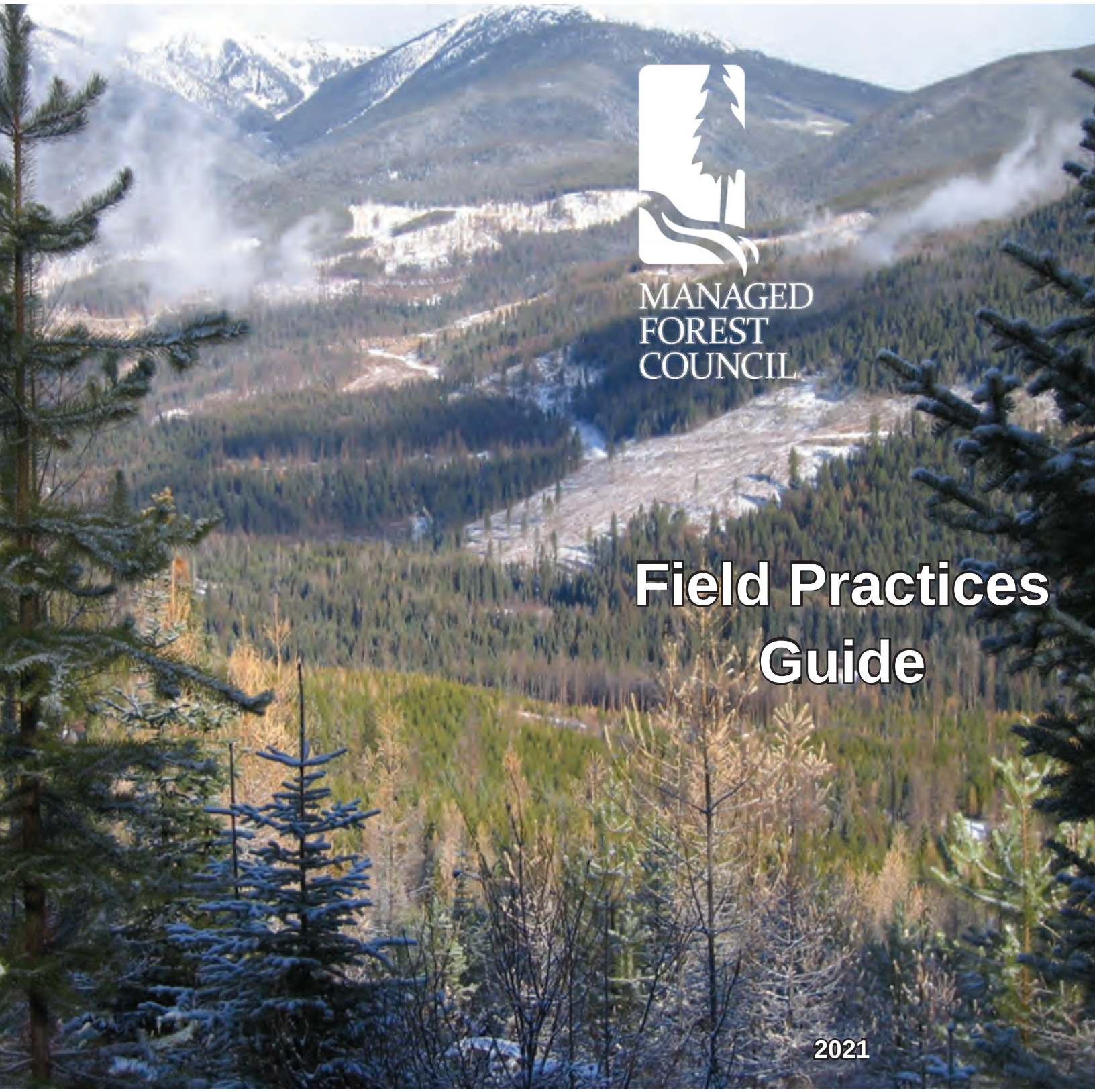

Field Practices Guide

2021

MANAGED FOREST COUNCIL

About this Field Practices Guide

The Managed Forest Council (MFC) initiated this **Field Practices Guide** to aid owners in their field decisions and meeting their practice obligations.

When you read this Guide you will recognize the repeated theme of field practices in terms of the forest management objectives. The icons for each objective are used to draw your attention to the objective. The sections on primary forest activities **(9 - 24)** identify **regulation requirements** important to meeting the objectives in the field and example practices to consider. Refer to legislation to determine whether slope or horizontal distances apply.

Although the primary focus of this Guide is sound field practices, it also contains information on key owner administrative responsibilities related to the Managed Forest Program and helpful links to information sources.

Figures 1 - 3 used with permission of Ministry of Forests and Range: Resource Tenures & Engineering Branch.

Field Practices Guide photographs taken during the MFC 2007 - 2008 Inspection Program.

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Regulatory Framework

The ***Private Managed Forest Land Act*** (Act) requires a management commitment from owners and describes forest management objectives generally as follows:

	**Soil conservation**: to protect soil productivity
	**Water quality**: to protect human drinking water, both during and after harvesting.
	**Fish habitat**: to retain sufficient streamside mature trees and understory vegetation both during and after harvesting to protect fish habitat.
	**Critical wildlife habitat**: to facilitate the long-term protection of that habitat.
	**Reforestation**: to promptly regenerate disturbed areas with a healthy commercially valuable stand of trees that are not impeded by vegetative competition.

Private Managed Forest Land Council Regulation (Council Regulation) provides, among other items, clear requirements for owners, contractors, employees and agents with respect to the forest management objectives described in the Act.

Note: the icons above are used throughout this publication to draw attention to these objectives.

Primary Forest Activities

The following information applies generally to the sections on road construction, road maintenance and deactivation, timber harvesting and reforestation. For each section, forest management objectives are identified by icons along with **regulation requirements** (highlighted) related to the objective. Example practices to consider are suggested in the bullets that follow.

Common messages:

- Engage experienced, qualified persons and consider best management practices options.
- Be familiar with the concept of "**material adverse effect**" as it may apply to protecting water quality and fish habitat. The words simply mean:
  - **material** - the impact must be of a substantive nature; the law will not address trivial or incidental impacts; this is the case even if the impact is negative
  - **adverse** - the impact must be negative for the provisions to apply; some disturbance to compacted soils may increase productivity; if the practice results in the stopping of a pre-existing source of sediment entering the streams, then this would have a material positive effect on water quality and fish habitat
  - **effect** - impact; net change to the value; the values are limited to water quality and fish habitat

Regulatory Framework
Primary Forest Activities
Due Diligence

Due Diligence

- Due diligence in its simplest terms is carrying out activities in a manner that a reasonable/experienced person would do under similar circumstances
- It is your responsibility to not only understand the forest management objectives, but to also determine how to achieve the objective(s) in a safe, environmentally sound manner
- You are expected to meet the standards and outcomes described in legislation by applying sound judgement and well-established work practices for each activity. This applies to yourself and those who work for you: agents, professionals, contractors and employees
- If a problem should develop or if a non-compliance is identified through an audit or inspection, it is important that you can demonstrate due diligence in your planning, risk assessment, and operational implementation if required

Liability Waiver

The regulatory requirements and suggested practices presented in this Field Practices Guide are not exclusive and may be subject to change. Readers are advised that it is the private managed forest land owner, employee, or agent of the owner who is responsible to ensure the regulatory compliance of activities conducted on their land. By publishing this Field Practices Guide, the Managed Forest Council does not assume this responsibility. If unsure about regulatory obligations, owners are advised to consult relevant Acts and regulations, or seek expert advice from an experienced, qualified person, before proceeding with any activities.

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1 Role of Council

The mandate of the Managed Forest Council is to administer the Managed Forest Program and to ensure that owners are complying with the Act and its regulations.
The following are key functions of the Council:

1. Strategic planning, reporting, program administration

- Carry out strategic planning, including liaison with federal, provincial and local government interests
- Levy and collect annual administration fees
- Prepare and make publicly available annual reports

2. Set and monitor forest practice standards

- Set forest practice standards by regulation in accordance with the objectives set out in the *Private Managed Forest Land Act*
- Monitor the effectiveness of the established forest practice standards
- Consult with stakeholders prior to revising operational standards

Council may authorize exemptions from the standards in accordance with the regulations.

3. Enforce standards and perform audits

- Conduct forest practices inspections and audits to assess compliance with operating requirements
- Respond to possible non-compliant activity and stakeholder concerns and conduct associated field reviews and investigations
- Enforce the established forest practice standards in accordance with regulations and the principles of natural justice
- In the event of regulatory non-compliance, use appropriate enforcement tools

4. Review Management Commitment applications for entering Managed Forest Land property class

- Assess applications for compliance with the Act and the Council Regulation
- Recommend to BC Assessment that properties, where management commitments meet the requirements, be classified as managed forest land under the *Assessment Act*

1 Role of Council

2 Management Commitment (MC)

The Act requires you to prepare a management commitment and have it accepted by Council before land can be classed as managed forest land by BC Assessment. It identifies your land, outlines the management commitment objectives (MCOs) for the land, and describes sample strategies that you plan to implement in order to achieve those objectives.

The management commitment includes:

- A description of the land in terms of its soil quality or growing potential
- Extent/location of roads
- A map of forest cover including land to be reforested (LTR)
- Commercial species ecologically suitable for reforestation
- A declaration by you to operate as required under legislation.

You are able to make amendments to the management commitment from time to time due to changed circumstances.

The management commitment objectives and related strategies are planning elements. Planning is a key factor in responsible forest management, and may include:

- Preparing suitable scale maps showing physical features, contours, streams, roads and structures
- Inventory of information including forest cover, terrain stability, and stream classification
- Assessments of licensed waterworks intakes (LWIs), drinking water intakes, fish habitat, critical wildlife habitat and planned activities that may affect water quality and/or fish habitat
- Marking of external property boundaries
- Developing project plans for roads, logging trails, harvesting operations and reforestation, together with details on fish streams, riparian areas, LWIs, drinking water intakes and areas of instability or sedimentation, including:
  - a review of risks associated with your operation and planned activities
  - strategies to manage known risks and a contingency plan to manage unplanned events such as an adverse weather change, slide or slump, fuel spill, etc.
  - ensuring field personnel have adequate training, knowledge, experience and supervision.

Although not covered by the PMFL legislation, it is important to consider how you will manage the risk of damage from fire, insects or disease. You are encouraged to interact with your neighbours and respective agencies that can help with solutions.

2 Management Commitment (MC)

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3 MCOs and Sample Strategies

The following illustrates *some examples* of **long-term management commitment objectives** (MCOs) followed by sample strategies to achieve them.

EXAMPLE MCO

Grow and harvest trees of commercial value that are suited to the ecosystem(s) of the property.

- Select harvest methods and equipment to minimize any potential adverse environmental impact
- Tend regenerated stands as necessary to grow trees to a healthy merchantable size
- Salvage damaged timber promptly

EXAMPLE MCO

Reforest harvested or disturbed areas promptly with healthy, ecologically suited commercial species.

- Plant healthy seedlings within the first two years following harvest, and in sufficient numbers to meet the regulations, and/or leave seed trees to establish natural regeneration
- Conduct survival and regeneration surveys to confirm stocking standards are being met
- Fill plant or stand tend (brush, weed, space, etc.) as necessary to establish a healthy productive stand

EXAMPLE MCO

Soil conservation objectives are to minimize soil productivity loss and maximize retention of productive site for growing trees.

- Minimize productive forest area lost to roads or erosion
- Ensure harvest activities do not adversely impact soil productivity or area available to reforest

EXAMPLE MCO

Protect **water quality** in streams with licensed waterworks intakes and drinking water intakes.

- Maintain streams in natural watercourses and comply with private managed forest land legislated standards for harvesting and forest road operations
- Determine presence of any LWI or drinking water intakes that could be impacted

EXAMPLE MCO

Protect and preserve **fish habitat**.

- Confirm fish presence or absence for streams within and adjacent to operating areas and classify them prior to activity; default is to treat riparian area and stream as fish habitat
- Adhere to all legislated requirements for fish habitat protection

EXAMPLE MCO

Facilitate the long-term protection of **critical wildlife habitat**.

- Recognize critical wildlife habitats and restrict activities accordingly

3 MCOs and Sample Strategies

4 Risk Management

Risk assessment and management are essentially about common sense and awareness. The objective of risk assessment in the context of a managed forest is to evaluate both the potential for activities to negatively impact the key public environmental values (hazard level) and the potential consequence if something should go wrong. The following table is one example of a range of risk results for various levels of hazard and consequence.

CONSEQUENCE LEVEL	HAZARD LEVEL		
	HIGH	MEDIUM	LOW
HIGH	Very High	High	Medium
MEDIUM	High	Medium	Low
LOW	Medium	Low	Very Low
	RISK RATING		

Example: a LOW level of Consequence and a HIGH level of Hazard would result in a MEDIUM Risk Rating

Assessing risk enables both managing the risk and achieving better planning. It also identifies where higher levels of diligence may be required, and where ongoing maintenance or monitoring efforts should be particularly focused. However, moderate and low risk areas also need regular hazard inspections, albeit at a reduced inspection frequency, so that problems can be addressed at an early stage.

Sample Risk Assessment: Forest Roads

A risk assessment of potential hazards and consequences related to forest roads may consider the following:

Higher → HAZARD → Lower

- Road sections featuring easily erodible sediment sources
- Poorly constructed roads with ineffective water management
- High rainfall areas
- Exposed sediment sources
- Unstable terrain
- Low rainfall areas
- Coarse textured or non-erodible materials
- Well-constructed roads with effective water management
- Vegetated soils
- Stable terrain

Higher → CONSEQUENCE → Lower

- Fish streams or stream reaches above a licensed waterworks intake
- Sedimentation highly likely to impact fish or water quality values
- No streams present
- Small seasonal streams without licensed waterworks intake or fish values
- Areas isolated from fish habitat and licensed waterworks intake
- Streams incapable of transporting sediment to impact downstream values

4 Risk Management

5 Administrative Requirements

Private managed forest land legislation requires you to submit administrative reports to Council, either annually or on occurrence of a reportable event, and to issue a "notice" as required, usually in relation to a field practice or event.

Annual Declaration

The annual declaration must be submitted for each managed forest on or before May 1 in the form provided. It details a summary of activities from the previous year:

- Area and volume harvested
- Location and distance of road constructed
- Location and distance of road deactivated
- Area destroyed by fire or other agent
- Area restocked
- Area declared successfully regenerated.

Notice of Sale

If you sell land to which a management commitment applies, you must notify the Council within 30 days of sale (use Council form).

Other Notices

Certain activities or events that take place on or about private managed forest land require that a "notice" be issued because of the significance or potential impact of the activity or event on soil conservation, water quality, fish habitat, critical wildlife habitat or reforestation. The following list is not to be interpreted as complete:

- You must notify the holder of a LWI of road construction or deactivation within 1 km upstream at least 48 hours before such work
- You must notify Council within 24 hours of becoming aware that a landslide or debris flow has occurred on your land, *IF* it has deposited debris or sediment into a class A, B, C, D or E stream. The slide or flow does not have to originate on your land

Exemptions

The Council may exempt an owner, in whole or in part, with or without conditions, from a requirement if satisfied that the exemption is:

- Necessary in the interests of public safety, or
- Not inconsistent with public interest or necessary to address management of forest health factors. Examples may include exemption for riparian management due to recovery of windfall timber or exemption from restocking because the area is low soil productivity and will not support a commercial stand.

Dates and Time Lines

Annual administration fee	March 15
Annual declaration	May 1
Notice: Road construction or deactivation above LWI	48 hours
Notice: Discovery of slide or debris flow	24 hours
Notice: Sale of land	30 days

5 Administrative Requirements

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6 Other Related Legislation (significant)

Assessment Act: Private land property assessment Class 7- Managed Forest Land

Managed Forest Land and Cut Timber Values Regulation: Determination of land and cut timber values

Drinking Water Protection Act: Drinking water protection, permits, contraventions, assessments and plans

Environmental Management Act: Environmental protection, remediation and emergency measures

Open Burning Smoke Control Regulation: Burning restrictions, requirements for designated smoke sensitivity zones, exemptions and penalties

Fisheries Act: (federal): Fish habitat protection and pollution prevention, serious harm to fish (ss. 32, 34,35, 36, 38) and 38(4) “duty to report” the deposit of a deleterious substance into a fish ***stream***

Forest Act: Timber scaling, timber marking

Timber Marking and Transportation Regulation: Requirements regarding the marking & transportation of logs

Land Act: Land registry, offences, Crown grants, bodies of water, trespass, surveys

Integrated Pest Management Act: Prohibitions and authorization of pesticide use and sale, compliance, offences and appeals

Integrated Pest Management Regulation: The sale, use and handling of pesticides including licences, certificates and permits, notices, records and reporting

Species at Risk Act: (federal): Protection of threatened and endangered species and their critical habitat

Trespass Act: Prohibition, posting notice of ownership, fencing, land under water

Water Sustainability Act: Licensing, diversion, use of water, water users’ communities, ground water protection, powers, offences. Section 9 water crossings notifications

Water Sustainability Regulation: Acquisition of water rights, sensitive streams, expropriation of land, exemptions, changes in and about a stream

Wildfire Act: Protection requirements, government authority, administrative remedies and cost recovery

Wildfire Regulation: Fire prevention, hazard assessment and abatement, control, exemptions

Wildlife Act: Critical wildlife areas and wildlife sanctuaries, endangered and threatened species, damage to land

Workers Compensation Act: Compensation, Workers’ Compensation Board (WCB), occupational health and safety, regulations and appeals

Occupational Health and Safety Regulation: Rights and responsibilities for many industries and occupations

6 Other Related Legislation (significant)

7 Information Links

Managed Forest Council: Legislation, owner information, compliance determinations, recent news: www.mfcouncil.ca

Private Forest Landowners Association: Education and training; regulatory, technical and advocacy support related to private forest land: www.pfla.bc.ca

Ministry of Environment and Climate Change Strategy, Environmental Sustainability: Community watersheds and water quality objectives, identified wildlife management strategy in wildlife habitat areas, fisheries sensitive watersheds and more: www.gov.bc.ca/env

- **BC Data Catalogue Water Licences:** Drinking water licences including KML file: catalogue.data.gov.bc.ca/dataset/water-rights-licences-public

Ministry of Forests, Lands, Natural Resource Operations & Rural Development: www.gov.bc.ca/for

- **F.T. Fyles Library:** Large selection of reference material, manuals, glossary of forestry terms, acronyms and initialisms used in BC, e-publications, journals, topic searches e.g. mountain pine beetle, fish and forestry, photos, maps, forest health, silviculture, timber harvesting, wildlife: www2.gov.bc.ca/gov/content/environment/research-monitoring-reporting/libraries-publication-catalogues/j-t-fyles-library
- **Forest Practices Code Guidebooks:** Forest Road Engineering, Soil Rehabilitation, Fish Stream Crossing, Fish Stream Identification, Soil Rehabilitation, Soil Conservation, Root Disease Management, etc.: www.for.gov.bc.ca/ftp/hfp/external/!publish/FPC%20archive/old%20web%20site%20contents/fpc/fpcguide/Guidetoc.htm
- **Wildlife Tree Committee of BC:** Policies for wildlife trees and coarse woody debris, publication library, training and education: www2.gov.bc.ca/gov/content/environment/plants-animals-ecosystems/wildlife/wildlife-habitats/wildlife-tree-committee

Association of BC Forest Professionals: www.abcfp.ca

Engineers and Geoscientists British Columbia: www.egbc.ca

BC Forest Safety Council: www.bcforestsafe.org/

College of Applied Biology: www.cab-bc.org

Western Forestry Contractors' Association: Consulting firms and services: www.wfca.ca

Fisheries and Oceans Canada: www.dfo-mpo.gc.ca/index-eng.htm
Projects Near Water: www.dfo-mpo.gc.ca/pnw-ppe/index-eng.html

FPInnovations: Research and publications specific to harvesting activities, equipment, road construction, etc.: www.fpinnovations.ca

Invasive Species Council of BC: www.bcinvasives.ca

WorkSafeBC: www.worksafebc.com

7 Information Links

8 Definitions

Act: *Private Managed Forest Land Act*

clearing width: an area that is cleared of standing trees for the purpose of constructing or maintaining a road

cutblock: an area of private managed forest land in which timber is harvested, but does not include areas where timber is harvested for the purpose only of facilitating road construction

deactivated: a road that has been treated in accordance with Council Regulation sec. 22

domestic purpose: has the same meaning as under the *Water Sustainabilty Act*

drinking water intake: an intake of water from a stream in accordance with a licence issued under the *Water Sustainability Act* that is used for domestic purpose or for an industrial purpose, and is consumed by humans

excavated or bladed trail: a constructed trail that has
- (a) an excavated or bladed width greater than 1.5 m, and
- (b) a mineral soil cutbank height greater than 30 cm

fish habitat: an area that
- (a) is a fish stream, or
- (b) provides habitat for specified species of fish

fish stream: the portion of a stream that
- (a) is frequented by a specified species of fish, or
- (b) has an average slope gradient of less than 20% for each 100 m of slope distance, unless
  - (i) a fish inventory, carried out in accordance with methods acceptable to the wildlife minister, shows that it is not frequented by a specified species of fish, or
  - (ii) the portion of the stream is located upstream of a proven barrier to fish

land to reforest (LTR): areas where timber has been harvested or destroyed, and not yet restocked per the Council Regulation

licensed waterworks intake (LWI): a water intake that
- (a) is to provide water for human consumption, and
- (b) is licensed under the *Water Sustainability Act* for
  - (i) a waterworks purpose, if the license is held by or is subject to the control of a municipality, regional district or improvement district, or
  - (ii) a domestic purpose, if the license is held by or is subject to the control of a water users' community incorporated under the *Water Users' Community Act*

logging trail: a structure, other than a road, that is used to transport timber or equipment, and includes excavated or bladed trails

primary forest activity: timber harvesting, road construction, maintenance or deactivation or silviculture treatment

road: includes
- (a) any part of a tote road, pit, quarry, landing or waste area that is located within the road's clearing width, that is used in conjunction with the road, and
- (b) any bridges, culverts, fords and other structures associated with the road

stream: a watercourse, including a watercourse that is obscured by overhanging or bridging vegetation or soil mats, that contains water on a perennial or seasonal basis, is scoured by water or contains observable deposits of mineral alluvium, and
- (a) has a continuous channel bed that is 100 m or more in length, or
- (b) flows directly into
  - (i) a fish stream or a fish-bearing lake or wetland, or
  - (ii) a licensed waterworks intake

stream channel: the area between the outermost opposing stream banks measured at the point where rooted terrestrial vegetation begins

stream crossing: a bridge, culvert or ford

8 Definitions

9 Road Construction

Roads that are well designed, constructed and maintained are a valuable asset. On the other hand, poorly constructed roads often result in unacceptable environmental risks, and would be considered a financial and environmental liability. Build quality roads, maintain them properly, upgrade sub-standard roads still in use, and deactivate temporary roads or logging trails after they are no longer required.

Restrict the amount of productive forest land converted to roads and logging trails to the minimum necessary for safe and efficient operations.

- Construct only enough road length and width necessary for efficient and safe harvesting access; determine the harvest method and only build roads or trails that are necessary
- Consider long-term access requirements
- Locate and build road on benches where it's possible to reduce cuts and fills to help control the road width
- Build only as many turnouts as required to accommodate safe and efficient hauling

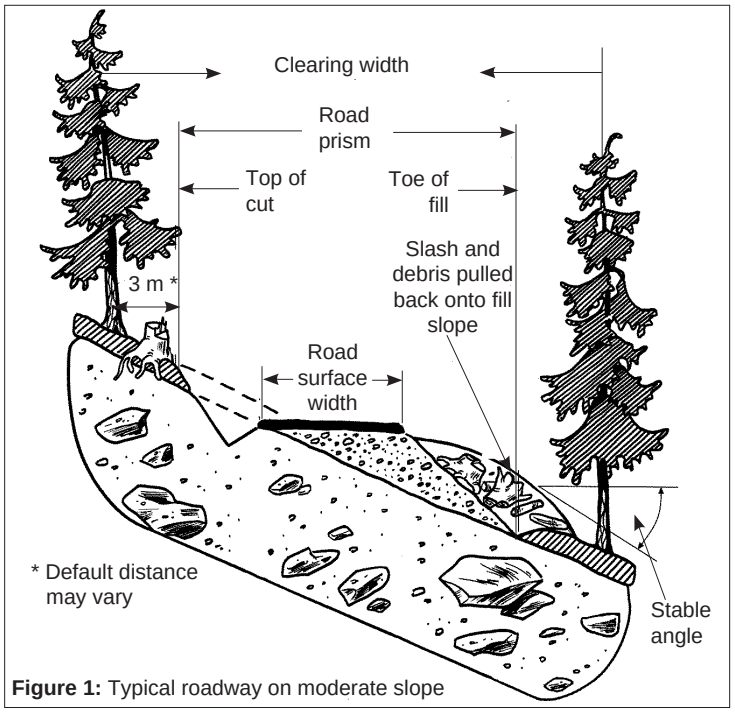


Figure 1: Typical roadway on moderate slope

Do not construct a road within 30 m of class A or B streams or 10 m of class C, D, or E streams.

Some exceptions are allowed in regulation; for example if compliance would create a higher risk of sediment delivery, no practicable option or the road is part of a stream crossing.

- Confirm class of nearby streams and make sure road is at least minimum distance away
- Ensure resulting silt or debris does not enter stream
- Minimize potential surface sediment sources on erodible, exposed slopes using revegetation techniques such as seeding, planting seedlings or other satisfactory means

9 Road Construction

10 Road Construction

You must not cause sediment or other material to be transported to, or deposited in a stream if it will have a material adverse effect on:

– fish habitat
– water diverted by a LWI
– quality of drinking water that may affect human health at a drinking water intake

- Excavate ditches and install culverts as early as possible during the construction process to control surface water and minimize siltation

  Note: Current weather patterns have tended to result in higher rainfall intensities and thus greater stream discharges than in the past; ensure that any bridge or culvert designs now account for the higher discharge rate

- Stop activity during rainy periods if there is an increased risk of causing material adverse effect on water quality and/or fish habitat
- Install filters/sediment traps to minimize sediment transport.
- Verify whether a water quality objective is established for streams involved and adjust plans if necessary

- Confirm if LWI exist within 1,000 m downstream or fish presence in nearby streams and classify streams according to regulation
- Do not allow water from ditches and cross-drain culverts to discharge directly into streams
- Use rip rap or other non-erodible material to reduce water velocity/ scour potential at the culvert outlet where required

If you construct a road or logging trail you must maintain the natural surface drainage patterns in the surrounding area both during and after construction to the extent necessary to avoid causing a material adverse effect on fish habitat or water diverted by a LWI.

If not possible, any altered drainage pattern must be made compatible with original pattern by earliest of end construction or next freshet.

- Maintain natural channel location for every stream encountered
- Do not carry ditch water too far. Install enough culverts to avoid long continuous ditchlines that could cause accelerated ditch erosion or road instability
- Identify any altered drainage pattern area on the map and document when required work is completed

Do not construct road within 100 m radius upslope of a LWI, unless:

– it will NOT increase sediment delivery to LWI, or
– you obtain prior approval from holder of LWI,

- Identify the location of any LWI or drinking water intake when planning road construction or other primary forest activity

10 Road Construction

11 Road Construction

If you build a stream crossing as part of a road or logging trail, you must locate, build and use the crossing in a manner that:

– protects stream channel and stream bank immediately above and below stream crossing
– mitigates disturbance to stream channel and stream bank at the crossing

to the extent necessary to avoid causing material adverse effect on fish habitat or water diverted by a LWI.

If you build a stream crossing as part of a logging trail you must remove the crossing when it is no longer required.

- Wherever possible, build approaches and crossing perpendicular to stream
- Conduct work from stream bank, not in the channel
- Rip rap placed to protect stream banks must be clean

If, during construction or deactivation, you expose soil on an area:

– outside of running surface of road
– where it is reasonably foreseeable that surface erosion would cause a material adverse effect on fish habitat or water diverted by a LWI

you must, within two years of completion of road construction or deactivation, revegetate the area or carry out other measures to reduce likelihood of surface erosion.

- Use rock check dams or rip rap to reduce water velocity and scour potential
- Construct stable cut and fill slopes
- Use armouring, geotextile or silt fencing, blocks or traps to minimize erosion in ditches
- Revegetate exposed, erodible soils as soon as practicable

If carrying out a primary forest activity, you must ensure:

– it does not damage a LWI
– it does not cause a material adverse effect on the quality of drinking water that may affect human health at a drinking water intake.

- Identify on your map any LWI or drinking water intake potentially affected by operations on your property

11 Road Construction

12 Road Maintenance and Deactivation

Two key items in the **Council Regulation** requirements related to road maintenance are:

1. Road constructed or used for harvesting purposes must be maintained until it is deactivated.
2. Maintain the structural integrity of the road prism and clearing width and the integrity of the road drainage system to the extent necessary to avoid causing a material adverse effect on fish habitat or on water diverted by a LWI or drinking water intake.

The standard of care for road maintenance is that the surface, ditches, crossings, and cut and fill slopes will not cause sedimentation or deposit material that may have a material adverse effect on water quality or fish habitat.

Note: For roads with multiple users, the owner must ensure that necessary road maintenance activities are implemented.

If a road is no longer needed for operational uses, decide whether to continue maintaining the road or to deactivate it, to:

- Stabilize the road prism and clearing width
- Maintain natural surface drainage patterns on the area within the road right-of-way and in adjacent areas
- Minimize the impact of silt and sediment transport on streams important to water quality and fish habitat
- Provide for fish passage in a fish stream during and after construction or deactivation
- Ensure activity is in low risk fisheries timing windows and methodology of the work is aimed at achieving this objective

Restrict the amount of productive forest land converted to roads and logging trails to the minimum necessary for safe and efficient operations.

- Maintenance activities such as grading or resurfacing should not increase the road surface width
- Deactivate roads and trails no longer needed and reforest with ecologically suited commercial tree species where practicable

12 Road Maintenance and Deactivation

13 Road Maintenance and Deactivation

If you construct a road or logging trail you must maintain the natural surface drainage patterns in the surrounding area both during and after construction to the extent necessary to avoid causing a material adverse effect on fish habitat or water diverted by a LWI.

If not possible, altered drainage patterns must be made compatible with the natural pattern by earliest of end of construction or next freshet.

- Maintain culverts and bridges so they keep water flow in natural paths and are capable of handling peak flows
- Select culvert locations so that ditch water is discharged to the same drainage area
- When reactivating old roads or trails for operational use, upgrade the road bed and drainage structures to meet current requirements

Note: Peak flows have increased due to changing weather patterns and it is even more critical to ensure that ditch lines and culvert inlets are kept clear of debris during annual freshets and that culverts are not discharging onto erodible or sensitive slopes.

If, during construction or deactivation, you expose soil on an area:

– outside of running surface of road, and
– where it is reasonably foreseeable that surface erosion would cause a material adverse effect on fish habitat or water diverted by a LWI,

you must, within two years of completion of road construction or deactivation, revegetate the area or carry out other measures to reduce likelihood of surface erosion.

If carrying out a primary forest activity, ensure it does not damage a LWI.

- Revegetate any erodible soils exposed as a result of deactivation works with seed, seedlings or other techniques

You are required to maintain the:

– structural integrity of the road prism and clearing width
– proper functioning of the drainage system **until the road is deactivated**.

- Reduce the risk of slides or slumps on steep sites by ensuring culverts or fords are functioning as intended
- Prevent surface water from being discharged onto erodible soils

13 Road Maintenance and Deactivation

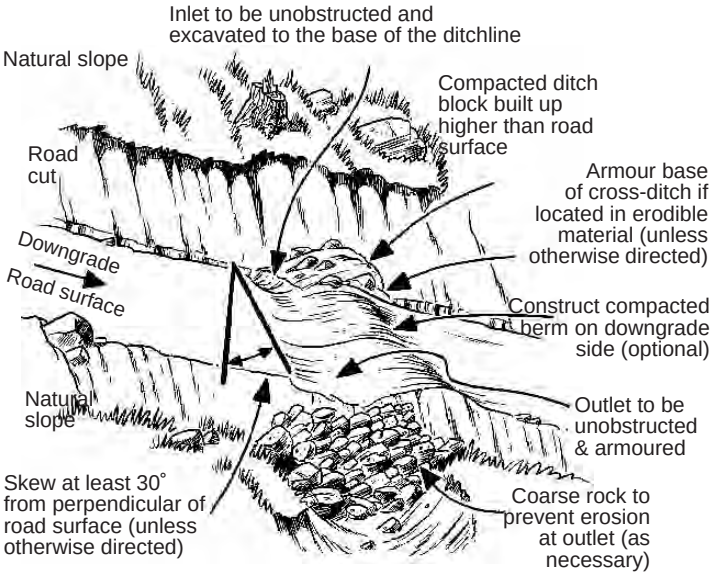


Figure 2: Cross-ditch to carry ditch water to other side of road

If you no longer require the use of a road section and intend to cease maintaining it, you must:

– remove round pipe stream culverts

– remove other culverts or bridges and stabilize the road prism as necessary to reduce likelihood of any material adverse effect on fish habitat or water diverted by a LWI.

- Stabilize the road prism or the clearing width using water bars and cross-ditches, pulling back road fill and re-vegetating exposed soils as necessary to minimize risk of sediment transport, slide or slump
- Re-establish and stabilize stream channels in deactivated roads to prevent erosion
- Revegetate any erodible soils

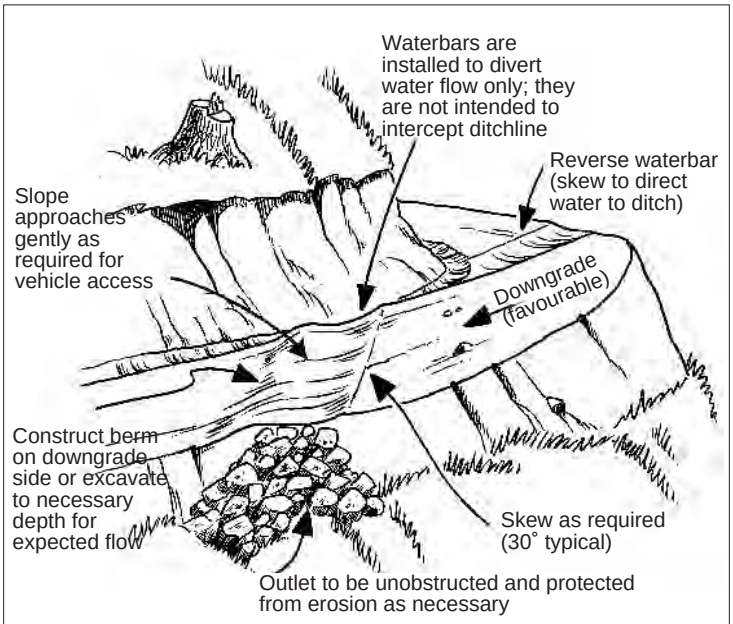


Figure 3: Waterbar used to intercept road surface water

15 Timber Harvesting

Executing an environmentally responsible and economically efficient timber harvesting operation requires a thorough understanding of the land, the forest cover, the capabilities of the harvesting equipment and the markets for timber products.

Harvesting trees is the first phase of forest renewal. Carefully managed operations can provide favourable conditions for encouraging vigorous regeneration. It is important to select a silviculture system, harvest method and equipment that are appropriate to the terrain, timber type and size.

Specific plans for each cutblock and the controlled execution of those plans are important actions to help you meet the regulations and minimize environmental risk when harvesting timber. As with road construction, the risks and consequences associated with timber harvesting will vary according to season, daily weather conditions, equipment types, environmental factors, plan details, experienced persons and appropriate supervision.

Restrict the amount of productive forest land converted to roads and logging trails to the minimum necessary for safe and efficient operations.

An owner who constructs logging trails for harvesting must rehabilitate them to the extent necessary to meet any reforestation requirements (subject to exemptions).

- Maximize regeneration opportunity by minimizing loss of productive forest area impacted due to soil compaction or other adverse ground disturbance
- After harvesting, rehabilitate roads or skid trails no longer required to reduce environmental risk and to maximize available area to reforest

You must not cause sediment or other material to be transported to, or deposited in a stream if it will have a material adverse effect on:

– fish habitat
– water diverted by a LWI
– quality of drinking water that may affect human health at a drinking water intake

- Ensure that ditches and culverts are kept open and functional so that they can keep water flowing as designed

15 Timber Harvesting

16 Timber Harvesting

When carrying out timber harvesting in a cutblock adjacent to a stream, retain commercial trees, non-commercial trees and understory vegetation as required by regulation based on stream reach classification.

- Protective measures should be used when falling trees near riparian zones to protect water quality and fish habitat
- Ensure that any cutblock boundaries along riparian zones are clearly marked and that plans are communicated to the appropriate personnel
- Notify holders of any LWIs downstream that may potentially be impacted by the operations
- Implement tree retention practices as required for stream class A to E following the procedure outlined in **Riparian Tree Retention (22–24)**

- Mark the tree retention boundary clearly in the field and address windfall potential
- Communicate relevant field practice requirements to the harvesting crew
- Restrict operations when there is an increased risk that weather or ground conditions could adversely affect fish habitat and water diverted by LWIs or drinking water intakes
- Avoid damaging retained trees

If critical wildlife habitat is present and identified on your land, you must cooperate in meeting requirements specified in a written agreement with the wildlife minister.

- Ensure any known critical wildlife habitat is identified in the harvest planning and the specific requirements are clearly understood by all involved
- Special procedures may be needed for falling and yarding to ensure operations do not damage the attributes of the critical wildlife habitat

On completion of harvesting, productive area disturbed must be restocked with suitable commercial species.

- Consider piling and burning debris from landings and log processing areas
- If ground-based equipment is used, vary skid road location and skid pattern to reduce soil compaction or rutting damage in the cutblock
- If natural regeneration is desired, make sure ground conditions are suitable to enable germination of seed

16 Timber Harvesting

17 Reforestation

Reforestation is much more than planting seedlings or waiting for natural regeneration to occur after an area has been disturbed. Disturbance is the result of harvesting, fire, insects, diseases or other causes. Reforestation is a process that starts with restocking the area and includes all the intermediate steps that may be necessary to achieve the legislated obligation of a successfully regenerated stand.

The management commitment for a managed forest contains certain broad objectives and strategies intended to achieve the reforestation goal. Because areas may vary throughout a property, it is prudent to have a more detailed reforestation plan specific to each area. For example, such a plan can allow for variations that consider:

- Residual and suppressed understory trees
- Selection of ecologically suited commercial trees
- Using genetically improved planting stock and/or fertilizer to improve survival and yield
- Pest management strategies
- Site preparation if required to ensure ample plantable spots

The two critical legislated requirements have time lines:

1. Restocking with required minimum number of crop trees (400 or 600 per ha) well distributed throughout the disturbed area must be achieved within five years*.
2. Successfully regenerated stand status, where there remains at least the minimum number of well distributed crop trees now free in height from any competing vegetation, must be achieved within 15 years.

* The regulation does not apply if the area harvested or destroyed is a contiguous area less than 1 ha in size or the trees remaining on the area meet the definition of a successfully regenerated stand.

Stocking density translates approximately as follows:

Stems per ha	Average distance between stems
400	5.0 m
600	4.0 m
800	3.5 m
1,000	3.2 m

Restrict the amount of productive forest land converted to roads and logging trails to the minimum necessary for safe and efficient operations.
A logging trail constructed to harvest a cutblock that is not required to access future timber must be rehabilitated to the extent necessary to meet reforestation requirements.

- Plant and/or seed areas of exposed soil promptly
- Rehabilitate and/or otherwise prepare for planting any roads or logging trails no longer required

17 Reforestation

18 Reforestation

Reforest areas where timber has been harvested or destroyed.

- Ensure the number of healthy trees meets the minimum restocking requirements and that trees remain well distributed
- Fill plant as necessary to replace any mortality in order to meet restocking requirements
- Accept naturally regenerated trees that are consistent with commercial species listed in your management commitment
- Determine stocking levels after restocking and again at year 5 to ensure the regulatory minimum stocking densities are met. Fill plant if necessary

- Monitor plantations and forest stands for signs of root rot or other forest health concerns
- Monitor pest problems such as rodent damage (voles, rabbits) as they can impede achieving acceptable seedling survival and growth
- Deer and elk (ungulate) browse damage can be a significant problem to achieving successful reforestation and may require use of less palatable species or physical browse protection such as Vexar tubes, fencing or repellents
- Treat brush competition that threatens initial survival and growth; it may require mechanical or herbicide treatment

Broadcast application of fertilizer near streams is:

- Not to be applied within 100 m upslope of a LWI
- Not to be applied within 1,000 m upslope of a LWI and within 10 m of stream that:
  - is visible from air at height applied,
  - contains flowing water at time of application, and,
  - flows directly into the stream on which the LWI is located.
- If fertilizer contains nitrogen, nitrate levels are not to exceed 10 ppm measured immediately downstream of area fertilized.
- Do not apply fertilizers by aerial broadcast within 10 m of a fish stream.

- Use of fertilizer must comply with product directions, terms of application permit and applicable legislation
- Identify location of any LWI, drinking water intake or fish stream that may be affected at the time of planning
- Mark stream boundary zones in the field so that it is clear where fertilizer is NOT to be applied
- If applicable, have the stream water sampled for nitrate levels to ensure compliance with legislation

18 Reforestation

19 Reforestation

Reforestation time line

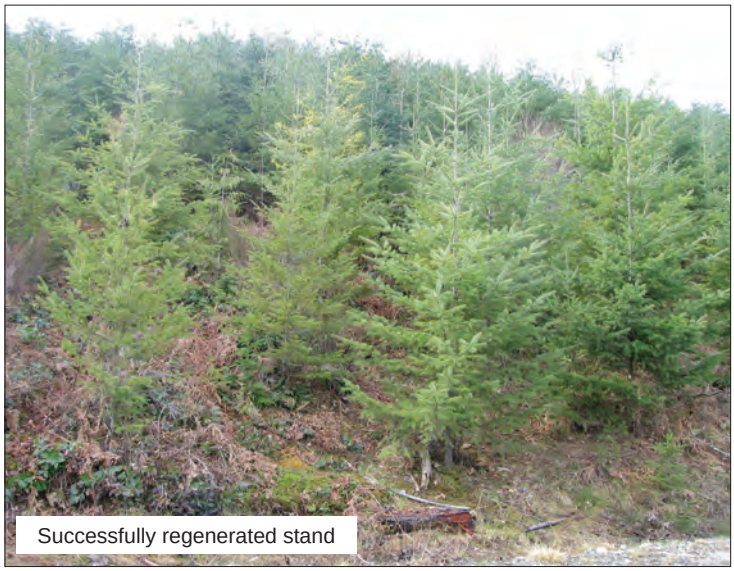
Maximum time from date declared in the annual declaration as either harvested or destroyed until the area is successfully regenerated.

Council Regulation describes detail and varying circumstances.

Seedling planted to restock area

Stocking level maintained

Criteria of Successfully Regenerated Stands			
	Crop trees/ ha, well distributed	Crop trees exceed height of competing vegetation within 1m of tree by	Minimum tree height if brush is within 1m of tree
Coast	400	50%	150% height of brush
Interior	600	25%	125% height of brush



Successfully regenerated stand

19 Reforestation

20 Stream Classification

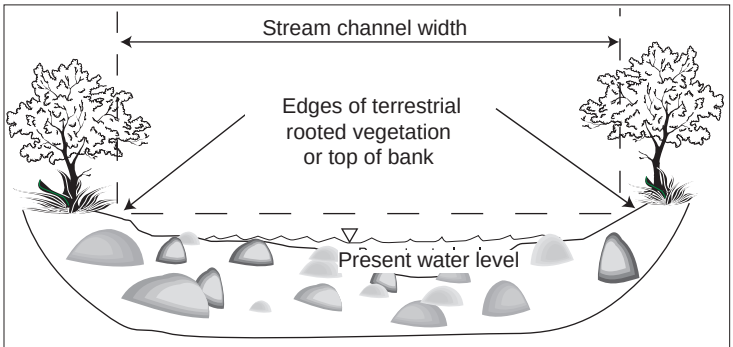
Owners conducting road construction, timber harvesting and other operational activities must achieve the forest management objectives for water quality and fish habitat. To determine the appropriate level of field activity near a stream use the four-step process presented here to classify streams.

Stream Classification Process	
Step 1	**Determine stream width** **Action:** Measure stream channel width as described below
Step 2	**Determine fish presence/absence** **Action:** Treat the stream as fish stream if gradient less than 20%, or have a qualified person determine fish absence
Step 3	**Determine existence of LWI and distance to the stream reach** **Action:** Use maps, local knowledge or research
Step 4	**Classify stream** **Action:** Use information from Steps 1–3 and Stream Riparian Classes table (below)

Determining stream channel width

- Measure from normal bank to bank, usually from edges of terrestial rooted vegetation (see diagram)
- If width of stream (reach) is obvious, e.g. >10m, or between 10m and 3m likely no extra measures needed
- When width is close to the change between two classes, more widths should be taken to confirm an average; (See **Information Links (7)** for FPC Guidebooks)
- If uncertain, consult a qualified person

Once you have determined the channel width and stream class, apply the appropriate strategies for **road construction (9-11)**, **timber harvesting (15-16)**, **reforestation (17-19)** and **riparian tree retention (22-24)**.



Determining stream channel width

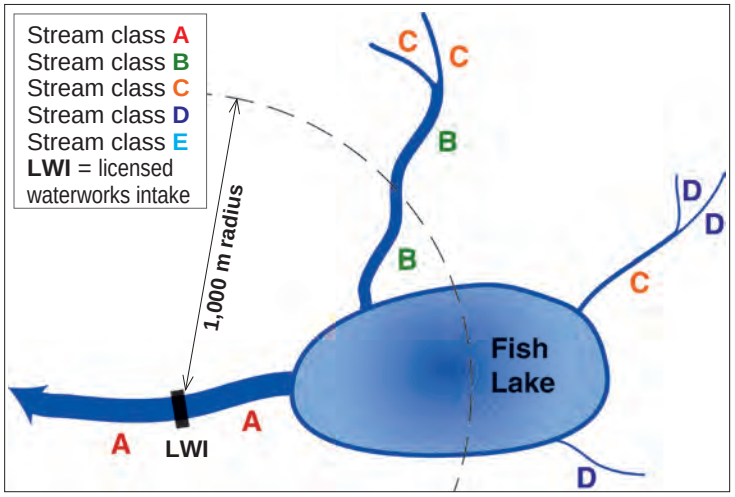
Stream Riparian Classes				
Class	Stream reach channel width	Fish	No fish, LWI within 1,000 m downstream	No fish and LWI > 1,000 m distance
A	10 m or wider	✓	✓	No Class
B	3 m – < 10m	✓	✓	No Class
C	1.5 m – < 3m	✓	✓	No Class
D	less than 1.5 m	✓	✓	No Class
E	1.5 m or wider AND flows directly into class A, B, C or D stream	X	X	No Class

20 Stream Classification

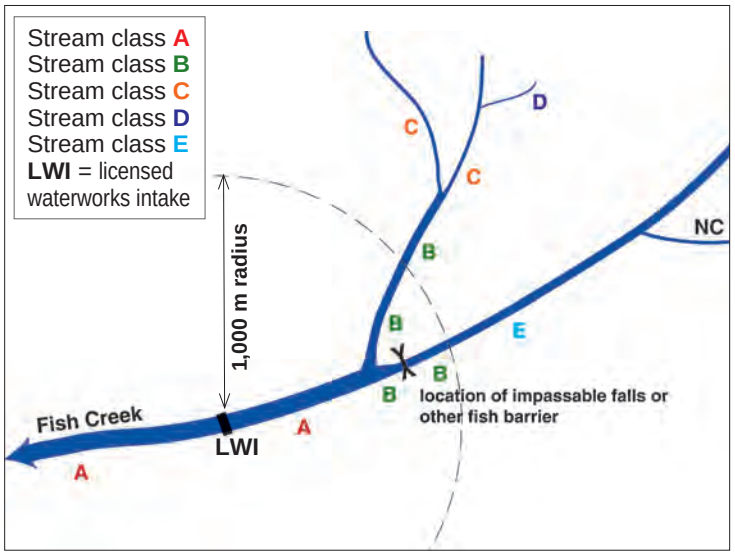
21 Stream Classification

Interpretive notes:

1. Streams, or stream reaches, that support fish are assigned a riparian class of **A**, **B**, **C**, or **D**, depending on channel width. The Council has determined that the same applies to non-fish streams or stream reaches within 1,000 m upstream of a LWI.
2. Non-fish streams that are 1.5 m or wider and flow directly into a class **A**, **B**, **C**, or **D** stream are class **E**. Council has determined that this includes streams greater than 1,000 m upstream of a LWI.
3. Council has determined that no classification (NC) refers to any non-fish stream where there is no LWI within 1,000 m and is not class **E**.



Stream Classification Example 1: Fish presence upstream of LWI defines stream reach classification. The 1,000 m radius to the LWI does not impact classification in this example. The lake is not classified but fish streams flowing into the lake are classified.

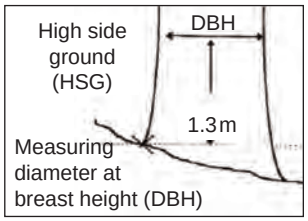


Stream Classification Example 2: Illustrates both the influence of a fish barrier and presence within 1,000 m upstream of a LWI on stream classification.

21 Stream Classification

22 Riparian Tree Retention

If you plan to build road or harvest trees in the vicinity of a stream, you may be required to retain commercial trees, non-commercial trees and understory vegetation in the zone adjacent to the stream. The riparian zone on each side of the stream has detailed tree retention requirements that vary by stream class for each reach.



Minimum Commercial Tree Retention Requirement		
Stream Class	**Minimum number of trees per 100 m of stream reach**	**Sequence for counting trees until the required number is reached**
A	30	**1. Within 10 m of stream** First, count trees ≥ 30 cm dbh, then count trees ≥ 20 cm dbh **2. Within 20 m of stream** First, count trees ≥ 30 cm dbh, then count trees ≥ 20 cm dbh **3. Within 30 m of stream** First, count trees ≥ 30 cm dbh, then count trees ≥ 20 cm dbh
B	25	
C	15	**Within 10 m of stream** Count trees ≥ 20 cm dbh

Note: Commercial trees are not required to be left along Stream Classes **D** and **E**. Maintain proportion of coniferous / deciduous size and distribution as in pre-harvest stand.

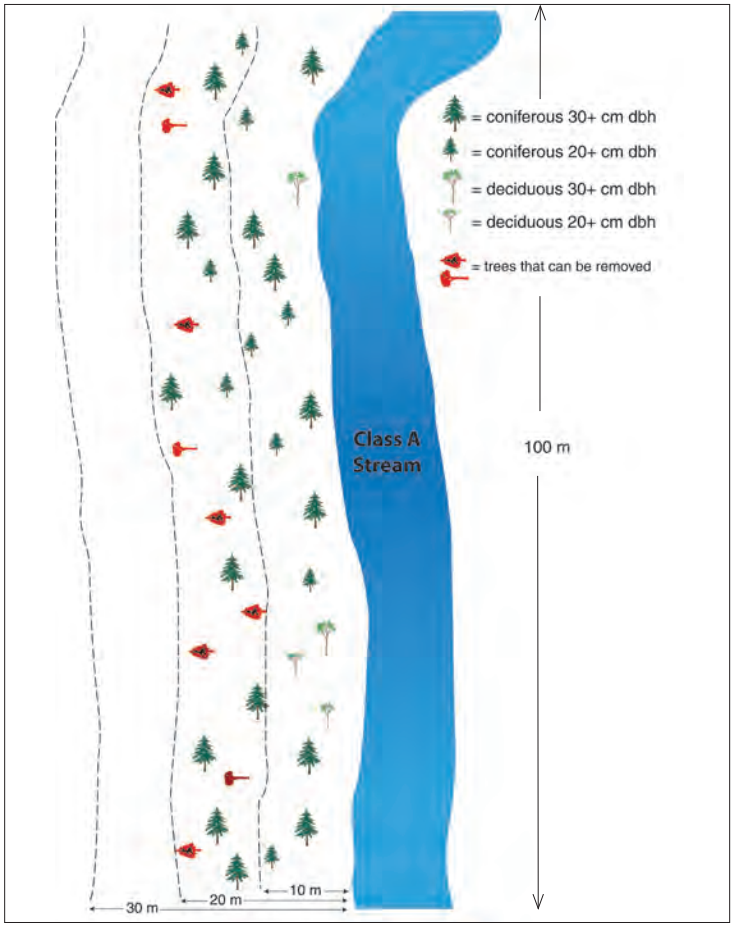
Refer to Council Policy for measuring distances along a stream, and corresponding tree counts and distribution.

Non-commercial Trees And Understory Retention		
Stream Class	**Distance from stream to retain non-commercial trees and understory vegetation**	**Considerations**
A	30 m	These minimum distances are required by stream class unless there is no risk of material adverse effect to fish habitat or water quality, or less distance is needed for specified reasons (stream crossing, safe road location, etc.)
B	30 m	
C	10 m	
D	10 m	
E	10 m	

Trees retained along stream

22 Riparian Tree Retention

23 Riparian Tree Retention



Riparian Tree Retention Example: Class **A** stream requires a minimum 30 trees be retained. In this example, the 17 trees within 10m of the stream plus an additional 13 trees located within the next 10m are required. The nine remaining trees located in the 10m – 20m band away from the stream could be harvested as long as removing them will not cause a material adverse effect on fish habitat or water quality.

Trees retained beside large Class B stream.

23 Riparian Tree Retention

24 Riparian Tree Retention

Trees retained along Class C stream

Objective of riparian tree retention

The objective of riparian tree retention for the protection of fish habitat is to retain sufficient streamside mature trees and understory vegetation to protect all of the following:

- Natural variation in water temperature,
- Sufficient cover for fish,
- Continual source of large woody debris (LWD) for stream channel stability purposes,
- Vigorous mass of roots capable of controlling stream bank erosion,
- A filter to prevent the transport of sediment into stream channels,
- Woody debris sufficient for in-stream habitat, and
- A source of nutrients to the stream through litter fall.

Flagging used to identify tree retention in riparian zone

24 Riparian Tree Retention