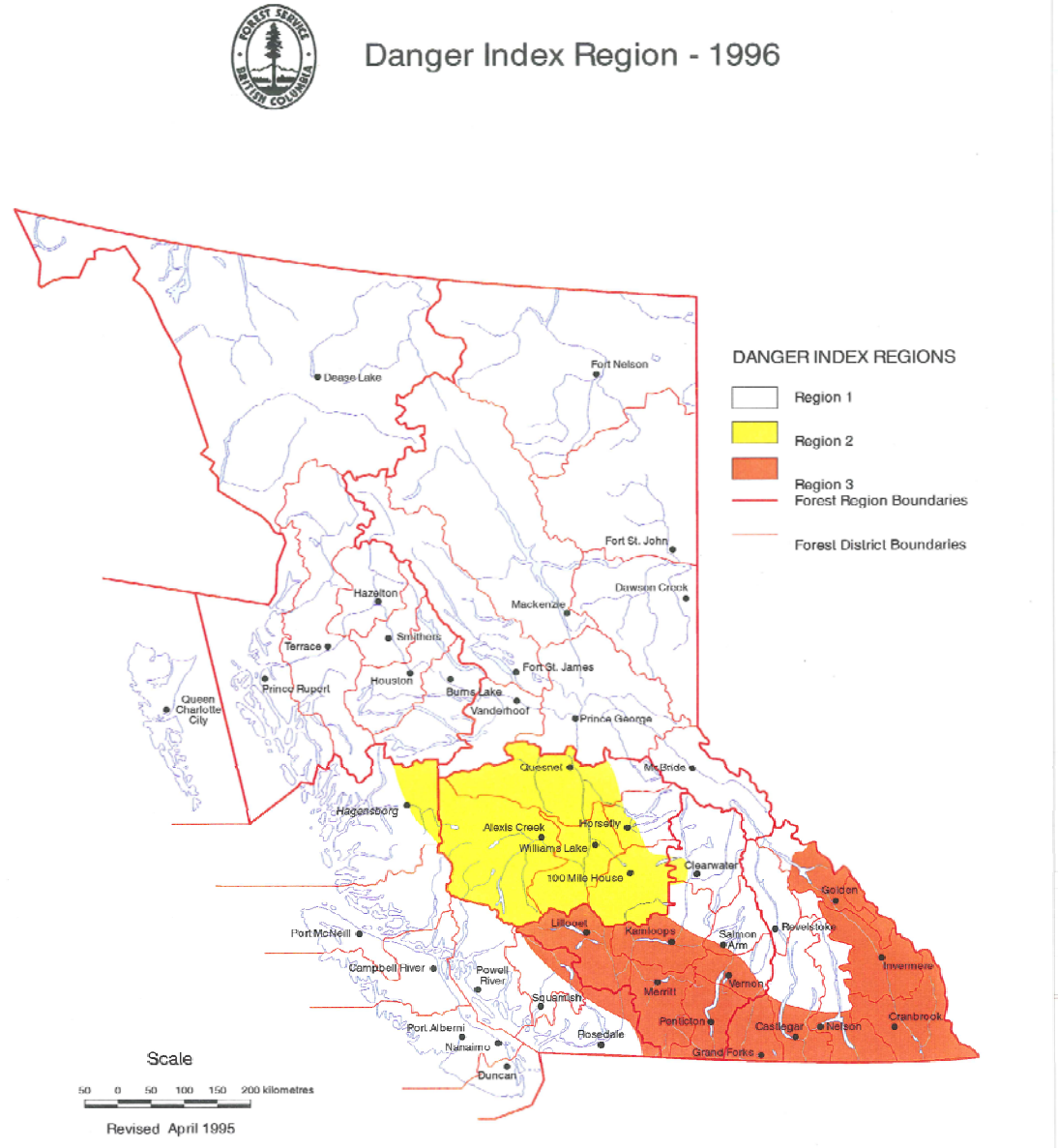
Follow the steps on pages 24-28 below to determine the restrictions on high risk activities for your site:

A. Determine Fire Danger Region;
B. Determine Danger Class;
C. Follow the Applicable Restrictions on High Risk Activities

A. Determine Fire Danger Region

1. First determining the Danger Region from Schedule 1 noted below:

Schedule 1 - Danger Regions



B. Determine the Danger Class:

Identify the buildup index and fire weather index and cross reference these for the applicable Danger Region under schedule 2 to determine the Fire Danger Class.

Schedule 2

Fire Danger Class

Danger Region 1

Buildup Index	Fire Weather Index				
	0	**1 - 7**	**8 - 16**	**17 - 30**	**31 +**
0 — 19	I	II	II	III	III
20 — 42	II	II	III	III	IV
43 — 69	II	III	III	IV	IV
70 — 118	II	III	IV	IV	V
119 +	III	III	IV	V	V

Danger Region 2

Buildup Index	Fire Weather Index				
	0 - 4	**5 - 16**	**17 - 26**	**27 - 37**	**38 +**
0 — 48	I	II	II	III	III
49 — 85	II	II	III	III	IV
86 — 118	II	III	III	IV	IV
119 — 158	II	III	IV	IV	V
159 +	III	III	IV	V	V

Danger Region 3

Buildup Index	Fire Weather Index				
	0 - 4	**5 - 16**	**17 - 27**	**28 - 46**	**47 +**
0 — 50	I	II	II	III	III
51 — 90	II	II	III	III	IV
91 — 140	II	III	III	IV	V
141 — 200	II	III	IV	IV	V
210 +	III	III	IV	IV	V

C. Follow the Applicable Restrictions on High Risk Activities

Schedule 3: Restrictions on High Risk Activities

Column 1 Fire Danger Class (DGR)	Column 2 Restriction	Column 3 Duration
III (moderate)	After 3 consecutive days of DGR III or greater, maintain a fire watcher after work for a minimum of one hour	Until after the fire danger class falls below DGR III
IV (high)	Maintain a fire watcher after work for a minimum of 2 hours	Until after the fire danger class falls below DGR III
	After 3 consecutive days of DGR IV, cease activity between 1 p.m. PDT (Pacific Daylight Saving Time) and sunset each day	Until after the fire danger class falls to DGR III for 2 consecutive days, or falls below DGR III
V (extreme)	Cease activity between 1 p.m. PDT (Pacific Daylight Saving Time) and sunset each day and maintain a fire watcher after work for a minimum of 2 hours	Until after the fire danger class falls below DGR IV for 2 or more consecutive days
	After 3 consecutive days of DGR V, cease activity all day	Until after the danger class falls below DGR V for 3 or more consecutive days, or falls below DGR IV

Part 6: Definitions

"Risk of a Fire Starting or Spreading" Fire risk can occur anytime that the area is snow free, however, more precise fire risk calculations can be defined as the fine fuel moisture code exceeding 75, the duff moisture code exceeding 6 or the drought code exceeding 15. As calculation of Fire Danger Class and determination of fire weather indices are not undertaken over the winter months, fire risk is only considered during the fire season March 1 to October 31.

"activity site" The site of the industrial activity is the location where the activity is taking place. It includes both stationary activities (i.e. milling, portable chipping and manufacturing) and mobile activities (i.e. mobile logging equipment).

> ***For stationary activities***, the site of the industrial activity would be the area in the immediate proximity of the site of the industrial activity.
> ***For mobile sites***, the site of the industrial activity would be assessed in terms of the specific location where the industrial activity is taking place, or where the industrial activity has recently taken place on a given day. It is not intended to be the potential area where the industrial activity could take place.

"**fire extinguisher**" means a fully charged and operable fire extinguisher bearing the Underwriters' Laboratories of Canada label that rates the extinguisher as suitable for use on class A, B or C fires;

"**fuel break**" means
(a) a barrier or a change in fuel type or condition, or
(b) a strip of land that has been modified or cleared
to prevent fire spread;

Note: the intention of the fuel break is so that it can act as a buffer to prevent the spread of fire beyond the fuel break.

"**heavy equipment**" means crawler tractors, skidders, excavators or other suitable mechanized firefighting equipment;

"hot work" means any work generating significant amounts of heat and includes the cutting, grinding, welding and heating of metals.

"large engine" means an engine having a power greater than 7.5 kw (10 hp) used in an industrial activity but does not include

> a) an engine on or in a watercraft that is in the water,
> (b) an engine in or on a vehicle which is primarily used for the transportation of people, or
> (c) an engine in an aircraft

"multiple activity site" means the location where several industrial activities are taking place. This could include stationary and / or mobile activities.

- For stationary industrial activities, the area is in the immediate proximity.

- For mobile industrial activities, the area is the specific location where the industrial activity is taking place or where the industrial activity took place that day.
- For the purpose of this guidance, the number of persons working at the multiple activity site is considered to be the sum of the number of persons normally working at each activity.
- It is acceptable to have a centrally located water delivery system at a multiple activity site, provided that all of the conditions are met as defined in the water delivery system section below.

"small engine" means an internal combustion engine having a power of 7.5 kw (10 hp) or less but does not include

(a) an engine on or in a watercraft that is in the water,

(b) an engine in or on a vehicle which is primarily used for the transportation of people, or

(c) an engine in an aircraft

PROVINCE OF BRITISH COLUMBIA

ORDER OF THE LIEUTENANT GOVERNOR IN COUNCIL

Order in Council No. 193 , *Approved and Ordered* MAY 26 2011

~~Lieutenant Governor~~ *Administrator*

Executive Council Chambers, Victoria

On the recommendation of the undersigned, the ~~Lieutenant Governor~~ *Administrator*, by and with the advice and consent of the Executive Council, orders that the Wildfire Regulation, B.C. Reg. 38/2005, is amended as set out in the attached Schedule.

Steve Thomas

Minister of Forests, Lands and Natural Resource Operations

Presiding Member of the Executive Council

(This part is for administrative purposes only and is not part of the Order.)

Authority under which Order is made:

Act and section: *Wildfire Act*, S.B.C. 2004, c. 31, s. 72 (2) (f) and (g)

Other: OIC 94/2005

May 11, 2011 R/238/2011/22

SCHEDULE

1 Section 1 (1) of the Wildfire Regulation, B.C. Reg. 38/2005, is amended

(a) in the definition of **"fire suppression system"** *by striking out* "and includes a water delivery system;" *and substituting* "and may include a water delivery system;", *and*

(b) by adding the following definition:

"qualified holder" means a person, other than the government,

(a) who is a party to a cost sharing agreement or service agreement, as defined in section 28 of this regulation, or

(b) who

(i) is the holder of an agreement or licence referred to in section 12 (1) (a), (c), (d), (e) and (g) and (2) (a) of the *Forest Act*, and

(ii) is not in arrears under the Annual Rent Regulation for the annual rent payable respecting the agreement or licence; .

2 Section 11 is amended

(a) in subsections (2) and (3) by striking out "The prescribed intervals," *and substituting* "Subject to subsection (3.1) of this section, the prescribed intervals,", *and*

(b) by adding the following subsection:

(3.1) The prescribed intervals, at which a person described in section 7 (1) of the Act who is a qualified holder must conduct fire hazard assessments, are the intervals

(a) set out in subsection (2) or (3) of this section, as applicable, or

(b) specified by a professional forester or a registered forest technologist.

3 Section 12 is amended

(a) in subsection (1) by striking out "the persons are aware:" *and substituting* "the persons are aware or ought reasonably to be aware:", *and*

(b) by adding the following subsection:

(3) This section does not apply to a person who is a qualified holder.

4 The following section is added to Division 2 of Part 2:

Hazard abatement: qualified holders

12.1 (1) In this section, **"abatement area"** means each area within which the industrial activity or prescribed activity takes place in each consecutive 12 month period that occurs after the date the activity begins.

(2) The following periods are prescribed as the periods in which a person described in section 7 (2) of the Act who is a qualified holder must abate fire hazards of which the person is aware or ought reasonably to be aware:

(a) for each abatement area within an area described in section 11 (2) (a) of this regulation, a period of 24 months, beginning on the date the industrial activity or prescribed activity begins in the abatement area,

(b) for each abatement area within an area other than an area described in section 11 (2) (a) of this regulation,

(i) a period of 30 months, beginning on the date the industrial activity or prescribed activity begins in the abatement area, or

(ii) the period specified by a professional forester or registered forest technologist under the *Foresters Act*.

(3) A person required to abate a fire hazard under section 7 (2) of the Act who is a qualified holder must reduce the fuel hazard on the site of the industrial activity or prescribed activity

(a) as necessary to ensure that carrying out the activity

(i) does not increase the risk of a fire starting on the site, and

(ii) if a fire were to start, would not increase the fire behavior or fire suppression associated with the fire, or

(b) as specified by a professional forester or registered forest technologist under the *Foresters Act*.