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Unit Introduction

By the end of this unit you will be able to demonstrate knowledge of:

- Terminology and phases of forestry
- Forestry as a business
- Harvesting methods
- Environmental and cultural considerations
- Types of trees and logs
- Transportation methods
- Basic regulations related to forestry

Section 1002-1: Terminology and Phases of Forestry

What you will learn in this section

By the end of this section you will be able to demonstrate knowledge of the following key points:

- 1.1 General terminology in the forest industry
- 1.2 Phases of forestry and how they connect

Key Point 1.1: General Terminology in the Forest Industry

The forest industry uses many industry-specific terms. As a forestry worker, it is important to be familiar with these common terms and their definitions.

Check out the Glossary found on the Home page of the BC Forest Safety Learning Management System.





Filter the Glossary to show only terminologies that apply to your industry.

Click Browse by category.



Click the **All categories** drop-down and select **General Forest** terminology and definitions.

The table below is the content from the General Forest terminology and definitions section of the glossary.

Acceptable to the Board (WorkSafeBC)	Information on what is acceptable to the Board may be obtained by referring to the OHS Guidelines on the section at <u>www.worksafebc.com</u> or other Board (WorkSafeBC) publications, or by contacting the Board.
	Note: Many sections of the Occupational Health and Safety Regulation refer to standards, procedures, or means "acceptable to the Board."
Active falling area	The area within a two-tree length radius of where a faller or mechanized falling equipment is located and equipped so as to be able to fall timber.
Articulated rock truck	A truck used to move material in forestry road building activities. This is generally on sub grade or unfinished roads. Rock trucks have traction capabilities that allow the vehicle to work in poor traction surface areas. Articulation capabilities allow the truck to be used on uneven topography.
Backcut	Final falling cut. The backcut will progress until the tree starts to fall in its intended direction.
Backhoe	A machine used to move and load earth, rock, gravel or other materials during construction and related activities.
	Backhoes work in the construction and maintenance of roads, bridges, airports and utilities, and of gas and oil pipelines, tunnels, buildings and other structures. They also operate equipment in surface mining, quarrying, and land clearing activities
	In forestry, a backhoe is used for road maintenance and deactivation.
Backspar	A tree rigged up at the back end of a work area to support a skyline.
Backstrap	A strip of solid wood (including the sap wood) that is left at the back of the tree. It holds the tree from falling while the backcut is being completed to the appropriate depth. Once all falling cuts have been applied, the backstrap

	can be cut to release the tree to fall.
	Used in heavy leaners to help prevent barberchairs; in large trees to hold the tree until cuts are complete, minimizing stump pull and provides added control for the Faller.
Barber chair	A vertical split in a tree, generally caused by an insufficient undercut or by neglecting to cut the sapwood on both sides of a heavy leaning tree before felling. Results in a stump that looks like a high-backed chair.
Bind	Compression created in a cut in a tree or log due to uneven terrain or contact pressure from other trees or logs.
Binder	A wire, synthetic rope, chain or other device that is secured by a cinch and placed around logs on a logging truck or trailer to prevent the logs from spilling.
Binder removal station	A structure that is designed to protect a worker, when releasing binders or stakes, from the maximum anticipated load of falling or sliding logs or log chunks.
Board	Means the Workers' Compensation Board, or WorkSafeBC.
Brushing	The striking of a standing tree by a tree being felled if the strike is a direct blow or a glancing blow of sufficient force to cause one or more branches to break at or near the stem of the standing tree.
Brush out	To clean out brush and other material around the base of trees to be felled or logs to be bucked. Gives protection against saw kickback and provides safe footing.
Bucker	A worker who cuts up trees on the ground.
Bucking	To saw log lengths from a tree after it has been felled.
Bull rails	Features that prevent vehicles from running off open sides of bridges, elevated truck weigh scales, elevated ramp approaches, and other elevated structures used by vehicles.
Bunk	The bottom section of the cradle assembly on a logging truck or trailer onto which logs are placed.

Butt rigging	A system of swivels, shackles, links and hooks which connect the haulback and mainlines and to which chokers are fastened.
Cab guard	A structure attached to a vehicle that provides protection to the cab occupants from the effects of load impact.
Cable logging	A yarding system employing winches, blocks and cables.
Certified welding inspector	A person who is certified as a Level 2 or Level 3 welding inspector in accordance with CSA Standard W178.2-08 (R2013), Certification of Welding Inspectors.
Chokerperson	A worker who puts chokers around logs and gets them ready for yarding.
Clearcut	When all trees in a given area are felled.
Climber	A worker who climbs trees or wooden spars at the workplace.
Combination falling	Sites where more than one falling method is used. An example is a block where hand falling takes place in conjunction with mechanical falling by a feller buncher.
Combustible liquid	A substance which meets the criteria for WHMIS Class B Division 3 combustible liquid (a flash point of 37.8°C (100°F) or more but less than 93.3°C (200°F).
Conk	A type of fungi growing from the trunk or base of a tree that is an indication of rot.
Contaminant	A harmful or irritant material, or nuisance dust, foreign to the normal composition of a substance, or a material that varies the normal proportions of components in a mixture such as air.
Cull	A tree or log considered un-merchantable because of defects.
Danger tree	A live or dead tree whose trunk, root system or branches have deteriorated or been damaged to such an extent as to be a potential danger to human safety.
	 Any tree that is hazardous to workers because of: Location or lean Physical damage

	 Overhead hazards Deterioration of limbs, stem, or root system
Dangle head processor	A piece of harvesting equipment that processes trees into logs by removing the limbs at the roadside or the landing, and cutting to length before logs are hauled to the mill or sort yard.
Directional control	Indicates that the fall direction of the tree must be controlled at all times. A feller buncher can maintain positive control as long as the tree's diameter and height aren't too great. A hand faller assisted by a feller buncher can also maintain directional control.
Dogs	Pointed teeth located between the chainsaw bar and motor. Used in falling or bucking to pivot saw and maintain position while cutting.
Dozer	A machine used to move, spread and strip earth, rock, gravel, or other materials during construction and related activities. They are used in the construction and maintenance of roads, bridges, airports, and utilities, and the construction of gas and oil pipelines, tunnels, buildings and other structures.
	In forestry, dozers are also used to clear brush and stumps, and to build roads and trails for logging purposes.
Drop line	The line to which to grapple or chokers are attached.
Emergency Response Plan (ERP)	Pre-planned responses to incidents to ensure protection of public health, safety, property and the environment and quick and effective responses.
Escape route	A planned and brushed-out path used by fallers to make their way into the clear when the backcut is completed.
Excavator	Machines used to excavate, move, lift, strip, stockpile, and place earth, rock, gravel or other materials. They are used in the construction and maintenance of roads, bridges, airports, and utilities, and the construction of gas and oil pipelines, tunnels, buildings, and other structures.
Excavator	Machines used to excavate, move, lift, strip, stockpile, and place earth, rock, gravel or other materials. They are used in the construction and maintenance of roads, bridges, airports, and utilities, and the construction of gas and oi pipelines, tunnels, buildings, and other structures. They also operate equipment in surface mining

	and quarrying.
	In forestry operations excavators are also used to create slopes, to construct landings and roads, build, and deactivate trails, pile debris, and relocate logs.
Faller	A worker who manually falls trees.
Falling Worksite	The working area of the Faller identified by signage, barricades, and/or flagging.
Fat truck	A large off-highway logging truck with up to 16- foot bunks and 8-foot stakes.
Feller buncher	A piece of harvesting equipment used in logging. It is a motorized vehicle with an attachment that can rapidly cut several trees before felling them.
Flammable liquid	A substance which meets the criterion for WHMIS Class B Division 2 flammable liquid (a flash point less than 37.8°C (100°F).
Flared butt	Extra expansion of the tree trunk that is flared out at the bottom. Also known as butt swell.
Forestry operation	A workplace where work is done in relation to silviculture or harvesting trees, including constructing the means of access and transporting the harvested trees to a facility where they are processed or from which they are exported.
Forwarder	A piece of harvesting equipment that loads wood onto a platform (on the forwarder) and moves it to a landing or roadside. This can be processed or unprocessed timber or logs. Some forwarders will process the log before putting it on bunks.
Fuel truck	A truck used for the storage and transport of fuel.
Grader	A wheeled machine used in civil road building, construction, and forestry applications. They are used to grade material, maintain roads, remove snow, and maintain ditch lines. Graders can also be used for removing debris
	off roadways and are used in extreme weather conditions including maintain water bars.
Grading	Determining what individual logs will be used for. For example, determining if the log is a

	saw log or peeler, etc.
Guylines	Used to support the tower and any tail trees, tails or intermediate supports. Yarders are equipped with drums holding the guylines necessary to support the tower.
Haul road standards	Roads, bridges, elevated platforms, and other structures used by vehicles transporting workers, logs or other forest products in forestry operations.
Hang up	A partially fallen tree supported by other standing timber. Hang ups are dangerous and can be natural or man-made.
Haulback	The cable used to outhaul the rigging or grapple when yarding.
Hauling cycle	The time allowed for each round trip.
Hazard	An object or condition that may expose a person to a risk of injury or occupational disease.
Hazard area	An area in a workplace where a hazard exists, or is created, due to a condition in the area or the activities conducted in it.
Hazardous product	Any product, mixture, material or substance that is classified in accordance with the regulations made under section 15 (1) of the Hazardous Products Act (Canada) in a category or subcategory of a hazard class listed in Schedule 2 of that Act.
HEPA	In reference to air filtration, a high efficiency particulate air filter meeting the specifications of a nuclear grade filter, providing a 99.97% filtration efficiency at a 0.3 micrometre particle size.
Hierarchy of Controls	When considering how to reduce risk, there is a certain order that should be followed known as the hierarchy of controls. The levels of control, from most effective to least effective, found within the hierarchy are elimination, substitution, engineering controls, administrative controls and personal protective equipment.
High lead	A cable logging system in which running line lead blocks are placed on a lift tree or on a mobile yarder to provide lift to the logs during

	yarding.
Hoe chucker	A piece of harvesting equipment, typically a loader, that swings felled trees or bundles from the forest to the road. This action is known as hoe chucking or shovel logging.
Hog's back	A narrow ridge or hump in the terrain that runs perpendicular to the existing ground.
Holding wood	The hinge of wood left uncut between the back of the undercut and the backcut.
Hooktender	The foreman in charge of a yarding site.
Hydraulic log loader	A hydraulic log loader is a machine used to load and unload timber from log transportation vehicles and storage piles.
IDLH atmosphere	An atmosphere containing a substance that is immediately dangerous to life or health.
Incident	Includes an accident or other occurrence that resulted in or had the potential for causing an injury or occupational disease.
Intermediate spar	A tree used to elevate a skyline between the yarder and the backspar in a multi-span skyline system.
Jackpot	A pile of haphazardly felled trees occurring naturally or manmade.
Jill-poke	A supported straight log that strikes an object at an angle either spearing the object or pushing it to the side.
Kerf	The width of any saw cut.
Kickback	When the chainsaw is driven back towards the operator.
	When a tree is felled and slips backwards off the stump toward the faller.
Landing	The area to which logs are:
	Yarded or skidded for sortingPrepared for transportation
Lift tree	A tree rigged to support running lines.
Log transporter	Any of the following used to transport logs on roads: • Truck • Trailer

	Truck and trailer assembly
Lowbed truck	A trailer attached to a truck that is used to move machinery and equipment from one location to another. This can be on public, private or resource roads in flat or mountainous areas.
Mainline	The cable used to yard logs.
Mainline release	A skidding winch on a ground-based skidding machine must have a quick-release system to permit the winch line to run out freely and automatically disengage from its drum.
Mg/m3	Milligrams of a substance per cubic metre of air.
	Note: It is a measure of weight and generally applies to aerosols such as dusts, fumes, and mists.
Mobile yarder	A logging machine mounted on wheels, tracks or skids, incorporating a vertical or inclined spar, tower or boom used in a skyline, slackline, modified slackline, high lead, or grapple cable logging system.
Molly Hogan	A single strand of wire rope rolled into a circle with six complete wraps that may be used as a temporary method of connecting the eye splices of two lines of the same size or in pin shackles to replace the cotter pin.
Multiple-employer workplace	A workplace where workers of 2 or more employers are working at the same time on different projects. Same time means that workers of two or more employers are merely present in the workplace over an appropriate interval rather than at any precise point in time.
New work location	A work location in a forestry operation where the crew of workers has not previously worked.
No Go or No Work Zone	Areas identified on maps that are forbidden for certain machines or workers. These could be sensitive areas, areas under power lines or riparian zones. These zones may or may not be flagged in the field.
Oxygen deficient	In relation to air, a condition in which there is less than 19.5% oxygen by volume or the partial pressure of oxygen is less than 16.3 kPa (122 mm Hg).

Ppm	Parts per million. Unit of measure for vapour or gas.
Phase congestion	Overlapping work processes that have the potential to negatively impact other phases due to proximity of work, such as falling, road construction, harvesting, blasting, etc. This overlapping of work processes can put workers at higher risk of an upset condition or incident.
Phase Integration	The practice of incorporating a number of harvesting phases (potentially multiple contractors), operating at the same time within a single cut block.
Positive control	Indicates that the fall direction of the tree must be controlled at all times. A feller buncher can maintain positive control as long as the tree's diameter and height isn't too great.
	A hand faller assisted by a feller buncher can also maintain positive control.
Prime contractor	In relation to a multiple-employer workplace, the directing contractor, employer or other person who enters into a written agreement with the owner of that workplace to be the prime contractor.
Professional engineer	A person who is registered or licensed to practice engineering under the provisions of the Engineers and Geoscientists Act.
Qualified	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 registered professional	In relation to a forestry operation, a registered professional forester, registered forest technologist or holder of a special permit under the Foresters Act.
Rated capacity	Also referred to as "rated load."
	The load that machinery or a piece of equipment is, in accordance with its design, rated to bear.
Resource road	A road or portion of a road on Crown land, private land and/or timber land area and includes a bridge, culvert, ford or other structure or work associated with the road but does not include a highway within the meaning

	of the Transportation Act.
Riparian	Area of stream or riverbank.
Risk	A chance of injury or occupational disease.
Rock drill	A drilling device used for penetrating rocks. They can be both mechanized and hand operated. Rock drills have specialized drill and lubrication systems to keep the drill cool. Rock drills are mainly used in road building in
Rootwad	Rootwads include the root mass or root ball of a tree plus a portion of the trunk.
Safety data sheet (SDS)	A document that provides health and safety information about products, substances or chemicals that are classified as hazardous
Also known as MSDS	substances or dangerous goods.
Salvage	The practice of logging trees in forest areas that have been harvested or are damaged by wildfire, flood, severe wind, disease, insect infestation, or other natural disturbance in order to recover economic value that would otherwise be lost.
Sapling	An immature tree that ordinarily would not be harvested.
Scaling	The determination of the gross and net volume of logs.
Sensitizer	A substance that has been shown to elicit an allergenic type of response in humans after an initial exposure, resulting in development of symptoms upon subsequent exposure at much lower concentrations.
Short stubby	Any tree that is half of its original height or less, relative to the timber stand, where the top weight does not influence falling cuts.
Silviculture	The growing and cultivation of trees and related activity.
Skidder/Skidding	Harvesting equipment used to grab bundles of logs and forward the logs to the landing/staging/roadside so the logs can be processed.
	Tracked skidders are generally used on steeper terrain and can also be used for

	building roads and trails where needed.
	Wheeled skidders are used on ground that is not as steep and forwards logs from grapple yarders and hoe chuckers to the landing.
Skyline	A cable on a yarder that supplies lift for yarding lines, blocks, rigging, carriage and logs.
Slackline	A skyline that can be tensioned at the operator's discretion.
Sort	Category of logs based on species, qualities, values and grade. Logs are sorted in preparation for the commercial market.
Spar	A tree or mast on which rigging is hung for a cable logging system.
Split line	A narrow zone between mechanically and hand felled areas. A minimum of a tree length of timber is removed, creating a buffer between the proposed mechanical falling and hand falling areas. Remember that a minimum of two tree lengths must be maintained at all times when both phases are working at the same time.
Stake	The upright section of the cradle assembly on a logging truck or trailer onto which logs are placed.
Stacking	Placing workers above each other on steep slopes. Stacking contributes to unsafe working conditions when runaway trees run down slopes toward other workers. It is a practice that must be avoided.
Strawline	A small diameter cable used in rigging up or moving larger cables or blocks.
Supervisor	A person, who instructs, directs and controls workers in the performance of their duties.
Tenure	Permissions granted by the government authorizing the rights to harvest Crown timber.
Tightline	To lift the lines taut in the air with regards to yarding.
Truck-mounted crane	A supporting vehicle for lifting, handling, and moving equipment or machinery. Truck- mounted crane trucks have cranes at the front or rear of the flat bed to move equipment on and off the truck trailer. They are under 5,000

	pounds and the boom is less than 25 feet.
Turn	One or more logs that are skidded or yarded to the landing at one time.
Utility service	 Could be any of the following: Petroleum (gas) pipeline Sanitary sewer line Enclosed storm sewer
	Water lineSteam lineElectrical cable
Wheeled loader	Wheeled machine used to move and load earth, rock, gravel, or other materials during construction and related activities. They are used in the construction and maintenance of roads, bridges, airports, utilities, and of gas and oil pipelines, tunnels, buildings and other structures. They are also used in surface mining, quarrying, and land clearing activities.
	In the forestry setting a wheeled loader is used for handling logs in log and sort yards. A hydraulic loader is used for loading log trucks handling logs, and piling debris.
Widowmaker	Limb or other loose material dropped or thrown from a tree toward the faller as the tree is felled.
	A constant hazard for fallers.
Winch assist	The practice of attaching a cable or cables to a forest machine to increase its operability on slopes. Winch assist can also be called tethered or traction assist.
Wildlife Tree Retention Area (WRTA)	A forest retention area associated with a silvicultural system where forest patches or individual trees are retained to provide habitat, biodiversity, scenic or other values.
Windfall	A single tree blown over by the wind. A windfall is often found lying among standing timber. Some are still merchantable.
Windthrow	A group of trees blown over by the wind.
Witch's broom	A deformity in a tree where the natural structure of the tree is changed. Caused by a dense mass of shoots growing from a single point with the result looking like a broom.

Working load limit (WLL)	The maximum load that a product is authorized by the manufacturer to support in a particular service.
Workplace Hazardous Materials Information System (WHMIS)	Canada's national hazard communication standard.
Yarding	The act of moving or pulling logs from the cutting area using mobile or other equipment that does not travel while the logs are being moved. Yarding of logs allows the operator to lift logs over tree trunks and other obstructions and position logs for loading onto trucks.
	There are many types of yarding including but not limited to:
	 Grapple yarding High lead yarding Skyline yarding Slackline yarding

Table 1: Glossary of Terms

Learner Activity



Instruction: Match the Term to the correct Description.

Term	Description
Board	Agreement with land owner
Clear cut	Area of stream or riverbank
ERP	All trees felled in an area
Prime Contractor	Pre-planned responses
Riparian	Permission granted to harvest
Tenure	WorkSafeBC



Now check your answers on the next page.

Answer





Key Point 1.2 Phases of Forestry

The phases of forestry include:

- Engineering and planning
- Road building
- Falling
- Skidding
- Yarding
- Log hauling
- Dryland sort (booming, scaling, and grading)
- End location of product
- Salvage
- Waste management
- Deactivation
- Silviculture

Engineering and Planning

The first phase in a harvesting operation is creating a harvesting plan. The main goal of planning a logging operation is to maximize economic returns and minimize environmental impact.

Engineers and planners map out where to put cutblocks, roads, landings, deflection lines (lifts to get the logs out), etc. Maps will also show where culverts, bridges, and turnouts are to be installed, when necessary.

Road Building

The road building phase starts after the engineers and planners have planned and mapped out the worksite.

Planning for road building must ensure the road, bridges, and other structures used by vehicles transporting workers, logs, and other forest products are constructed and maintained to a standard which will permit safe transit.

Falling

Falling is the act of falling trees by hand using a chainsaw or with a machine.

All known and foreseeable hazards must be identified and communicated to all fallers and other workers on the site. The prescribed harvesting method must be communicated and will determine how the trees will be felled.

Skidding

Skidding involves transporting logs from the hillside or cutting site to a landing using a grapple to drag or skid the logs.

Yarding

Yarding generally occurs on steep terrain and involves moving the logs from the hillside to a landing using machinery consisting of winches and cables to fully or partially lift logs off the ground to transit to the landing site.

Log Hauling

Log hauling is when the logs are picked up from the landing site and are loaded onto trucks to be transported to the dryland sort (mill) or the water (for further transport).

Planning for log hauling focuses on finding a route to move the logs from the site to the end location considering efficiency, safety and cost.

Dryland Sort

In the dryland sort phase, timber is sorted, graded, and built into packages or booms for different customers. This is when scalers look at individual logs and grade them. They measure logs to calculate volume for each log.

Booming

Booming is bundling logs and getting them ready for transport by water where booms can be pulled to a dryland sort or to a mill, or put on a ship or log barge and transported locally or to another country.

Scaling

The scaling phase in forestry is when the volume of wood harvested is calculated in order to determine stumpage costs that an operation is required to pay to the government for use of the land. Stumpage is defined as the price on standing timber and the right to harvest it.

Grading

Grading is determining what individual logs will be used for. For example, if the log is a saw log or peeler, etc.

End Location of Product

The end location of product phase is when the logs are processed into the desired product. This phase may start with shipping the product (which could be raw logs) to the mill or another country.

Salvage

In forest operations, salvage is the recovery or harvesting of timber that has been unused or damaged by natural causes, such as fire, high wind, insects, or disease.

Plans for salvage operations must ensure the operation is conducted in a manner that:

- Maximizes the recovery of the killed or damaged timber
- Restricts further damage or infestation to the stand
- Protects communities and natural resources

Waste Management

The waste management phase happens alongside the salvage phase. This phase may include destroying timber that cannot be used in a controlled burn as part of fire prevention measures. Activities in both the salvage and waste management phases are conducted to meet government regulations related to maximizing timber products from the entire logging operation.

Deactivation

The deactivation phase includes activities that return the land as closely as possible to its natural state before the logging operation began.

Silviculture

The silviculture phase includes harvesting, regeneration, and standtending activities. It covers all activities for the entire length of a cutting cycle to ensure that the harvesting operation meets resource management objectives.

Silviculture include tree planting and stand tending activities.

Section 1002-2: Forestry as a Business

What you will learn in this section

By the end of this section you will be able to demonstrate knowledge of the following key point:

2.1 Forestry as a business

Key Point 2.1: Forestry as a Business

British Columbia's forest sector has long been a cornerstone of economic activity and continues to be the foundation of the province's economy.

Operational forestry occurs on both Crown lands and private lands, both of which have a set of Regulations that govern activities and uses.

Nearly two-thirds of BC's total area is forested. Of that forested area, approximately 5% is privately owned, and the remaining 95% is managed by the Province as public lands.

The BC government has a responsibility to the people of BC to maintain their environmental, social, and economic interests in forests. The government manages the public forests through laws that enable the use of the forest, while ensuring its long-term sustainability.

Sustainable Forestry

Sustainable forest management is a way of using and caring for a forest. This includes:

- Maintaining the environmental, social and economic values over time
- Provisions that address wildlife habitat and water quality, ensure prompt reforestation, consider tourism, visual quality, and recreation, and much more

The Forest and Range Practices Act (FRPA) and its associated regulations help ensure forestry practices are sustainable.

Legislation covers a wide range of topics, and addresses many of the plans required and associated steps that will protect the environmental, economic, and social values within BC's forests.

Since 1947 the Association of BC Forest Professionals (ABCFP) has regulated the work of professionals responsible for ensuring that sustainable forest management takes place. See the ABCFP website for more information on professionals working in the forest industry.

Companies or other groups with a timber tenure, like a Forest License, have many factors to consider. They must meet their obligations for sustainable practices under their agreement with the government, and the applicable legal requirements, and they must also consider their customers. Many customers today want to see wood that is produced from sustainable forests, so BC's forest companies seek additional certifications that allow them to label their wood products as "sustainable."

Logos on lumber products from the following organizations indicate that the company's practices meet a standard over and above what is required by their tenure and government legislation:

- Canadian Standards Association (CSA)
- Forest Stewardship Council (FSC)
- Sustainable Forestry Initiative (SFI)

Tenures

Tenures are legally binding contracts between a company, community, or individual and the government. They offer rights to use public forest lands "over a specific period of time, in exchange for meeting government objectives, including forest management obligations and the payment of fees, including stumpage."

The Forest Act outlines the many different types of tenure that exist for BC's Crown forest lands. They can be major tenures, like Forest Licenses and Tree Farm Licenses that provide rights to harvest trees from large areas over many years, in exchange for stumpage fees, good reforestation, and overall sustainable forest practices. Tenures can also be for small areas, and for short terms, like a License to Cut or a Road Permit. Regardless of the tenure, the tenure holder is required to comply with applicable legislation, including the Forest and Range Practices Act, the Wildlife Act and Federal Fisheries Act.

Privately Managed Forest Lands

There are a number of companies, communities, and individuals in BC that manage commercial private forest lands. These forest lands are not governed by the Forest Act and Forest and Range Practices Act, but rather by the Private Managed Forest Land Act.

Because the land is privately owned, no stumpage is paid to the Crown, and the government does not assert control over specifics of reforestation and other sustainable forest management objectives.

Section 1002-3: Harvesting Methods

What you will learn in this section

By the end of this section you will be able to demonstrate knowledge of the following key points:

- 3.1 Harvesting methods
- 3.2 Mechanical harvesting methods

Key Point 3.1: Harvesting Methods

BC's logging industry operates in varied terrain. A single cut block can have flat and steep ground, wet and dry areas, large and smaller diameter trees. To maximize productivity and safety in these variable blocks, companies use more than one method to fall and harvest timber.

Harvesting methods may include:

- Cable yarding
- Grapple yarding
- Super snorkel
- Long line
- Single tree select harvesting
- Helicopter
- Horse logging
- Clean up (salvage)

Cable Yarding

A cable yarder is a type of logging equipment that stays on the road and is used to pull and lift logs with cables from steep slopes to the roadside or landing. It involves a hooktender and may include rigging slinger and chokerperson.



Figure 1: Cable Yarder

Grapple Yarding

A grapple yarder, also known as swing yarder or another version of cable yarding, is a heavy duty piece of forestry equipment used for pulling logs from the woods to a logging road with cables.



Figure 2: Grapple Yarder

Super Snorkel

A variation on the yarder is the line loader, or super snorkel. With skillful manipulation of the grapple, this machine can pluck felled logs from the forest, skid them up or down a slope to the landing (the ledge on which the machines work) then drop them onto a stockpile or waiting truck, combining the work of two separate machines.



Figure 3: Super Snorkel

Long Line

A long line is a cable system method of yarding logs to a landing from distances up to 1,200 feet away.

Single Tree Select Harvesting

Single tree select harvesting removes individual trees throughout the stand.

Helicopter

Heli-logging or helicopter logging, is a method of logging that uses helicopters to remove cut trees from forests by lifting them on cables with either a grapple or choker attached. Heli-logging is often used in inaccessible areas of forests.

Because the use of helicopters reduces the level of infrastructure required to log in a specific location, the method also helps to reduce the environmental impact of logging. It also can increase the productivity in remote areas.



Figure 4: Helicopter Logging

Horse Logging

Horse logging uses horses instead of logging machinery that can take a heavy toll on the land. Horse logging is mostly used for selectively harvesting trees and not for clear-cut operations. The advantages of using horses to move logs is their ability to enter sensitive areas (such as bird nesting areas) and leave minimal to almost no damage behind.



Figure 5: Horse Logging

Clean Up (Salvage)

Clean up behind machines includes salvage work where salvage contractors, loggers, or firewood contractors come in to the cut block after all the machine operations are completed, to collect pieces that can still be turned into timber by-products.

Key Point 3.2: Equipment used for Mechanical Harvesting

Mechanical harvesting is carried out using a handful of cutting methods including equipment such as feller bunchers which are highly efficient on moderately sloped, drier ground where trees are not oversized. Operators sit inside a steel cab while working, so they are well protected and have a reduced risk of injury.

Equipment used for mechanical harvesting may include:

- Processor
- Feller buncher
- Skidder
- Forwarder
- Delimber
- Dozer

Processor

A processor is a mobile machine consisting of a maneuverable articulating arm onto which a processing head, also known as a dangle head, is attached. This machine picks up one tree at a time from the tree pile or bunch. The tree is pulled by rollers through a clamp which removes all branches also known as delimbing, then a saw in the processing head cuts off the top of the tree. This saw is also known as a hot saw. The machine then pulls the delimbed tree through the processing head, stops at the desired length and cuts off the log, then repeats the process until the tree and other trees in the pile or bunch are processed into a pile of delimbed, cut-to-length logs.



Figure 6: Processor

Feller Buncher

A feller buncher is a machine used in logging for falling trees and piling them into bunches.



Figure 7: Feller Buncher

Skidder

A skidder is any type of heavy vehicle, with either tracks or rubber tires, used in a logging operation for pulling cut trees out of a forest in a process called "skidding". It uses either a grapple (as shown below) or a cable to skid the trees to the roadside. The logs are transported from the cutting site to a landing. Here they are processed and then loaded onto trucks (or in times past, railroad cars or flumes), and sent to the mill.



Figure 8: Skidder
Forwarder

A forwarder is a forest tractor, usually self-loading, that carries logs from the stump to a roadside landing.

Unlike a skidder, a forwarder carries logs clear of the ground, which can reduce soil impacts but tends to limit the size of the logs it can move. Forwarders are typically used together with harvesters in cutto-length logging operations.



Figure 9: Forwarder

Delimber

A delimber is a self-propelled machine used to remove branches from trees or tree parts. It can cut logs to length similar to a processor. Examples include:

- Wrap-around knife delimber
- Milling head delimber
- Pocket delimber
- Stroker delimber



Figure 10: Delimber

Dozer

A dozer is a crawler tractor with a steel blade mounted across the front that can be raised and lowered to push dirt, timber, or debris.

A dozer can be used for the following tasks:

- Clearing right-of-way and other access routes
- Building and smoothing roads and landings
- Improving road drainage
- Anchoring cable rigging
- Pulling rigging and logs



Figure 11: Dozer

Self-Quiz

- 1. Which statement best defines a danger tree? (1002.1.1)
 - A tree that is hazardous because of location, lean or state of decay
 - A tree that is hazardous because of its height, weight and lean
 - □ A tree that is hazardous because of its age and location
 - □ A tree that is hazardous because of location and ground conditions
- 2. What are the three main components of an Emergency Response Plan? (1002.1.1)
 - ETV location, emergency location, first aid procedures
 - □ Muster point, access and egress routes, communication protocols
 - □ First Aid equipment, helicopter landing site, staging area
 - Emergency contacts, GPS coordinates, First Aid procedures
- 3. What area on a map should be labeled as a no work zone? (1002.1.1)
 - □ Roadways
 - □ Staging area
 - □ Riparian zones
 - □ Safety zones
- 4. What is part of the WorkSafeBC definition of Qualified? (1002.1.1)
 - □ Having a Certificate of Qualification
 - □ Knowledgeable of the work
 - □ Knowledgeable of the job requirements
 - Undergoing a third-party assessment

- 5. What is phase integration? (1002.1.1)
 - □ Overlapping work processes
 - □ Work processes that are planned together
 - □ People closer than 2 tree lengths
 - Equipment in the work area
- 6. What are three phases of forestry? (1002.1.2)
 - □ Waste management, deactivation, fire prevention
 - □ Cutting cycle, Engineering, planning
 - □ Silviculture, packaging, yarding
 - Logging, deactivation, end location of product
- 7. In what phase of forestry do scalers look at individual logs and grade them? (1002.1.2)
 - □ End location of product
 - □ Dryland sort
 - □ Yarding
 - □ Planning
- 8. What phase happens alongside the salvage phase? (1002.1.2)
 - □ Silviculture
 - □ Dryland sort
 - □ Waste management
 - □ Deactivation
- 9. What does silviculture include? (1002.1.2)
 - □ Stand tending
 - □ Scaling
 - □ Grading
 - □ Decommissioning

- 10. What is an example of a major tenure? (1002.2.1)
 - □ License to cut
 - □ Road permit
 - □ Tree farm licenses
 - □ Salvage operation
- 11. Why is logging by helicopter done? (1002.3.1)
 - □ Most cost-effective method
 - □ Fire hazards prevents other methods
 - □ Supports cable logging activities
 - □ Reduces levels of infrastructure required
- 12. Which type of equipment has a maneuverable articulating head? (1002.3.2)
 - □ Forwarder
 - □ Skidder
 - □ Processor
 - Dozer



Now check your answers on the next page.

Self-Quiz - Answers

1. Which statement best defines a danger tree? (1002.1.1)

Answer: A tree that is hazardous because of location, lean or state of decay

2. What are the three main components of an Emergency Response Plan? (1002.1.1)

Answer: Emergency contacts, GPS coordinates, First Aid procedures

3. What area on a map should be labeled as a no work zone? (1002.1.1)

Answer: Riparian zones

- 4. What is part of the WorkSafeBC definition of Qualified? (1002.1.1)Answer: Knowledgeable of the work
- 5. What is phase integration? (1002.1.1) Answer: **Overlapping work processes**
- 6. What are three phases of forestry? (1002.1.2)

Answer: Logging, deactivation, end location of product

7. In what phase of forestry do scalers look at individual logs and grade them? (1002.1.2)

Answer: Dryland sort

- What phase happens alongside the salvage phase? (1002.1.2)
 Answer: Waste management
- 9. What does silviculture include? (1002.1.2) Answer: **Stand tending**
- 10. What is an example of a major tenure? (1002.2.1) Answer: **Tree farm licenses**
- 11. Why is logging by helicopter done? (1002.3.1)

Answer: Reduces levels of infrastructure required

12. Which type of equipment has a maneuverable articulating head? (1002.3.2)

Answer: Processor

Learner Activity



Instruction: Select the Feller Buncher from the following pictures.





Instruction: Select the Forwarder from the following pictures.





Now check your answers on the next page.

Answers

 Select the Feller Buncher from the following pictures. Answer:



2. Select the Forwarder from the following pictures. Answer:



Section 1002-4: Environmental and Cultural Considerations

What you will learn in this section

By the end of this section you will be able to demonstrate knowledge of the following key points:

- 4.1 Environmental considerations in the forestry sector
- 4.2 Cultural considerations in the forestry sector

Key Point 4.1: Environmental Considerations

During harvesting operations, the forest and its environment are disturbed. This may include:

- Ground and site disturbance
- Waterways and stream disturbance
- Wildlife disturbance

Ground and Site Disturbance

Harvesting equipment causes ground disturbance by creating ruts or moving the soil. This may cause issues such as erosion, damage to other timber, loose soils and unstable terrain.

Another risk to using heavy equipment is spills of fuel, hydraulic fluids and oils.

Waterways and Stream Disturbance

When working near streams, the goal of a forestry operation is to:

- Prevent and manage siltation
- Prevent disturbance to fish bearing streams
- Prevent contamination, when working in community watersheds
- Maintain riparian management zones around streams
- Minimize equipment crossing of streams
- Minimize disturbing wildlife

Wildlife

Animals are affected by forestry operations. Be aware of nests and dens. Ensure a buffer is left around the nest or dens to protect the animals living in them.

Key Point 4.2: Cultural Considerations

When undertaking forestry operations, cultural considerations must be given to First Nations and government ministries.

First Nations

Forests have been economically, culturally, and spiritually significant to First Nations people for thousands of years. First Nations legal rights to the forest land base are protected by, but not limited to:

- The Constitution
- Charter of Rights and Freedoms
- Treaties
- Significant "game changer" legal precedent for aboriginal title in BC such as the Supreme Court of Canada's landmark Tsilhqot'in decision on June 2014
- Other significant legal rulings, such as Sparrow, Delgamuukw and others
- Identified traditional territories
- Identified traditional hunting, fishing and gathering areas
- Archaeological sites

First Nations involvement for forest-related matters on First Nations land includes consultation and consent on:

- Planning and decision-making
- Potential impacts to First Nations' domestic use rights
- · Gaining access to forest resources for timber and other uses
- Revenue sharing through Non-renewal Forest Licenses (NRFL)
- Traditional use projects

Workers in BC's forest industry must be aware of the importance of respecting the culture and traditions of the First Nations people in the area they are working in. First Nations have deep roots and attachment to the land. Their philosophy as stewards of the land, of work and ties to the land, and the use of resources may be different from your company's existing work culture.

If you will be working on First Nations land, ask your employer for information on the considerations related to First Nations. Learn about them and plan accordingly.

Culturally modified trees

One example of what you need to be aware of when working on First Nations land is culturally modified trees.

A culturally modified tree is a tree that has been altered by aboriginal people as part of their traditional use of the forest. Examples include stumps, felled logs and trees:

- With bark removed
- Tested for soundness
- Chopped for pitch
- With scars from plank removal
- Delimbed for wood



Figure 12: Culturally modified tree

Other modified trees

"Other modified trees" is a class of culturally modified trees that includes trees modified for purposes other than bark collecting or the gathering of large pieces of wood.

These other purposes include the collection of kindling, pitch, and small pieces of wood suitable for the making of tools.

Reasons for modifying this type of tree may include:

- Marking a trail
- Asserting tree ownership
- Facilitating passage on streams (dug out canoes)
- Serving as support posts for shelters, drying frames, and planks for houses

• Providing alcoves for the placement of trap sets in winter

In many cases these culturally modified trees are difficult to confirm as being aboriginal. Modifications not attributable to bark-stripping or aboriginal logging should be examined carefully when deciding if a tree should be recorded as a culturally modified tree. If in doubt, do not proceed until you have received confirmation from a First Nations' expert in the area.

Archaeological sites

Archaeological sites are places or groups of physical sites where evidence of past activity is preserved. These sites may have been, or may be, investigated using the discipline of archaeology and represents a part of the archaeological record.

Sites may range from those with few or no remains visible above ground, to buildings and other structures still in use.

If any sites are discovered during forestry operations, all work must be stopped immediately as mandated by the Heritage Conservation Act, until a qualified professional (such as an archaeologist and First Nations' expert) can review the finding and prescribe protective measures if required.

The following are examples of archaeological sites:

- Burial sites
- Camp and settlement sites (usually near creeks, rivers and near beaches)
- Fishing and camping sites
- Fire altered rock where tools were made at these camps
- Traditional trails

Government Ministries

Government ministries are tasked with ensuring that forest operations leave no negative visual impact to the landscape. The government is also responsible for setting aside and protecting forest lands for values such as old-growth, water, species and ecosystems at risk, wildlife habitat, scenic viewscapes, and cultural features.

Section 1002-5: Types of Trees and Logs

What you will learn in this section

By the end of this section you will be able to demonstrate knowledge of the following key points:

5.1 Types of trees logged in British Columbia and their use

5.2 Grades of logs

Key Point 5.1: Types of Trees Logged In British Columbia and their Use

Trees logged in British Columbia are grouped into four groups:

Group 1

- Douglas-fir
- Larch
- Pine
- Spruce

Group 2

- Western red cedar
- Yellow cedar

Group 3

- Hemlock
- Balsam

Group 4

All deciduous

Group 1

Douglas fir

British Columbia has two varieties of Douglas fir trees – coastal and Interior.

Older trees have a long, branch-free trunk and a short cylindrical crown with a flattened top.

This dense wood is exceptionally hard, stiff, and durable. Its strength and availability in large dimensions make it outstanding for heavyduty construction such as wharves, trestles, bridge parts, and commercial buildings.

Coastal Douglas fir

The coastal Douglas fir is found along the southern mainland coast and across Vancouver Island, except for the very northern tip. This coastal variety can reach heights of 85 metres.



Western Douglas fir

The western Douglas fir can reach heights of 42 metres.

The Interior variety is found throughout southern British Columbia and north to Takla Lake.

Larch

British Columbia has two varieties of larch trees – alpine and western.

Alpine larch

A small, often dwarfed or contorted tree that grows to 15 metres tall. It is found in the subalpine area of the Rocky Mountains, the Purcell and southern Selkirk ranges, as well as in Manning Park and adjacent areas in the Cascade ranges.



Western larch

A large tree that can grow to 80 metres tall and 850 years of age. Like all larches, it loses its needles in the autumn. It grows in valleys and on the lower slopes of mountains in the southern Interior.

The wood of western larch is one of the strongest in Canada. It is often used in heavy construction and for railway ties and pilings.

Siberian Tamarack

A small to medium-sized conifer tree, growing up to 15 meters tall, featuring needles that turn gold before dropping. This species is cold-tolerant and grows well in wet conditions.





Pine

British Columbia has five varieties of pine trees:

• Limber



- Lodgepole
- Ponderosa (yellow pine)
- Western white
- Whitebark

Limber pine

A small, scrubby, twisted tree with short limbs, usually 5 to 10 metres high. The lower branches on older trees become very long and drooping but with upturned tips. It looks similar to whitebark pine, but limber pine has larger cones.

Limber pines are found at higher elevations on the western foothills of the Rocky Mountains, in the extreme southeast of British Columbia.

Lodgepole pine

A tall, slender, straight tree which grows throughout most of the Interior. The bark is thin, orangey-brown to grey, and finely scaled.

Lodgepole pine is excellent for lumber, plywood, and paneling. It is used to make doors, windows and furniture, as well as railway ties, mine props and fence posts.

Ponderosa (yellow pine)

A large-crowned tree with a straight trunk, usually about 25 to 30 metres tall, but sometimes reaching a height of 50 metres and a diameter of 2 metres.

The Ponderosa is found mostly in the southern Interior.

The wood is used mainly for doors, windows, and furniture, as well as paneling and shelving.

Western white pine

A large tree, up to 60 metres high. It usually grows in closed groups of trees and has a short, open crown.

It is commonly found in the drier parts of Vancouver Island, the adjacent mainland coast and in the wetter parts of the southern Interior, particularly at low elevations.

The wood is ideal for carving because of its fine grain and uniform texture. It is also prized for special construction purposes, pattern making, and furniture.









Whitebark pine

A subalpine tree that varies in shape from a small tree with a rapidly spreading trunk and broad crown to a shrub with a wide-spreading crown and twisted, gnarled branches when exposed to strong winds. It is similar in appearance to limber pine, but its cones are quite different.

It found mostly at high elevations in southern British Columbia.

Whitebark pine's greatest values are for wildlife habitat, watershed protection, and esthetics. Whitebark pine helps to stabilize snow, soil, and rocks on steep terrain and has potential for use in land-reclamation projects at high elevation.



Spruce

British Columbia has four varieties of spruce trees:

- Black
- Engelman
- Sitka
- White

Black spruce

A small, slow-growing tree, up to 20 metres tall and 25 centimetres in diameter. It often has a characteristic cluster of branches at the top forming a club or crow's nest.

It grows throughout the northern part of British Columbia.

The long fibres in black spruce make this a preferred pulp species for paper products.



Engelman spruce

A straight tree with a spire-like crown that can reach 50 metres tall and 1 metre in diameter when mature. Branches near the ground tend to droop.

The Engleman spruce is found at high elevations throughout the Interior and along the east slope of the Coast Range. It has been successfully introduced into high-elevation plantations on the west side of the Coast Range and on Vancouver Island.

Engelmann spruce lumber is used for construction when great strength is not required. Rotary cut spruce veneer is used in manufacturing plywood. Specialty items such as violins, pianos, and aircraft parts are produced from Engelmann spruce.

Sitka spruce

A large tree that commonly grows up to 70 metres tall and 2 metres across when mature. The largest known Sitka spruce is 93 metres tall and 5 metres across.

The Sitka spruce grows along the coast in a narrow band from sea level to about 700 metres. It is most common along the coastal fog-belt and river and stream flood plains.

Sitka spruce is valued for its wood, which is light, soft, and relatively strong and flexible. It is used for general construction, ship building, and plywood. The wood has excellent acoustic properties and is used to make sounding boards in pianos and other musical instruments such as violins and guitars.

White spruce

A large tree with a narrow crown, it can grow to 40 metres tall and 1 metre in diameter when mature.

White spruce and its hybrids are found through-out the Interior from valley floor to mid elevations. In the central Interior, white spruce cross-pollinates with Engelmann spruce and is referred to as interior spruce. The pure species is generally found only north of Dawson Creek.

White spruce is a very important commercial tree species, yielding excellent lumber and pulp.



Group 2

Western red cedar

A large tree, up to 60 metres tall when mature, with drooping branches; trunk often spreading out widely at the base.

The western red cedar is mostly found at low to mid elevations along the coast and in the wet belt of the Interior, where the climate is cool, mild, and moist.

The wood is naturally durable and light in weight. It is used for house siding and interior paneling as well as outdoor furniture, decking and fencing. Because of its resistance to decay and insect damage, the wood of large, fallen trees remains sound for over 100 years. Even after 100 years, the wood can be salvaged and cut into shakes for roofs.

Yellow cedar (Cypress)

A medium-sized tree, up to 24 metres tall and 90 centimetres in diameter; has a broad, grooved trunk that spreads out widely at the base. The crown is sharply cone-shaped, with branches that spread out and droop, and have small, loosely hanging branchlets. Large-sized trees can be up to 39 meters tall and 220 centimeters in diameter.

The yellow cedar is commonly found west of the Coast Mountains, and rarely in southeastern British Columbia

The wood is very valuable commercially because of its straight grain, yellow colour, and resistance to decay. It is used extensively for boat building.





Group 3

Hemlock

British Columbia has two varieties of hemlock trees:

- Mountain
- Western

Mountain hemlock

A subalpine tree with only a slightly drooping leader or top. It rarely grows more than 30 metres tall and is often stunted at high elevations.

It grows at mid elevations to timberline in the coastal mountains and at low elevations further north. In the Interior, it grows in the Cariboo, Selkirk and Monashee mountains.

Commercial uses include small dimension lumber and pulp.

Western hemlock

A large tree, it usually grows 30 to 50 metres tall and up to 270 centimetres in diameter. It has a rather narrow crown and conspicuously drooping new growth at the top of the tree. It has mostly down-sweeping branches and delicate feathery foliage.

It grows along both the east and west sides of the Coast Ranges, from sea level to mid elevations, as well as in the Interior wet belt west of the Rocky Mountains.

The wood has an even grain and resists scraping, which makes it easy to machine. It is widely used for doors, windows, parts of staircases, ladders and other architectural millwork items.

Balsam

The bark is smooth and greyish-brown with white spots and blisters filled with gummy resin when young. It grows in the North part of the province and is rare on the Queen Charlotte Islands and northern outer coast of Vancouver Island.

A tall, stately tree that can grow up to 80 metres when mature.

The short, fine fibres are used in tissues and other paper products and fibre wood.







Deciduous trees

Examples of deciduous trees in British Columbia include the following:

Alder (mountain and red)	
Birch (paper and water)	
Maple (bigleaf, Douglas and vine)	
Poplar	
Aspen (white and black)	
Cottonwood	

Learner Activity



Instruction: Select the Balsam tree from the pictures.











Instruction: Select the Yellow Cedar tree from the pictures.





Now check your answers on the next page.

Answers

1. Select the Balsam tree from below.

Answer:



2. Select the Yellow Cedar tree from the following pictures. Answer:



Key Point 5.2: Grade of Logs

All logs are created differently and have varying qualities, value, and volume. To grade a log, timber scalers measure, assess, and determine potential end use and log quality. In British Columbia, all timber harvested from private or Crown lands or salvaged must be scaled.

Log grades include:

- Cedar and Douglas fir poles
- Chip and saw log
- Cull logs
- Cut-to length logs
- Gang
- High grade
- Mulch
- Peeler logs
- Pulp logs
- Shake and shingle logs
- Tree length logs

Cedar and Douglas Fir Poles

Cedar and Douglas fir poles are logs that meet a certain specification for making a variety of specialty products such as utility poles or house logs. They typically have no rot and are straight.

Chip and Saw Logs

Chip and saw logs are recoverable logs with the smallest diameter that are run through a chip and saw mill. They typically have no rot but may have lots of knots.

Cull Logs

Cull logs are logs that do not meet any of the merchantable log grades. They may have defects due to rot and insect damage.

Cut-to-Length Logs

Cut-to-length logs are logs that are cut to a pre-determined length.

Gang

Gangs are logs that are rough and are run through a gang mill to make lumber. They usually have knots but no rot.

High Grade (Premium)

High grade or premium logs are logs that have little or no defect. They are saw logs of the highest value.

Mulch

Mulch is logging debris that is ground up and turned into hog fuel.

Peeler Logs

Peeler logs are small in diameter, have well-spaced knots and only very minor sweep. They are used to make plywood.

Pulp Logs

Pulp logs are very rough logs with different amounts of defect. They can have large knots or rot.

Shake and Shingle Logs

Shake and shingle logs are usually cedar logs or slab that are used to make shake and shingle products. They may have fractures and rot and may look very rough.

Tree Length Logs

Tree length logs are trees yarded at full length and not cut to a specific length, partially manufactured or not.

Section 1002-6: Transportation Methods

What you will learn in this section

By the end of this section you will be able to demonstrate knowledge of the following key point:

6.1 Transportation methods used within the forest industry

Key Point 6.1: Transportation Methods Used Within the Forest Industry

Transportation methods used within the forest industry may include:

- Ground
- Airplane
- Helicopter
- Marine (Small passenger vessel, boom boat, tugboat)

Ground

Ground transportation used to transport forest workers includes trucks, crew cab pick-ups, crummies (usually with four-wheel drive) and buses. Forest products are transported on the ground using logging trucks and trains.

Other Methods of Ground Transportation

Other methods of transporting crew on the ground include All Terrain Vehicles (ATV) and Utility Task Vehicles (UTV).

ATV

ATVs have increased in popularity with crews, especially if they have to cover a lot of distance and the terrain is not easily navigable with other ground transportation such as trucks and buses. ATVs are reasonably easy to operate, can carry up to 250 pounds of gear, and are quite economical to run.

However, ATVs can be very dangerous and are prone to overloading, mechanical failure, and becoming stuck. They also could tempt operators to try maneuvers that are unsafe.



Figure 13: All Terrain Vehicle (ATV)

UTV

UTVs are surpassing ATVs due to their ability to carry multiple workers and larger loads or materials. Also, they are much more stable and have a Roll Over Protection Structure (ROPS) and seatbelts.



Figure 14: Utility Task Vehicle (UTV)

Airplane

Airplanes are frequently used to transport workers and supplies to and from worksites. They are also commonly used in fire detection and suppression activities, and special projects such as spraying insecticides on pest-infested forests.



Figure 15: Float Plane

Helicopter

Because of their ability to hover and move vertically, helicopters can be used in relatively confined spaces. They are often used for moving logs from cut blocks using cables (heli-logging), transporting crews and equipment, and firefighting.



Figure 16: Helicopter Logging

Marine transportation

Examples of marine transportation used in forestry operations include the small passenger vessel and boom boat.

Small Passenger Vessel

A small passenger vessel used to transport crews can take up to 12 passengers or a maximum of 5000 pounds of weight.

A small passenger vessel used to transport crews must be:

- Constructed, equipped, and operated in accordance with the Canada Shipping Act
- Adequate to accommodate an injured worker on a stretcher
- Have adequate lighting during hours of darkness



Figure 17: Small Passenger Vessel

Boom Boat

Boom boats are also referred to as pond boats, dozer boats, and log broncs. They are used for moving and sorting logs by pulling, bobbing, bumping, and spinning around.



Figure 18: Boom Boat

Tugboat

Tug boats are used for towing or pushing larger vessels, especially into a harbor or up a river.



Figure 19: Tugboat

Section 1002-7: Regulations

What you will learn in this section

By the end of this section you will be able to demonstrate knowledge of the following key point:

7.1 Key Regulations and legislation in the forest industry

Key Point 7.1: Regulations and Legislation in the Forest Industry

Occupational Health and Safety Regulations (OHS Regulations) contain legal requirements that must be met by all workplaces in the inspection jurisdiction of WorkSafeBC. Guidelines provided by WorkSafeBC explain the regulation.

OHS Regulations are broken down into parts. The parts listed below are the main areas that govern activities in forestry operations. More information can be found at <u>https://www.worksafebc.com/en/law-policy/occupational-health-safety/searchable-ohs-regulation</u>

OHS Regulation Part 1

Part 1 provides terms and definitions that apply to the forest industry.

OHS Regulation Part 2

Part 2 defines how the OHS Regulation applies to all employers, workers and other persons on the worksite including general duty compliance and inspection.

OHS Regulation Part 3

Part 3 of the OHS Regulation defines the rights and responsibilities of employers, workers, and first aid attendants.

OHS Regulation Part 4

Part 4 of the OHS Regulation defines the general conditions of buildings, structures, and equipment that leads to a safe workplace.

OHS Regulation Part 12

Part 12 of the OHS Regulation covers tools, machinery, and equipment.

OHS Regulation Part 15

Part 15 of the OHS Regulation covers general requirements for qualified riggers and wire rope splices.

OHS Regulation Part 16

Part 16 of the OHS Regulation gives the general requirements and definition of mobile equipment.

OHS Regulation Part 17

Part 17 of the OHS Regulation covers transportation of workers.

OHS Regulation Part 19

Part 19 of the OHS Regulation covers requirements related to electrical safety including minimum approach, minimum clearance and safety requirements for tree pruning near energized conductors.

OHS Regulation Part 21

Part 21 of the OHS Regualtion covers the requirements to blasting.

OHS Regulation Part 26

Part 26 of the OHS Regulation covers the safety requirements for all forestry operations and similar activities.

Under the Workers Compensation Act (WCA) Section 21 (2)(f) an employer must make a copy of this Act and the regulations readily available for review by the employer's workers and post and keep posted a notice advising where the copy is available for review.
Self-Quiz

- 1. Which is a responsibility of forestry operations? (1002.4.1)
 - □ Manage and upgrade fish bearing streams
 - □ Ensure only natural substances go into community watersheds
 - □ Ensure wildlife values are maintained
 - □ Rebuild riparian zones
- 2. When working in an area what might indicate that there are culturally modified trees in the area? (1002.4.2)
 - □ More than usual number of logs in the area
 - □ Older trees than surrounding forests
 - □ Near government land
 - □ Trees with man-made changes
- 3. Name three types of larch trees found in British Columbia? (1002.5.1)
 - □ Whitebark, balsam, aspen
 - Limber, western, ponderosa
 - □ Spruce, coastal, alpine
 - □ Alpine, western, siberian tamarack
- 4. Which are common pine trees found in British Columbia? (1002.5.1)
 - □ Limber, lodgepole, ponderosa
 - □ Alder, Birch, cottonwood
 - □ Hemlock, sitka, engleman
 - □ Siberian tamarack, alder, ponderosa
- 5. What are four types of spruce trees in British Columbia? (1002.5.1)
 - □ Sitka, engelman, black, white
 - □ Larch, birch, cottonwood, lodgepole
 - Douglas, birch, siberian tamarack, engleman
 - Limber, lodgepole, white, sitka
- 6. What is a log that does not meet any merchantable grade called? (1002.5.2)

- □ Shake and shingle logs
- □ Cull logs
- □ Pulp logs
- □ Mulch
- 7. Which type of trees are commonly used for utility poles? (1002.5.2)
 - □ Hemlock and pine
 - □ Cottonwood and spruce
 - □ Birch and alder
 - □ Cedar and Douglas fir
- 8. What are logs used to make plywood called? (1002.5.2)
 - □ Chip and saw logs
 - □ Gang
 - □ Pulp logs
 - □ Peeler logs
- 9. Which part of the WorkSafeBC regulation pertains to forestry operations? (1002.7.1)
 - □ 2
 - □ 3
 - □ 16
 - □ 26
- 10. Which part of WorkSafeBC regulations defines the rights and responsibilities of employers, workers, and first aid attendants? (1002.7.1)
 - □ 3
 - □ 4
 - □ 12
 - □ 15
- 11. Which part of the WorkSafeBC regulation covers tools, machinery and equipment? (1002.7.1)
 - □ 3
 - □ 4
 - □ 12
 - □ 15



Now check your answers on the next page.

Self-Quiz – Answers

1. Which is a responsibility of forestry operations? (1002.4.1)

Answer: Ensure wildlife values are maintained

2. When working in an area what might indicate that there are culturally modified trees in the area? (1002.4.2)

Answer: Trees with man-made changes

3. Name three types of larch trees found in British Columbia? (1002.5.1)

Answer: Alpine, western, siberian tamarack

- 4. Which are common pine trees found in British Columbia? (1002.5.1) Answer: Limber, lodgepole, ponderosa
- 5. What are four types of spruce trees in British Columbia? (1002.5.1) Answer: **Sitka, engelman, black, white**
- 6. What is a log that does not meet any merchantable grade called? (1002.5.2)

Answer: Cull logs

- Which type of trees are commonly used for utility poles? (1002.5.2)
 Answer: Cedar and Douglas fir
- 8. What are logs used to make plywood called? (1002.5.2)

Answer: Peeler logs

9. Which part of the WorkSafeBC regulation pertains to forestry operations? (1002.7.1)

Answer: 26

 Which part of WorkSafeBC regulations defines the rights and responsibilities of employers, workers, and first aid attendants? (1002.7.1)

Answer: 3

11. Which part of the WorkSafeBC regulation covers tools, machinery and equipment? (1002.7.1)

Answer: 12

Learner Activity



Instruction: Match the regulation part to the correct description.

Part	Description
Part 1	Covers the safety requirements for all forestry operations and similar activities.
Part 2	The general requirements and definition of mobile equipment
Part 3	Covers the requirements to blasting
Part 16	Defines the rights and responsibilities of employers, workers, and first aid attendants
Part 17	Covers transportation of workers.
Part 21	Defines how the OHS Regulation applies to all employers, workers and other persons on the worksite
Part 26	Terms and definitions that apply to the forest industry



Now check your answers on the next page.

Answer

Match the regulation part to the correct description.

