

Guidelines for Fire Suppression Systems and Fire Fighting Hand Tools for British Columbia

This Guideline provides information on industrial activities that are high or low risk, and on appropriate types and quantities of tools and fire suppression systems to be available during industrial activities. This is intended to apply to crews working within 300m of forest or grassland as required by the *Wildfire Act* and *Regulation*. The undertaking of low or high risk activities, combined with the Fire Danger Class for the work site, will determine the type of equipment required. The Guideline should be used in the context of hazard assessment. In addition to fire fighting equipment, safe operating procedures and an overall plan to prevent forest fires should be developed for each work activity.

The fire tools and water delivery systems discussed in the Guideline are recommended as adequate only for suppressing wildfire ignitions, as required by the *Wildfire Act*. They do not constitute equipment required to fight an established fire.

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Disclaimer

This publication was developed through contributions by members of various industry groups which are affected by and must comply with the *Wildfire Act* and *Regulation* thereunder (the “Act”). The information herein is provided only to assist with the application and interpretation of, and compliance with, the Act.

This publication is not intended to be a comprehensive guide to all detailed aspects of the Act or to be exhaustive or inclusive of all pertinent requirements or responses that might be appropriate in a particular situation. Ultimately, it is the obligation of the individual organization to ensure, on a case-by-case basis, the appropriate application of the standards set out here. No reader should act on the basis of any such information without referring to the Act and/or without seeking appropriate independent legal or other professional advice. The information provided is subject to review in light of changing government requirements and regulations.

No representations, warranties, or guarantees are made as to the accuracy, completeness, or timeliness of the information contained herein, or that following the indicated standards will result in compliance with any applicable laws including, without limitation, the Act. The contributors expressly disclaim, and shall not be liable for, any and all costs and damages of any nature whatsoever, whether direct or indirect, arising from or relating to this publication, or in respect of anything done or omitted by any person in reliance on the contents hereof.

Background

The Wildfire Guidelines Committee recognized a significant void in BC's regulatory framework with the application of the results-based approach to forestry-related activities outside the traditional forest industry. Therefore, the Committee is developing Guidelines that meet the intent of the new *Wildfire Act* and *Regulation* (the "Act"), and which provide practical guidance so operations can be undertaken safely, lawfully, and with reasonable confidence.

The Act applies to both industrial operations and forestry operations within 300m of forest or grass land. This means that guidelines should be relevant to a variety of sectors and operations, including, but not limited to, logging and silviculture operations, mining, utility operations (electrical, oil, gas, radio, microwave, and telephone service), exploration drilling, ski hill grooming, railway and highway vegetation management, road construction and maintenance, and others.

This is the first Guideline to be developed by the Committee, and covers requirements for **Fire Suppression Systems and Fire Fighting Hand Tools** under the Act, specifically the requirements of high hazard forestry activities where project worksite access is restricted or inaccessible by road. (Note: This draft incorporates information from the *Interpretive Bulletin on the Application of the Wildfire Regulation for the Forest Industry*, by the BC Forest Service, June 12/08).

The Committee intends to further review these fire fighting tools and systems in the field for their practicality and effectiveness. Depending on outcomes and feedback, we may produce a revised Guideline in the future.

The Committee drafted this Guideline using a consultative process that included reviewing written submissions, consulting with a wide range of industry representatives, and holding a strategic workshop comprised of working group members. Input was used from organizations representing the utilities industries, forestry, and oil and gas. A similar process will be followed for future guidelines.

Due Diligence

Guidelines developed by the Committee will be designed to meet the test of "all reasonable care" and form a defence of due diligence for stakeholders in the event of possible prosecution under the Act.

What Is Due Diligence?

In the context of these guidelines, due diligence means taking all reasonable care to ensure wildfires do not occur—and if they do occur, taking all reasonable care to contain them. Under Canadian regulatory law, a defence of due diligence will succeed if the defendant has taken "all reasonable efforts" to comply with the law.

To determine whether a party is duly diligent, the law considers what a reasonable person would have done under similar circumstances. The more likely it is that a harmful event would occur, the higher the duty of care is required. The greater the potential damage, the greater the degree of care is required.

For example, a court would probably look at:

- Whether the party acted according to general industry practices and those set out in guidelines, licences, permits, plans, and legislation.
- Whether the party used preventive systems such as environmental management systems, training programs, internal and external audits, risk assessments, and contingency plans designed to prevent the event.
- Whether alternative solutions were reasonably available to prevent the occurrence of the event.
- Whether the party responded promptly to the problem, and made efforts to mitigate the effects quickly.
- Whether the party was responsive to suggestions of regulatory officials.
- To what degree the party had control over actions that led to the event.

How Guidelines Contribute to Due Diligence

There are several reasons why it is important that stakeholders work together to establish industry guidelines. First, it allows those stakeholders who have previously been required to comply with regulations governing wildfires to share their knowledge with those who have only recently come under the jurisdiction of the Act. Second, setting out guidelines in these areas will allow stakeholders to have a clearer understanding of what steps they should take to meet the standard of due diligence, which operates as a defence to any prosecution under the Act.

While industry guidelines are not in themselves determinative of whether a defendant has taken “all reasonable steps”, the law is clear that reliance on bona fide industry guidelines is a significant element in a successful due diligence defence. By drawing on the collective knowledge of those affected by the Act, the Committee aims to develop guidelines that will meet that legal test.

Some stakeholders have expressed concern that they may expose themselves to liability just by taking part in the development of industry guidelines. This concern appears to be unfounded — the Committee’s legal advisor reviewed both Canadian and American law on this point and concluded that no liability should attach to a body that seeks in good faith to articulate industry guidelines or best practices. It is only when those bodies act negligently in setting those guidelines – for example, by creating safety guidelines that they know will expose some consumers to serious risk – that a court will hold them responsible if harm occurs despite adherence to those guidelines.¹

¹ See, for example, *Meneely v. S.R. Smith*, where the Washington State Court of Appeals upheld a trial court’s finding that the National Spa and Pools Institute was liable for injuries caused by particular diving board/pool

Due Diligence in Reporting a Fire

When you report a fire that cannot be controlled or put out with available resources, you will need to provide the following information when reporting. This information will also assist in demonstrating your due diligence to the Ministry of Forests and Range.

- Location (geographic or coordinates) from logging plan map
- Size of the fire
- Fire Danger Class
- The fuel type burning and what fuel is nearby
- Current weather conditions at the site
- Any values at risk (homes, power lines, timber felled and bucked, or standing timber)
- Other relevant site conditions
- How to access the work site
- What resources are currently on site (number of tools, people, types of machinery)

Low Risk Activities

Fire Fighting Tools

As defined in the *Wildfire Regulation*, fire fighting hand tools include shovels, axes, pulaskis, hand tank pumps, and fire extinguishers.

Under Section 5 of the Regulation, sufficient fire fighting hand tools are required if there is a risk of a fire starting or spreading for a person who carries out an industrial activity on or within 300m of forest or grassland.

“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.”

One of the first considerations for an assessment is to continually monitor whether there is a risk of a fire starting or spreading. If there is no such risk, for example when snow remains on the ground during the activity, there would be no need to have fire tools on site. The moment there is a risk of a fire starting or spreading, as defined in Section 1(5) of the Regulation, tools are required on site.

The number of tools should be dictated by the number of workers on site. However, each site does not need to have enough tools to equip every person, or those who may subsequently come on site. Additional resources should come with their own tools.

combination because it had disregarded a 1971 report it had commissioned that found that young, tall, athletic males risked serious injury when using this board and pool combination.

One suggested procedure for assessing the adequacy of fire fighting hand tools is to count the number of workers on site, assess the role and function of each worker, and count the number of hand tools on site. Each worker should have access to a tool for fire suppression work. However, a person working at the end of a nozzle would not require a hand tool, while a person building a hand guard should have a shovel, mattock, or Pulaski. Other tools can be used instead, such as a McLeod tool, a hazel hoe, or other effective fire fighting tool. The intent is to use the most appropriate tool for the conditions and type of fire suppression expected.

Table 1: Low Risk Activities

For low risk activities, operators should consider the following guidelines.

The required number of hand tools and backpack tanks (one fire fighting hand tool per worker) must be kept at a cache near or on the work site. Leaving the tools in a nearby vehicle would be acceptable.

In case of an ignition, it must not take a worker more than the specified time for the current Fire Danger Class to reach the equipment cache to retrieve the necessary equipment and return to the ignition point. The equipment cache may need to be relocated periodically for dynamic work sites (where the workers may move around frequently) to meet this time requirement.

Danger class	Time
Danger class 3 or less	<ul style="list-style-type: none"> • less than 30 minutes
Danger class 4 or greater	<ul style="list-style-type: none"> • less than 10 minutes

High Risk Activities

High risk activities are restricted at certain times when the Fire Danger Class reaches a set threshold, as set out in Schedule 3 of the *Wildfire Regulation*. Once the threshold is reached, additional requirements apply (described in more detail below).

In addition to sufficient fire fighting hand tools, high risk activities require a fire suppression system, as per Section 6(3)(b)(ii) of the Regulation. The key terms are in bold:

*“If there is a risk of fire starting or spreading, a person carrying out a **high risk activity** on or within 300m of forest land or grass land must (b) keep at the **activity site** (ii) an adequate **fire suppression system**.”*

- “High risk activity” is clearly defined in the Regulation (see Table 2 below).
- “Activity site” is the location where the high risk activity is taking place.
- “Fire suppression system” means a system for suppressing fire by delivering water, a suppressant, or a surfactant.

Table 2 lists high risk activities as defined by the Act. If the activity the crew will undertake is listed in Table 2, use the High Risk Activity Table 6 on page 13.

For the sake of due diligence, when assessing the activity type, consider that the list in Table 2 may be incomplete. If the activity to be conducted will create sparks or excessive heat, or throw debris that could create a spark—for example ATV operation—it should be considered a high risk activity.

Table 2: High Risk Work Activities

Under the current* BC *Wildfire Regulation*, high risk activities mean each of the following.

Note: Readers should double-check the legislation to verify high risk activities, in case of updates since this guideline was developed.

- Mechanical brushing
- Disk trenching
- Preparation or use of explosives
- Using fire or spark-producing tools (including cutting tools)
- Grinding metal
- Mechanical land clearing
- Operating a power saw other than on a road/landing or in a log sorting area
- Rock drilling
- Tree processing, including delimiting
- Welding
- Portable wood chipping, milling, and processing
- Skidding logs, with rubber tire or tracked machines
- Yarding using cable systems
- Clearing and maintaining rights of way, including grass mowing
- Operating a vehicle with metal tracks, chains, or studs (other than operating it for road construction, road maintenance, or deactivation; or on a road, landing, or in a log sort where the machine is stationary) **
- Log forwarding other than by truck on a road (i.e., hoe chucking)

* From the *Wildfire Regulation* (Definitions section), including amendments up to BC Reg. 215/2006, July 14, 2006, www.qp.gov.bc.ca/statreg/reg/W/38_2005.htm.

** The Regulation states that “operating a vehicle with metal tracks, chains, or studs is considered a high risk activity, but outlines exceptions to this under subsections p(i) and p(ii) of the Definitions.

Activity Site

The activity site is the location where the high risk activity is taking place. It includes both stationary activities and mobile activities.

- The activity site of a stationary, high risk activity would be the area in the immediate proximity of the high risk activity.

- Activity sites for mobile, high risk activities may be assessed in terms of the specific location where the activity is taking place or where the activity has taken place on a given day. It is not intended to be the potential area where the activity could take place.

The key aspects of an activity site to consider are the risk of a fire starting, and the risk of a fire spreading.

Identifying Fire Danger Class

Under Section 6 of the *Wildfire Regulation*, persons conducting high risk activities are required to determine the Fire Danger Class for the activity site. To determine Fire Danger Class, the person carrying out the high risk activity must reference the representative weather data for the activity site. The source of this data could be internal weather stations, third party stations, or the MFR weather station network.

Ministry of Forests and Range (MFR) Weather Station Network

From the Ministry of Forests and Range's (MFR) website (<http://www.bcwildfire.ca/Weather/danger.htm>), determine the Fire Danger Class your activity site will experience during the afternoon of the current day. This website displays the current and forecasted Fire Danger Class for every MFR weather station. It is designed to support fire preparedness planning for the provincial government's fire operations, but it is not intended to accurately describe all potential, site-specific fire environments across the province.

Weather Stations

Use data from the nearest weather station to determine the associated Fire Danger Class for the activity site. Accurate locations and elevations of stations can be found under the Weather Stations Location section at: <http://www.bcwildfire.ca/Weather/stations.htm>.

Although weather stations are strategically located throughout the province, they are limited in number, and readings at a particular station cannot describe all the conditions that may be found on your activity site. Therefore, be aware that your site may be higher than the Fire Danger Class provided, based on variable characteristics of the activity site. Consider if weather information from the nearest station is representative of your site by comparing your specific site conditions with those of the station location, including slope, aspect, elevation, stand conditions, forest health, date of snow melt, fuel type, fuel loading, and distance from the weather station.

Monitoring Weather Conditions

Table 3 indicates how to determine current conditions at the activity site. Use this in conjunction with information from the weather station. (Note: The Regulation does not describe high risk weather conditions, so the Committee used the professional judgement of fire experts to define high risk weather.)

If any of these site and weather triggers are present or will occur during the day, you are in a high risk situation. You should consider the triggers when ascertaining your Fire Danger Class, or whether to undertake operations at all during high risk periods.

Table 3: High Risk Weather Conditions

Moisture Codes (weather reports) <ul style="list-style-type: none"> • FFMC >88 DMC >35 • DC >450 Danger Class 4 or higher
Rain-free period (>10 days) from June to September
Strong gusts or consistent winds on site
Branches 1-3 inches snap easily when walking on them

The following Beaufort Wind Scale provides important information on how to determine if work is advisable or not.

Table 4: The Beaufort Wind Scale

Beaufort Wind Scale	Airspeed (km/h)	Description	Visible Signs
0	< 2	Calm	Leaves hang motionless. Grass motionless. Smoke rises vertically.
1	2 – 5	Light air	Leaves and grasses move gently. Direction shown by smoke.
2	6 – 8	Light breeze	Very small branches move. Leaves rustle. Wind felt on face.
2	9 - 10	Light breeze	Leaves and twigs in constant motion Tall grasses swaying.
3	11 – 19	Gentle breeze	Smaller branches move. Billowing fields. Raises dust or loose paper.
4	20 – 29	Moderate breeze	Large branches move.
5	30 – 38	Fresh breeze	Large branches move strongly. Small trees (less than 5m high) move.
6	39 – 50	Strong breeze	Large trees (higher than 5m move).
7	51 – 60	Moderate gale	Large trees move vigorously.

Pre-work Procedures for High-Risk Activities

For high or extreme Fire Danger Class, and where the activities are high risk, you should do the following before starting work:

- Determine how you or your co-workers will suppress an accidental fire.

- Decide on equipment location.
- Put in place a communications plan (radio or phone).
- Verify water sources available and location (truck-tanker, backpack, or body of water).
- Set up and test the water delivery system.

The *Definitions* at the end of this Guideline are intended to help you determine your site conditions. When doubt exists as to access or water availability, you should err on the side of caution, for example, stopping work, doing higher-risk activities in the morning, or having more equipment on site.

Fire Watch

If a fire watch is required at days' end as per the Regulation, determine:

- The person(s) for Fire Watch duty.
- The required time for the Fire Watch.
- The most likely location for a fire from the day's activities.
- How you will report a fire from the setting (phone, VHF etc.).

Table 5: Restrictions on High Risk Activities

Under the Act, you are required to follow these shutdown procedures. Following this Guideline does not exempt you from shutdown procedures.

Table 5 is taken from the *Wildfire Regulation*, Schedule 3 (Section 6 (3)).

Fire Danger Class	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 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

Fire Suppression System

High risk activities are required to have a functioning fire suppression system. This can take many forms as dictated by the high risk activity, the risk of fire starting, and the risk of fire spreading. It may involve the delivery of water, the addition of a surfactant, the application of a suppressant, or a combination of all three.

The system should be practical and reasonable for the specific high risk activity being carried out. In addition, the fire suppression system should be capable of initial suppression of a fire of a reasonable and foreseeable size if started as a result of the high risk activity. If the system involves the delivery of water, it should be nearby, operational, and capable of being deployed in a reasonable length of time to suppress a fire, taking into account the Fire Danger Class.

The proximity and complexity of the fire suppression system should take into account the travel time for supporting the operation. As the Fire Danger Class increases, the importance of quickly deploying a fire suppression system increases. Larger, less mobile systems may be located in a central area to serve several high risk activities, while smaller, more mobile fire suppression systems may be strategically located, or on the machine itself for use by the operator.

Some considerations for a fire suppression system may include:

- The ability to be activated quickly
- The number of high risk activities to be serviced by the fire suppression system
- The presence or absence of any potential fire suppressing materials (e.g., soil)

Operators do not have to maintain a fire suppression system to address every eventuality. Rather, the system should be adequate to address a fire starting from the high risk activity being carried out, with consideration to weather, fuel load, and other site conditions. Assigning a reasonable risk of a fire starting and spreading should be based on available information, such as the Canadian Forest Fire Danger Rating System, the probability of ignition models, or established local fire history for that activity under those conditions. For convenience, some operators may choose to maintain a prolonged readiness level for higher fire risk environments rather than consciously escalating or diminishing readiness as site conditions change.

How to Use the High Risk Activity Table

For high risk activities, operators should consider the following guidelines and Table 6 for the current Fire Danger Class and access/water category for the work site. (Also refer to the Regulation, Schedule 3:

www.for.gov.bc.ca/tasb/legsregs/wildfire/wildfirereg/wildfirereg.htm#sch3)

Fire Danger Class ratings: 5=extreme, 4=high, 3=moderate, 2=low, and 1=very low.

Fire Danger Class 5 is a category for which the Committee recommends not undertaking high risk activities. This alternative would limit operations but this would follow previous regulations and some municipal bylaws. (The *Wildfire Regulation* requires a complete shutdown of high risk activities after the danger class reaches 5 for three consecutive days.)

Other factors: Besides danger class, other factors require consideration when developing a strong understanding of high risk fire potential, including slope, aspect, elevation, stand conditions, forest health, date of snow melt, fuel type, and fuel loading.

Water availability and access: On Table 6, locate the category on the Site Condition row that best describes the water availability and access on your work site. The equipment listed within this category is the suggested minimum that should be considered for this combination of access and water availability. For example, if there is adequate water on site and ATV access, your work site would be in Category #3. Access/Water Categories 1 or 2 include the use of heavy machines used for mowing, since there is vehicle access. Categories 5 and 6 cover the use of hand tools only, such as chainsaws.

Surfactants: Using a surfactant is recommended. For backpacks, use of a surfactant will depend on whether the material needs to be inducted into the hose system. Some surfactants are not recommended for use near riparian areas. Refer to the product label for usage instructions.

Backpacks: Under the Act, backpack tanks are defined as firefighting hand tools. They do **not** constitute a water delivery system.

Table 6: High Risk Activity Table

Access/water category		1	2	3	4	5	6
	Water Availability	Adequate Water	No/limited water	Adequate Water	No/limited water	Adequate Water	No/limited water
Site Conditions	Danger classes 3, 4, and 5	<ul style="list-style-type: none"> • Hand tools • Backpack tank with surfactant (2 per 3 person crew) • Water delivery system 	<ul style="list-style-type: none"> • Hand tools • Backpack tank with surfactant (2 per 3 person crew) • 200 gallons of water in a tank/bladder (or equivalent water/surfactant mix) • Water delivery system 	<ul style="list-style-type: none"> • Hand tools • Backpack tank with surfactant (2 per 3 person crew) • Water delivery system 	<ul style="list-style-type: none"> • Hand tools • Backpack tank with surfactant (2 per 3 person crew) • 50 gallons of water in a tank/bladder, with surfactant • Water delivery system 	<ul style="list-style-type: none"> • Hand tools • Backpack tank with surfactant (3 per 3 person crew) • Water delivery system with surfactant 	Recommend shutting down operations, but if operating is necessary: <ul style="list-style-type: none"> • Hand tools • Backpack tank with surfactant (3 per 3 person crew) • 50 gallons of water in a tank/bladder, with surfactant • Water delivery system
	Access	Vehicle access		ATV only or >300m from roadway		Helicopter or walk greater than 1km	

Guidelines for Machinery

Machinery comprises two categories: heavy and light.

Heavy Machinery

Heavy machinery is defined as equipment with a large engine engaged in heavy construction-related activities. It does not include vehicles with the main purpose of transporting workers (see next section). Heavy machinery may include, but is not limited to:

- Industrial mobile equipment (bulldozer, excavator, grader, etc.)
- Industrial permanent or semi-mobile equipment (pump, drilling machine, mulcher, trenching machinery, etc.)

Spark arrestors should be in good working order on all machinery.

Heavy equipment operators should consider attaching the following equipment to their machinery. Fire fighting equipment should be kept on the vehicle itself in case of a machine-caused fire, or at least within a short distance of the machinery or the high risk work site. (Note: If you want to have less equipment than is recommended, ensure you have a reasonable alternative in case of fire, and justify your decision in writing.)

- One fire extinguisher with a ULC rating of at least 1A 5BC (i.e., FlameEx)
- One fire extinguisher with a ULC rating of at least 3A 10BC (i.e., FlameEx), or an integral vehicle fire suppression system
- One backpack tank
- One round nose shovel
- One pulaski or mattock

While some heavy machinery may be equipped with a bucket that surpasses the ability of a shovel, there can be situations where the bucket cannot reach the moving fire or it is unsafe to do so (near power lines, on steep slopes, etc.).

Light Machinery

Light machinery is defined as equipment with a small engine and not used for heavy construction-related activities. However, light machinery can still be a high risk source for causing an ignition (e.g., chainsaw, hand-held grinder).

Light machinery includes, but is not limited to, chainsaws, grinders, other hand-held motorized tools, and power generators. Spark arrestors should be in good working order on all machinery.

Light equipment operators should consider having ready access to the following equipment. (Note: If you want to have less equipment than is recommended, ensure you have a reasonable alternative in case of fire, and justify your decision in writing.)

- One fire extinguisher charged with at least 0.225 kg (0.5 lb) of fire extinguishing chemical
- One backpack tank (with the exception of sawyers, who should have a chemical fire extinguisher on their person)
- One round nose shovel
- One pulaski or mattock

Crew Transportation Vehicles

Crew vehicles should be equipped with an appropriate fire extinguisher for an engine or passenger compartment fire.

The vehicle should have at least one, but preferably two, backpack tanks, and a contingent of round nose shovels and pulaskis that equal the number of crew members typically being transported in the vehicle.

A full contingent of tools may not be feasible for every crew vehicle, such as a van. In such cases, propose reasonable alternatives in case of fire, and document your decisions.

ATVs require a minimum 2.5 pound fire extinguisher with a ULC rating of 1A 10BC. The extinguisher should be mounted right on the vehicle in case of a vehicle-caused fire.

Definitions

Access — A worksite with vehicle access is described as one that falls within 300 m (1000 ft) of a road on which a standard 4x4 truck could be expected to navigate during typical fire season road conditions. If any portions of the worksite do not fall within 300m of a navigable road, they should be considered to fall into one of the other two access categories.

Activity site — The location where an industrial activity is taking place.

Backpack tanks — A standard backpack (minimum 18 L) with nozzle wand and straps that are in working order.

Fuel Moisture Code (FMC) — A numerical rating of the moisture content of litter and other fuels. This is mostly dead and down vegetation, as well as lichens, mosses, and other loose debris. The FMC is an indicator of the relative ease of ignition and flammability of fuel.

Duff Moisture Code (DMC) — A numerical rating of the average moisture content of the duff layer, a layer of loosely compacted organic layers of moderate depth on the ground. The DMC gives an indication of fuel consumption in moderate duff layers and medium-size woody material.

Fire suppression system — A system for suppressing fire by delivering water, a suppressant, or a surfactant.

Fuel break — A barrier or change in fuel type or condition, or a strip of land that has been modified or cleared to prevent fire spread.

Hand tools — Refers to durable fire suppression hand tools, including (but not necessarily limited to) shovels, axes, pulaskis, hand tank pumps, and fire extinguishers. Ensure tools are of a strength to withstand the required use and are appropriate for the site (presence of rock and roots, duff depths, etc.).

Landing — For the purposes of this Guideline, a landing is a cleared area on a logging operation linked to the haul road system where logs are initially landed and/or skidded. Cleared areas or pads on or near industrial operations where helicopters may land are not considered landings by this definition.

No/limited water — Refers to any worksite not having an adequate water supply within 300 m (1000 ft) of the work site. Justification: 300 m was used as the approximate (or more) amount of inch and a half hose carried in an initial attack crew bag.

Stillwell — A closed compartment bladder bag that is designed to be dropped off by a helicopter on a long line and left on the hillside. It has a minimum capacity of 60 to 80 gallons, and a water delivery system or hose can be attached to it. Another type of Stillwell is called a “bambi” bucket, which is an open top bag for dropping water on a fire. It cannot be left on the hillside to be used as a bladder. There are other bladder types available from SEI industries in Delta.

Suppressant — A general term for families of chemicals that have the effect of suppressing combustion.

Surfactant — A chemical that when added to water increases its ability to adhere to fuel surfaces and suppress fire, reducing the amount of water needed to have an effect.

Tank/bladder — A tank or bladder that is capable of holding water and from which a water delivery system can be attached.

Water availability — Adequate water refers to a natural body of water that contains at least 2000 L of water. This may be a stagnant or free flowing body of water as long as it meets the volume requirement. (Justification: 2000 L would be a maximum weight that could be carried in a standard crew cab truck. Alternatively, 2500 L is the volume of water that was contained within the previously-accepted *Forest Fire Prevention and Suppression Regulation*.)

Water delivery system — Under the Regulation, a water delivery system is defined as one that can:

- 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

- deliver water to any place at the site of an industrial activity, on the burn area or site of the high risk activity, or reasonably adjacent to the burn area or the site of a high risk activity.

The equipment required for a water delivery system should include:

- A pump that is suitable for delivering water to the work site at an adequate pressure for suppressing an ignition for the current Fire Danger Class. As the danger class or site slope increases, a more powerful pump may be necessary.
- Hose specifications should be of a standard that can withstand the pressure delivered by the pump.
- Accessories should include water delivery appliances, including (but not limited to) nozzles, water thieves, and three-ways.
- In calculating water availability and pressure, consider the length of hose and the volume of water it would take to fill the hose and reach the ignition site. Consider having more than the minimum amount of hose on site.

Note: The above recommendations for equipment are intended as helpful guidelines for areas where access is limited or restricted, such as utility rights-of-way.

References / Bibliography

The following documents may provide additional useful information.

- *Wildfire Act*: http://www.qp.gov.bc.ca/statreg/stat/W/04031_01.htm
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