



BC Forest Safety

Glading Resource Package

This resource package is designed for those engaged in identifying and falling timber to create and enhance openings for glade skiing. It contains information and tools to safely identify appropriate areas, planning the project and falling the area.



Released 2020

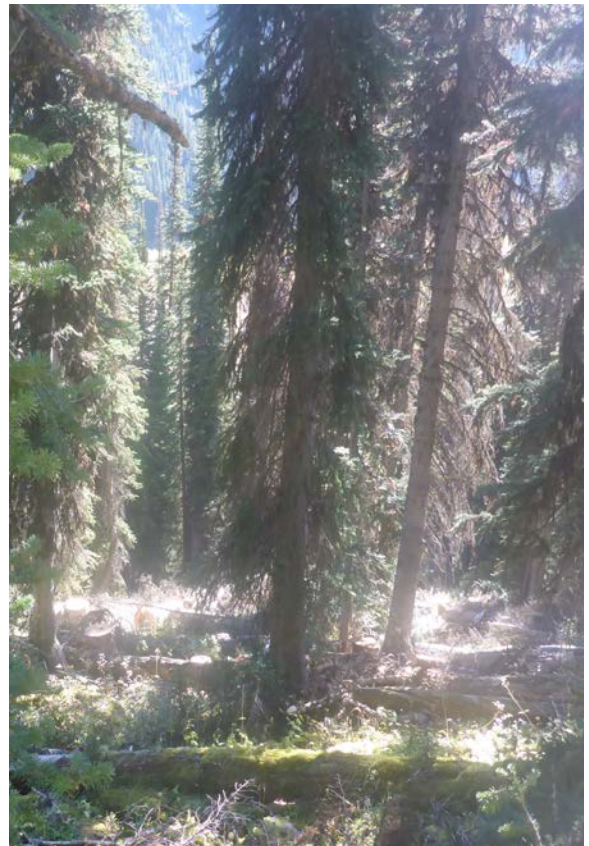


Purpose

The information and tools in this guide are provided to assist companies with project efficiency and effectiveness as well as provide information to meet current legal requirements for a glading project. The use of these resources is not required by law or intended to add unnecessary workload. However, using them will help ensure that your operation is in compliance with WorkSafeBC (WSBC) requirements including the [Workers Compensation Act](#) and [Occupational Health and Safety Regulation](#). It is the responsibility of owners, employers, supervisors and workers to ensure they are in compliance with this act and regulations.

This resource package will help identify:

- What is glading?
- What is required to fall trees for a glading project?
- What qualifications are needed?
- What needs to be in place before work starts?



Gladed runs ready for snow

Table of Contents

- 1) Definitions
- 2) Overview
- 3) Project Preparations
- 4) Roles, Responsibilities & Qualifications
 - Qualified Falling Supervisor
 - Certified Faller
 - Bucker
 - Brusher
- 5) Training
- 6) Daily Plan
- 7) Common Challenges & Best Practices
- 8) Tools & Resources

1. Definitions

ALTERNATE FALLING METHODS

Methods of falling trees to overcome falling difficulties that include machine assist, qualified assistance, line pull, and danger tree blasting.

BC FALLER TRAINING STANDARD

These are the safe work procedures for falling trees.

BRUSHER

A brush saw operator who cuts brush and saplings using a brush saw, typically gas powered.

BUCKER

A chainsaw operator who limbs and bucks the felled timber into segments that lay with the contour of the hillside.

CERTIFIED FALLER

A person who has demonstrated the required skills and knowledge of a hand faller and is certified by one of the three WSBC approved administrators of the BC Faller Training Standard:

- 1) BC Forest Safety Council (BCFSC)
- 2) BC Wildfire Management Branch
- 3) Canadian Association of Geophysical Contractors (CAGC)

CHARGE HAND

A qualified person designated as an alternate Falling Supervisor who is knowledgeable of the supervisor roles and responsibilities when the lead Falling Supervisor is not readily available at the falling site.

DANGER TREE

A live or dead tree whose trunk, root system or branches have deteriorated or been damaged to such an extent that it is a potential danger or hazard to worker safety.

[OHS Regulation 26.1](#) defines a dangerous tree as a tree that is a hazard to a worker due to:

- a. its location or lean,
- b. its physical damage,
- c. overhead conditions,
- d. deterioration of its limbs, stem or root system, or
- e. any combination of the conditions in (a) to (d) above.

DESIGNATED FIRST AID ATTENDANT

Person with a current first aid certificate that meets the site's first aid requirements. This person is responsible for administering first aid as needed, maintaining first aid records and maintaining first aid equipment.

EMERGENCY RESPONSE PLAN

A documented, pre-planned response plan to aid in quickly and effectively handling incidents to ensure the protection of workers, public health, safety, property and the environment. Refer to WSBC OHS Regulation Section [3.16](#) and the Guideline Part [4.13 - 4.16](#).

FALLER INSPECTIONS

A qualified person must perform and document an inspection of a faller's worksite, tools, equipment and work practices, using the BC Faller Training Standard, at time intervals appropriate to the risk.

[OHS Regulation 3.5 General requirement](#)

Every employer must ensure that regular inspections are made of all workplaces, including buildings, structures, grounds, excavations, tools, equipment, machinery and work methods and practices, at intervals that will prevent the development of unsafe working conditions.

FALLER TRAINEE

An individual who has met the outcomes of the 30-day New Faller Training program and is working in industry, under close supervision, continuing to gain experience and knowledge through hands on training. A faller trainee will continue to build their skills and experience in this phase for a minimum of 20 weeks, after which they may be eligible to apply to challenge the faller certification.

FALLING SUPERVISOR

OHS Regulation [26.22.1](#) - Falling Supervisors for forestry operations.

- 1) A qualified supervisor must be designated for all falling and associated bucking activities in a forestry operation.
- 2) The supervisor designated under subsection (1) must:
 - a. ensure that the falling and bucking activities are planned and conducted in accordance with this regulation,
 - b. inspect the workplace of each faller at time intervals appropriate to the risks, and
 - c. keep a record of every inspection conducted under paragraph (b).
- 3) The supervisor designated under subsection (1) must not undertake or be assigned activities which interfere with performance of the supervisor's duties under subsection (2).

GLADING

The process of selectively removing trees to create or enhance openings through the timber for alpine skiing on ski resort developments and in backcountry tenure areas.

HAZARD

WSBC defines a hazard as “a thing or condition that may expose a person to a risk of injury or occupational disease”.

NO WORK ZONE

An area around a hazard that is well marked with flagging tape, documented and communicated to other workers. Work may not be carried out within the zone due to exposure to the hazard. Often used in situations where the hazard cannot be immediately felled or removed.

QUALIFIED

WSBC defines qualified as being knowledgeable of the work, the hazards involved and the means to control the hazards, by reason of education, training, experience or a combination thereof.

QUALIFIED ASSISTANCE

A person qualified to render assistance to a faller for first aid, an emergency or a falling difficulty. [OHS Guideline G26.28 Summoning qualified assistance](#)

WILDLIFE TREE

A tree, dead or living with dead wood features (holes, cracks, loose bark, etc.) providing habitats for cavity dwelling species or nesting species. May also be lichen producing.

WORKSAFEBC (WSBC)

The organization was established by provincial legislation as an agency with the mandate to oversee a no-fault insurance system for the workplace. The Occupational Health and Safety (OHS) Regulation and Part 3 of the Workers Compensation Act contain legal requirements for workplace health and safety that must be met by all workplaces under the inspection jurisdiction of WorkSafeBC. Some sections of the Workers Compensation Act and OHS Regulation have associated policies and guidelines. [Workers Compensation Act](#) and [OHS Regulation](#)



Faller assessing trees

2. Overview

Glading is the process of clearing trees for glade skiing. Forested glade ski areas are typically lower in the elevation band of the avalanche hazard evaluation system. These lower ski areas can reduce exposure to avalanche hazards more common in open alpine areas. The three elevation bands in the avalanche hazard evaluation system are alpine (ALP), tree line (TLN) and below tree line (BTLN).

Skiing in the trees is popular because snow conditions are often pristine since the forest shelters the snow from sun and wind and is also better for low visibility conditions such as white out or heavy snowfall. Skiers can enjoy the peaceful solitude of being in the trees rather than in wide open alpine areas.

Glading projects create or enhance openings in the forest for ski lines. They begin with identifying appropriate areas, planning the work and applying for a cutting permit.

There are strict parameters for cutting timber for glading; specifically, around quantity, type and size of timber, and the size of openings. Crews tie natural openings or glades together to enhance the flow of a ski line by targeting low value for wildlife trees, dead trees, non-merchantable and low market-value trees with the goal of keeping the natural fall line and avoiding the creation of straight down-slope lines that may increase avalanche risk and lose the benefits of glade skiing. Other key factors considered in glading projects include wildlife habitat values, terrain, forest density and access.

Fallers use natural openings or create openings to fall the targeted trees within the run boundaries. The felled trees typically are not harvested but are limbed and bucked to lay with the terrain. For smaller operations, the faller will do the falling and bucking. For larger operations, crews may consist of fallers, buckers and brushers. Fallers will choose the trees, then fall them specifically to allow the buckers to follow a safe distance behind to limb and buck the downed timber. Brushers will then operate brush saws to remove the underbrush and saplings in and around the natural “glades”.

The popularity of natural glade skiing has led operators to develop a way to enhance tree skiing and expand new terrain. Back country tenure operations and ski hill developers use glading to enhance the forested areas within their tenures to increase usable land and offer a variety of terrain options for skiers and snowboarders.

3. Project Preparation

Glading projects should have the following in place before falling activities start:

- 1) A **pre-work meeting** with the client needs to occur. This is an onsite meeting where all the details of the project are discussed and signed off by the tenure holder and contractor. Issues pertaining to cut allowances, environmental constraints, project targets and goals, safety related issues and operational plans are discussed.
- 2) Filing a **Notice of Project (NOP)** with WorkSafeBC. In accordance with [OHS Reg 26.4](#), this important step is a WSBC requirement for any project. The [Notice of Project Form](#) is available on the WSBC website and must be submitted at least 24-hours in advance of the startup of work.
- 3) A comprehensive, site-specific **Emergency Response Plan (ERP)** is a crucial requirement for any worksite and needs to be tested for effectiveness.
- 4) A pre-work walk-through of the project should be completed by a qualified person to identify work area hazards and to confirm the layout and work plan is achievable.
- 5) A **site hazard assessment** needs to be completed to document the general hazards identified during the walk-through. The control measures for these hazards need to be described and included in the document.
- 6) A **first aid site assessment** needs to be developed. Glading operations are often in very remote locations in the back country which is a considerable barrier to access time-sensitive first aid treatment and medivac services. Prior to work starting, all appropriate first aid requirements must be readily available on-site including first aid equipment, trained first aid attendant(s) and an established medivac plan (as outlined in the ERP).
- 7) An **initial safety meeting** needs to be held and documented reviewing the ERP, the site hazards and controls, identifying the designated first aid attendant(s), the location of first aid and fire management equipment, etc. Crews should also review the communication system, designated radio channel, person-check system, work-site signage and general documented work plan as outlined in [OHS Reg 26.5](#).
- 8) A system should be in place to document and alert workers to the existence of a specific hazard. Use a **hazard report form** with a Corrective Action Log (CAL) to document any specific hazards identified at any time during the project. The hazard alert must be shared with workers, contractors and other phases that may be affected by the hazard.
- 9) As the project progresses, any relevant changes to the original work plan needs to be documented and shared with any workers affected by the changes.
- 10) Consider using this all-in-one [fillable ERP and Block Plan PDF](#) form which streamlines the documentation requirements.

- 11) An accurate, **detailed project map** is required and is a key component of a successful work plan. The map should show access routes, ski run boundaries, trails, helicopter pads and any important landmark references. Used in conjunction with the daily work plan, the map can show location of work activities, known hazards and other vital information. Every member of the crew should be provided with a copy and have access to the work plan documents on-site.
- 12) A **Qualified Falling Supervisor** must be designated and on-site to control and direct the falling activity, whether there are two fallers or twenty. The supervisor is responsible for planning and documenting the daily activities and faller inspections. With a small crew, the supervisor may also be one of the fallers.



Falling Supervisor performing stump audit

4. Roles, Responsibilities & Qualifications

QUALIFIED CONTRACTOR

A qualified contractor will have references, a sound work plan for the project and all the necessary people and equipment for the task. This can be confirmed by asking for and checking references, requesting documentation from previous projects and discussing the crew experience/qualifications.

QUALIFIED FALLING SUPERVISOR

The Falling Supervisor is required to control and direct the hand falling for the project and is responsible to ensure all steps have been taken to prepare for the falling activity. These steps include making a falling plan to ensure qualified assistance is available to each faller, ensuring the ERP is accurate and has been tested for effectiveness, and making sure the work area is controlled.

Each certified hand faller on the crew needs to be qualified to fall trees in the timber and terrain they will be working in. The falling supervisor verifies this by observing the faller's work and completing a documented faller inspection to confirm the faller has the skills and knowledge to use the Safe Work Procedures (SWP) of the BC Faller Training Standard as outlined in [OHS Reg 26.21](#).

The falling supervisor's responsibilities are to ensure:

- Each faller knows the work plan, Emergency Transport Vehicle (ETV) location and can develop and manage their work area.
- Access and egress trails are cleared and marked.
- Qualified assistance is available for each faller.
- An effective person-check and communication system is established and followed.
- The work plan is followed including danger tree management and ensuring safe working distances are maintained.
- Regular safety meetings with the crew are conducted and documented.
- Ensure other workers, contractors and phases are identified and made aware of falling activity.
- Alternate falling methods are available.
- Program objectives are met.
- Ensure visitors are managed in accordance with the company's visitor orientation policy which should include a visitor orientation checklist. Visitors must be accompanied on the falling site.

The qualifications of a Qualified Falling Supervisor are explained in the definitions section of this document as outlined by WSBC Regulation 26.22.1. A qualified Falling Supervisor should have knowledge of their role, previous experience and may have attended a [Falling Supervisor training course](#).

To ensure the Falling Supervisor is qualified, check references and discuss their experience and their plan for executing the project. They should be able to provide documentation from previous projects they have supervised that will include the documents discussed above along with regular documented faller inspections. Their experience should include projects similar to glading, in similar timber and terrain with similar objectives.

CERTIFIED FALLER

A Certified Faller is responsible for carrying out the work plan. They must be knowledgeable of the plan, project goal and methods required to achieve the desired outcome by ensuring they:

- Review the work plan documents and have access to them.
- Participate in the initial safety meeting, document review and sign off.
- Follow the work plan, stop work if the plan cannot be achieved or an unsafe condition is encountered.
- Use SWP's outlined in the BC Faller Training Standard.
- Follow person-check and qualified assistance guidelines.
- Have a map and a copy of the ERP.
- Not undertake work that is beyond their limits of skills, knowledge or experience and seeks qualified assistance when these situations are encountered.

By understanding the criteria that makes good glade skiing lines, the Faller can use knowledge and experience to make the project a success.

A Certified Faller should have current certification from one of the three approved Administrators of the BC Faller Training Standard and should provide a current wallet certification card and logbook.

The logbook should have past work experience and contact information for references. A qualified person needs to ensure the Faller has the experience to perform the work required of them in the timber and terrain where they are placed. This can be done by checking work references, through discussion and observing the Faller's work.

[OHS Regulation 26.21](#) and [OHS Guideline G26.21/26.22](#)

BUCKER

Responsible for cutting the felled trees with chainsaws into lengths that lay with the contour of the hillside. Once trees have been felled it is important for skier safety to have the trees lay on the contour of the ground to prevent the creation of hollow pockets hidden under the snow. The Buckers will cut the limbs and the trees so the logs lay along the ground and are stabilized to remain on the often steep hillsides. As Buckers follow the Fallers, they must ensure safe working distances are maintained from the Fallers and from other Buckers. In some situations, a Bucker may provide emergency or medical qualified assistance to a Faller if they are qualified to do so. It is the Buckers responsibility to follow the safe work procedures provided to them by the employers and to avoid the designated high risk violations of manual falling and bucking.

Buckers may have taken a chainsaw training course, or they may have been trained on the job.

BRUSHER

Responsible for cutting brush and saplings using a brush saw. Using Brushers to cut areas that are thick with heavy brush and immature saplings can be more efficient than using chainsaws and provides better ergonomics for the worker. Like Buckers, the Brushers must maintain safe working distances from Fallers and other workers. They must follow the safe work procedures provided by their employer, including using full PPE and performing person checks with other workers. Most Brushers will have been trained on the job as there are minimal structured training courses available for brush saw operators.

5. Training

Glading projects involve jobs that are excellent for new workers to gain valuable experience working towards a rewarding career. Many faller trainees that have completed the 30-day New Faller Training course gain experience on glading falling projects as they offer beneficial in-field experience working towards their Faller Certification. Some workers new to this type of project are trained as brush saw operators by the employer while some power-saw operators with basic chainsaw operator training are assigned as Buckers.

Employers training workers are required to maintain training documentation as outlined in [OHS Regulation 3.25](#). Consider these key items when hiring new and young workers and training workers:

- 1) Young / New Workers - WSBC OH&S Regulation [3.22 to 3.25](#) and related Guideline [G3.23](#)
- 2) Faller Training – WSBC OH&S Regulation [26.22](#)
- 3) [Faller Trainee Weekly Training and Progress Reports](#)
- 4) Coaching and mentoring: Can assist in training workers to learn a new job or adding new skillsets to a familiar role.

In falling, a Certified Faller may not be qualified to perform the work in the timber and terrain they are placed in which leaves a Falling Supervisor with some choices.

- 1) Determine that the Faller is not qualified to do the job and decide not to employ that person.
- 2) Employ the Faller in a role that they are qualified to do such as bucker.
- 3) Provide the Faller with training to fill gaps of knowledge and skills relating directly to the timber type and terrain that they will be working in. Training is done under the close supervision of a person who is qualified in the timber type and terrain. A record of the training must be completed and maintained by the employer as per regulation.

As glading is a specialized activity, a Certified Faller may be qualified in the timber and terrain to fall trees on the project but may have little or no knowledge of creating glade skiing lines outlined in the project parameters. Training and guidance from the qualified supervisor will help avoid falling too much timber in the wrong locations.

6. Daily Plan

Completing a daily work plan involves many factors including adjusting to operational changes, ensuring First Aid coverage, ERP effectiveness and crew management.

FIRST AID COVERAGE

- Designated qualified assistance in place for all fallers.
- First aid attendant and equipment requirements are met for daily and project operations.
- Medivac arrangements confirmed daily including day-to-day confirmation with helicopter to confirm availability and check-in/out with contact designate.

OPERATIONAL CHANGES

- Adjusting work location due to weather or other outside influences.
- On-site visitors.
- Wildlife or other new hazards identified with controls implemented.
- Work progression identifying new ground covered each day.

CREW MANAGEMENT

- Crew member placement involves keeping each worker safe and productive by putting individuals in roles where their skills and experience can be maximized.
- Maintaining safe working distances while meeting qualified assistance needs.
- Documenting individual worker placement and person check-in assignments.
- Daily crew safety discussion.



Daily crew safety discussion

7. Common Challenges & Best Practices

COMMON CHALLENGES

Glading projects have many challenges that add difficulty and risk to workers. Crews may face barriers including remote locations and difficulty accessing the worksite which may affect emergency evacuations. A risk assessment of the work site is required ([OHS Reg 4.13](#)).

Injured Worker Evacuation:

As an example, a small glading operation on a backcountry cat skiing tenure may need to consider the following:

Could a four-person crew safely extract an injured worker from the middle of a 2,000 ft cat ski run to an access road located at the bottom of the run? Could the injured worker be transported to the nearest access point to meet an ETV or helicopter in time get them to a hospital within 60 minutes (known as the golden hour)?

This example has a high-risk activity extraction greater than 20 minutes from a hospital which requires a crew member with Level 1 First Aid Certification and a Level 1 First Aid Kit as outlined in WSBC's OHS Regulation Part 3, Schedule 3-A, Table 5 which indicates the minimum levels of first aid for a two to five person crew.

For this type of project, is this level of first aid adequate for emergency response? The answer is no.

In the scenario presented, the reality is, while the minimum first aid requirements may be met, they are not enough, as the remoteness of the project and distance for extraction are barriers in meeting a time-sensitive evacuation. [OHS Reg 3.16](#) (1) Basic Requirements states "*the employer must provide for each work place such equipment, supplies, facilities, first aid attendants and services that are adequate and appropriate for (a) promptly rendering first aid to workers if they suffer an injury at work, and (b) transporting injured workers to medical treatment*".

Appropriate first aid equipment for this scenario would include a spine board and basket stretcher as well as a Level 1 First Aid Kit and at least two workers with Level 1 First Aid Certification with the transportation endorsement. An emergency response that includes a medivac plan from a remote location with a small crew would include requiring additional manpower to aid in carrying the injured worker to the evacuation access point. If an ambulance cannot access the work site, an Emergency Transportation Vehicle (ETV) or appropriate mode of transportation such as a helicopter would be required to move the injured worker from the evacuation site to a rendezvous point to meet the ambulance.

Best practice would be to have the required emergency equipment and a pre-arranged evacuation plan with a helicopter company to assist in quickly transporting the worker to medical care. If the ERP includes a helicopter for transporting an injured worker, several steps must be taken each workday and should be documented on the day-plan or daily notes.

- Check-in with the helicopter company at the beginning of each workday to confirm availability and test communication.
- Have a way to be notified by the helicopter company if their availability changes.
- Be prepared to shut down work activity if weather or other issues prevent the helicopter from providing medivac.
- Check-out with the helicopter company at the end of each workday.

Wildlife Encounters:

Wildlife can pose many challenges. In some timber types and ski terrain elevations bee, hornet and/or wasp nests are often abundant and are common encounters. Bears are also common including working in grizzly bear habitats.

Bears, especially grizzly bears, are apex predators and while they prefer to avoid humans, they also can be territorial. In some cases, chainsaw noise can agitate a bear rather than scare it out of the area making it a serious hazard to workers. For bear signs and sightings, use a hazard report to document and share the information including the implemented risk controls which usually involves moving work activity from the area until the animal has moved well away from the site. ([Bear Safety](#))

Worker Placement:

When planning falling activity in a relatively narrow strip of timber that is running vertically on steep ski terrain, a thorough walk of the work area will help develop a carefully mapped plan. The plan must determine where workers can be safely placed, where their activities won't expose other crew members to risk.

Tree falling on downslopes can create many hazards that include but are not limited to dislodging rocks or ground debris, and the felled tree rolling or torpedoing down the slope. Bucking trees into segments can also produce hazards to downslope workers as a bucked section may roll or slide downhill.

Maintaining safe working distances can be difficult and requires absolute diligence from every worker. Often, due to the terrain and tree retention, it is not possible to see your falling partner. Regular person-checks must be done at a minimum of every 30 minutes for falling activities and it is highly recommended to use radio-wired earmuffs. In a glading environment, there are often multiple chainsaws running at any given time which can make it difficult to discern the sound of your check-in partner's chainsaw noise and the locations of other chainsaw operators. Before any falling cuts are placed on a tree, a faller must ensure no one is within two tree lengths of that tree.

BEST PRACTICES

A successful glading project will factor many considerations into the workplan.

- Knowing all the challenges of the timber and terrain will allow the Falling Supervisor to place fallers where their skills and experience can be maximized. For intensive falling areas, like flight path corridors, stands of larger timber and firewood falling, use Fallers that are well qualified with the appropriate skills, knowledge and experience to complete the tasks safely. It may be necessary to hire one or more experienced and qualified Fallers to complete some specialized tasks.
- Danger tree management can be important for glading project planning. The danger tree risk is low during the ski season as the deep snowpack around the base helps stabilize the danger tree. But during falling activity there is a much higher risk of disturbance and increased exposure to danger trees. Identifying and retaining high value to wildlife trees is always a priority but identifying and removing hazard trees is also required and is vital to the safety of the falling crew. It is recommended to have one or more crew members with a current Wildlife Danger Tree Assessor Certificate participate in the planning to determine what trees are safe to cut and what should be avoided and retained. Being able to do this efficiently and accurately will help avoid injury and may save lives.
- For high value wildlife trees, or danger trees where falling should be avoided, **No Work Zones** can be created to keep workers clear of the area. An experienced glading Faller will often avoid a clump or cluster around a danger tree to steer skiers away from it and this also helps avoid exposing the Faller or other crew members to the danger tree.
- Alternate falling methods, such as danger tree blasting, can help manage hazard trees. A certified danger tree blaster can safely remove a danger tree that would otherwise be too hazardous to hand fall. As many alpine ski operations have avalanche management programs in place which use explosives for avalanche control, a certified danger tree blaster could utilize the existing infrastructure already in place to access the materials needed to blast a danger tree. ([Danger Tree Blasting](#))
- If there is no alternate means to fall a hazardous tree, creating a No Work Zone is the control measure to use. The No Work Zone and the hazard should be properly marked on the work site, documented on the hazard report with a marked hazard location on the operational map and communicated to affected workers and other phases.



The best part of the job

8. Resources

WorkSafeBC

WorkSafeBC – Occupational Health and Safety Regulation:

<https://www.worksafebc.com/en/law-policy/occupational-health-safety/occupational-health-safety-regulation>

WorkSafeBC – Occupational Health and Safety Regulation 26.22.1:

<https://www.worksafebc.com/en/law-policy/occupational-health-safety/searchable-ohs-regulation/ohs-regulation/part-26-forestry-operations?origin=s&returnurl=https%3A%2F%2Fwww.worksafebc.com%2Fen%2Fsearch%23q%3D26.22.1%26sort%3D%2540fcomputedohsorderfield343%2520ascending%26f%3Acontent-type-facet%3D%5BOHS%2520regulation%2520%2526%2520related%2520materials%5D%26f%3Alanguage-facet%3D%5BEnglish%5D#61EA11DFEAB946CD9A163C3CBF6772C4>

Workers Compensation Act:

<https://www.worksafebc.com/en/law-policy/workers-compensation-law/workers-compensation-act>

BC Forest Safety

Emergency Response Plan and Block Plan:

www.bcforestsafesafe.org/files/frm_xERPAndBlockPlan.pdf

BCFSC Faller Supervisor Training:

www.bcforestsafesafe.org/node/2216