Sustainable Forest Management Plan (SFM Plan)

Port Alberni Forest Operation

2010 - 2014

Revised: April 17, 2014
### Table of Contents

**Introduction** 1

**Sustainable Forest Management** 1

- Canadian Standards Association (CSA) ............................................................... 1
  - CSA Z809 Standard.......................................................................................... 1
- SFM System ........................................................................................................ 2
  - Environmental Management System (EMS) ......................................................... 3
  - SFM Plan ........................................................................................................ 3
- West Island Woodlands Advisory Group (WIWAG) ............................................ 3
- Links to management plans and operational plans .............................................. 4
- Third-Party Independent Audits ........................................................................ 7

**Defined Forest Area (DFA)** 7

- The Forest Land and AAC .................................................................................. 7
  - Map of the DFA ............................................................................................. 8
- Management Responsibilities in the DFA ........................................................... 9
- First Nations ....................................................................................................... 9
- Products and Markets ......................................................................................... 9

**Management Strategies** 10

- Biodiversity Conservation .................................................................................. 10
- Variable Retention ............................................................................................. 10
- Wildlife ................................................................................................................ 11
- Fish Protection .................................................................................................... 12
- Harvesting Adjacent to Parks ............................................................................. 12
- Fire Control ........................................................................................................ 13
- Forest Insect Control .......................................................................................... 13
- Forest Disease Control ....................................................................................... 14
- Windthrow Control .............................................................................................. 15
- Terrain Management .......................................................................................... 16
- Reforestation ..................................................................................................... 16
- Road Building and Maintenance ....................................................................... 17
- Site Restoration ................................................................................................ 17
- Soil Conservation ................................................................................................ 17
- Water Conservation ............................................................................................ 19
- Riparian Management ......................................................................................... 19
- Contributions to Global Ecological Cycles ......................................................... 20
- Forest Growth and Yield Plan ............................................................................ 20
- Benefits to Society .............................................................................................. 20
- Forest Recreation ................................................................................................ 21
- Visual Landscape Management .......................................................................... 21
- Road Access ........................................................................................................ 21
Introduction

Sustainable Forest Management (SFM) strives to maintain and enhance the long term health of forest ecosystems, while providing ecological, economic, social and cultural opportunities for the benefit of present and future generations.1

The Sustainable Forest Management (SFM) Plan has been prepared to support Western Forest Products Inc.’s (WFP) commitment to sustainable forest management, consistent with the Canadian Standards Association (CSA) Z809-2008 standard. The SFM Plan is designed to complement the following existing management systems and procedures:

- Environmental Management System (and related ISO 14001 certification) including the Timberlands Sustainable Forest Management Statement and SFM Management Procedure;
- Safety Program (and related SAFE Company certification);
- Existing management plans (e.g., TFL 44 Management Plan); and
- Legal requirements (refer to Figure 2 and the EMS Manual, Legal and Other Requirements).

British Columbia has rigorous legislation and policies for protection, conservation, and sustainable management of forests. This legislative framework is being continuously improved, as is forest management and policy. In addition to applying regulatory tools, WFP benefits from using voluntary tools, such as CSA Certification, to aid in the achievement of sustainable forest management (SFM).

Sustainable Forest Management

Canadian Standards Association (CSA)

The Canadian Standards Association (CSA) is a non-profit, membership-based association which has developed over 2000 standards for various industries. CSA develops both nationally and internationally accepted standards for values such as health and safety, quality of life and the environment2.

CSA Z809 Standard

The CSA Z809 forest management standard is based on the Canadian Council of Forest Ministers (CCFM) SFM criteria and elements. The CCFM SFM criteria and elements are fully consistent with those of the UNCED Montréal and Helsinki processes, which are both recognized by governments around the world.

The CSA SFM Z809 2008 Standard requires:

- A systematic approach to management, based on continual improvement; and compliance with legislation, regulations and government policies, taking into account environmental, social and economic factors;
- Public participation in order to give local communities input into how forests are managed;
- Demonstration of sustainable forest management performance; and
- Third party audits to confirm adherence to the standard.

---

1 Source: Canadian Standards Association Sustainable Forest Management Z809-08 Standard.
2 Source: http://www.csa.ca
WFP is required to work closely with the public to identify local values, objectives, indicators, and targets that reflect the national criteria and to incorporate them into forest management planning and practices. Decisions are made together with the public during this process. CSA Z809 is more than a system standard; it is also a performance standard, and it sets specific requirements for the public participation process. This approach to performance not only respects government-recognized criteria for SFM but also allows the public to participate in the interpretation for the local forest.

The CSA Z809 Standard was recently reviewed and updated. The 2008 edition is the third edition of CSA Z809 (CSA Z809-08), sustainable forest management standard and supersedes all previous versions. The updates to the standard reflect the objective to foster consistency between SFMP plans across Canada by establishing pre-set “Core Indicators”. The standard is available at: http://www.csagroup.org/%5Crepository%5Cgroup%5CZ809-08.pdf. A summary of the changes in the 2008 standard can be viewed at: http://www.scc.ca/en/programs-services/ms/csa-z809-transition.

**SFM System**

WFP maintains an SFM System under the Environmental Management System. The SFM System includes an SFM Statement documenting the corporate commitments to sustainable forest management, an SFM Management Procedure describing the general procedures/outline for achieving SFM certification and the SFM Plan that contains the specific CSA Z809 Standard requirements.

**Figure 1:** Overview of the SFM System
Environmental Management System (EMS)

The EMS is an adaptive management system allows for a systematic approach to continual improvement. It is based on the dynamic, cyclical process of: planning; implementation & operation; checking; and management review.

The core elements of the EMS are described within the EMS Manual and the corresponding supporting documents which include, but are not limited to: Policies, Standard Operating Procedures (SOP), Standards and Emergency Preparedness & Response Plans (EPRP). These documents provide standards to guide daily activities out in the woods (i.e., “on the ground”) in order to ensure environmental protection and compliance with legal requirements.

SFM Plan

The SFM Plan documents current and long-term SFM performance objectives and management strategies in the Port Alberni Forest Operation operating area, referred to as the Defined Forest Area (DFA).

The SFM Plan is an adaptation of existing planning processes including strategic and operational plans, analyses, standards, monitoring and public review. Management of forest land in the area has continued to evolve over time in response to changes in society’s values. Revised Management Plans, submitted at approximately 10-year intervals, include objectives, management strategies and analyses of management impacts. Standards and operating plans have been updated as changes occur. Monitoring has included corporate reports and both internal and external audits and inspection to evaluate conformance with management system requirements as well as compliance with legal requirements.

The values, objectives, indicators, targets, and management practices described in this document (developed by WFP and WIWAG) are currently understood and followed by Port Alberni Forest Operations (PAFO) for working towards sustainable forest management on the DFA. This is an evolving document that is reviewed and revised on an ongoing basis with the community advisory group to reflect changes in the forest and local community.

Ongoing review and input is provided by the advisory group, TFL management, and others through performance assessments, operational plan reviews, and processes related to specific land use issues such as landscape unit planning and community water supply.

West Island Woodlands Advisory Group (WIWAG)

The West Island Woodlands Advisory Group (WIWAG) has helped to develop the SFM performance framework for the DFA. A web site has been developed to facilitate communication with WIWAG members as well as the general public: http://www.westernforest.com/wiwag/

A broad range of interested parties from various sectors of society participate in each of the public advisory group meetings, e.g., local communities, tourism, wildlife, labour, business, recreation, fisheries, government, and First nations.

WIWAG operate under a Terms of Reference that outlines: goals, roles and responsibilities; membership; measures to deal with conflicts of interest; meeting content; timelines; communication, decision making and dispute resolution protocols; as well as methods to modify the Terms of Reference. The Terms of Reference may be found in Appendix 3.
Links to management plans and operational plans

Figure 2 shows the links between operational planning and TFL Management Plans with the B.C. Forest and Range Practices Act (FRPA).

The SFM Plan is an umbrella plan that links higher level plans, such as the Management Plan, with operational plans. The performance commitments included in the SFM Plan equal or surpass commitments previously approved under TFL 44 Management Plans. The SFM Plan reflects the objectives, management strategies, and reporting structure of management plans. The SFM Plan is influenced by other higher level plans, such as the Vancouver Island Land Use Plan, and by legislation including the FRPA and associated Forest Stewardship Plan. The SFMP annual performance is reviewed and discussed during Management Review (on an annual basis). Conclusions drawn during Management Review are documented in the Management Review meeting minutes (where applicable).

Figure 2 shows the flow of input and direction to Forest Stewardship Plans and site plans. It does not show the feedback loops of monitoring and adaptive management that occur from operations to the management plans and other higher level plans.
Figure 2: Links between Plans (TFL – with FRPA)

Legislation, Regulations & Policy
- Forest Practices Code of BC Act
- Forest and Range Practices Act
- Forest Act
- Fisheries Act
- Private Land Forest Act
- Workers’ Compensation Act
- Forest Investment Account, etc.

Strategic Land Use Plans

Public Process
- Government
- Public Advisory Group
- Audits

Continual Improvement/
Adaptive Management

SFM Plan

Research and Forest Resource Inventories
- Timber & Operability
- Ecological Classification
- Regeneration
- Wildlife & Habitat
- Fisheries
- Riparian
- Visual Quality
- Soils & Terrain
- Community Watersheds
- Biodiversity
- Cultural Heritage

Management Plan, Timber Supply Analysis

First Nations Consultation

Forest Stewardship Plan

Public Review

Operational Plans and Assessments (e.g. SP, RP)

Agency Review
- Ministry of Forests & Range
- Ministry of Environment
- Department of Fisheries & Oceans

Cutting Permit, Road Permit (MoFR)
Assessments
- Watershed
- VIA
- TSFA
- Fish
- AIA, etc.

Forest Operations

Environmental Management System/ Procedures

Monitoring
- SFM Plan
- SFM Annual Performance Report
- MoFR Compliance and Enforcement
- Internal and External Audits,
- MoFR FREP
- Management Review
Third-Party Independent Audits

To become certified to this Standard, WFP must undergo a third-party, independent annual audit to the SFM requirements in this Standard. A registrar (certifier), accredited by the Standards Council of Canada, conducts the audit. The individual auditors employed or contracted by the registrar have the requisite forestry expertise and are certified as environmental auditors. Audits to this Standard are done by accredited certifiers and certified auditors who are independent of the standards-writing body (CSA).

Audits include both a document review and field visits of the forest operation to ensure progress is being made towards the achievement of targets and that the SFM requirements are being upheld.

Defined Forest Area (DFA)

The DFA includes WFP’s TFL 44, Port Alberni Forest Operation (refer to Figure 3 for a map of the DFA). Volume based, short term licenses that are issued to the BC Timber Sales program or First Nations by the Ministry of Forests and Range and are within TFL 44 are excluded from the DFA for the duration that they are under the management responsibility of an entity other than WFP. Typically these areas revert back into the TFL once they are harvested and reforested and will form part of the DFA once they revert back to the management responsibility of WFP. Parks and protected areas are also excluded from the DFA.

WFP respects the legal rights and responsibilities of the other parties within or adjacent to the DFA (e.g., First Nations, trappers, water license holders, mining claims, etc.). WFP respects the treaty title and rights flowing from the Maa-nulth Final Agreement effective April 1, 2011. Refer to the TFL Management Plan and Forest Stewardship Plan information sharing/referral information regarding specific legal rights and responsibilities of other tenure holders, as they apply to the DFA.

The Port Alberni Forest Operations is located on western Vancouver Island and represents one of twelve WFP Timberlands operations. There are five communities within or adjacent to the licence area. These are Port Alberni, Bamfield, Anacla (Huu-ay-aht First Nation), Nitinat ( Ditidaht First Nation), and Kildonan.

The location, tenures and facilities are divided into three district geographic areas; Franklin, Henderson Lake, and Great Central Lake.

The Operations consist of harvesting, hauling, maintenance shops, dryland sorts, landfills and administrative offices. The organization chart indicates the staff positions (see corporate intranet).

Refer to the current TFL 44 Management Plan for a detailed description of the DFA, visit: http://www.westernforest.com/company/stewardship/planning.php

The Forest Land and AAC

The area of the DFA (as per Management Plan #5) is 139,446 hectares. The current AAC for TFL 44 is 800,000 m³ as determined by the Chief Forester effective May 5, 2011.
Map of the DFA

Figure 3: Map of the Defined Forest Area
Management Responsibilities in the DFA

TFL 44 is a renewable tenure on Provincial Crown land and administered by the Ministry of Forests, Lands and Natural Resource Operation (FLNRO) under the Forest Act. These tenures are managed by WFP in conjunction with (FLNRO), Ministry of Environment, Ministry of Agriculture and other agencies. The primary roles and responsibilities are defined under a variety of legislation including, but not limited to, the Ministry of Forests Act, Forest Act, and Forest and Range Practices Act.

Other independent third party entities that currently carry out work on the DFA include First Nation operators with an allocation of 17,518 cubic meters and BCTS with a competitive bidding allocation... The BCTS allocation is excluded from the DFA. Any residual BCTS timber sales will be minor volumes and should be completed by 2016. These parties are not considered necessary for the achievement of SFM on the DFA.

First Nations

First Nation participation in WIWAG will not prejudice aboriginal or treaty rights. WIWAG meetings do not, in any way, intend to define, interpret, or prejudice ongoing or future discussions and negotiations regarding these legal rights and do not stipulate how to deal with treaty rights.

The Defined Forest Area falls within the traditional territories of the following First Nations:

- Stz’uminus
- Lyackson
- Cowichan
- Pacheedaht
- Ditidaht
- Penelakut
- Hupacasath
- Tseshah
- Huu-ay-aht
- Uchucklesaht
- Lake Cowichan
- Yuuluʔiłʔaθ

A map of the traditional territories can be reviewed at: http://www.for.gov.bc.ca/dsi/First_Nations.htm

Products and Markets

Logs are distributed by the Fiber Supply department for sale and transport to local Western Forest Products sawmills, outside purchasers and export. Majority of logs go to local Western Forest Products sawmills, Catalyst Paper (a local paper producer) and Western Product sawmills on southern Vancouver Island.

Table 1: DFA Products and Markets

<table>
<thead>
<tr>
<th>By Species (%)</th>
<th>By Grade (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ba 17</td>
<td>Pulp 2</td>
</tr>
<tr>
<td>Cy 1</td>
<td>Utility 13</td>
</tr>
<tr>
<td>Hw 34</td>
<td>Merchantable 30</td>
</tr>
<tr>
<td>Cw 38</td>
<td>Shingle / Special Forest Products 10</td>
</tr>
<tr>
<td>Fd 10</td>
<td>Peeler / Lumber 14</td>
</tr>
<tr>
<td></td>
<td>Gang 31</td>
</tr>
</tbody>
</table>
Management Strategies

Biodiversity Conservation

Substantial areas, largely old growth, have been reserved throughout the DFA on inoperable or sensitive soil sites as riparian, wildlife or recreation reserves and, increasingly, as permanent Variable Retention reserves according to the guidelines set forth under the Western Forest Strategy. Biodiversity conservation requirements are in place at the stand level. They are defined at the larger, landscape levels through provincially assigned Biodiversity Emphasis Options and through the Western Forest Strategy.

Developing a biodiversity conservation strategy that is based on management of individual species is not feasible or effective because practices that benefit some species are often detrimental to others. The development of an ecosystem management approach that provides suitable habitat conditions for all native species will provide habitat diversity that in turn provides species biodiversity.

The strategy for biodiversity conservation is:

- Institute landscape-level ecological planning.
- Plan forest management activities based on Western Forest Strategy.
- Work with the government specialists to further develop objectives and strategies for landscape units.
- Implement ecologically based stand-level requirements as required under the Western Forest Strategy and Forest Stewardship Plan.
- Choose species mixtures for reforestation based on ecological site adaptation.
- Consistent with FSP Results and Strategies’ and Western Forest Strategy, retain leave tree reserves or wildlife tree patches to enhance structural diversity of harvested areas.
- Improve knowledge through inventory and research.
- Cooperate with other agencies in research and inventory projects on species of concern.

Variable Retention

The term variable retention (VR) is used to describe an overall approach to harvesting and silvicultural systems that retains trees and associated habitat for purposes other than timber management and traditional silviculture goals. Variable retention can be implemented with a wide range of harvesting systems, and can utilize traditional silvicultural systems, such as shelterwood or selection, to meet forest regeneration objectives. As the name implies, various levels of retention can be used with different types, amounts and spatial patterns of structure. Retention can be dispersed throughout a cutblock (as individual trees or small clumps) or aggregated in larger groups and patches, depending upon the objectives. There is such a wide range of possibilities within the VR concept that it is not a "one size fits all" approach.
The term retention system refers to a specific silvicultural system designed to meet the goals of variable retention. It was originally defined in the BC Operational Planning Regulations (March 1999) and has 3 requirements: 1) retention of trees distributed across the cutblock; 2) trees are left for the long term (at least one rotation); 3) distribution of leave trees achieves >50% “forest influence”. The specific definition of the retention system is: “a silvicultural system that is designed to:

1. retain individual trees or groups of trees to maintain structural diversity over the area of the cutblock for at least one rotation, and
2. leave more than half the total area of the cutblock within one tree height from the base of a tree or group of trees, whether or not the tree or group of trees is inside the cutblock.”

The distribution of long-term retention over the area of the cutblock is open to interpretation, but the spatial requirement in “2” for “forest influence” provides the minimum standard for distribution. The retention system is no longer officially defined in BC legislation; however the BC Forest Planning and Practices Regulation (Div.5, 64(4)) exempts harvesting that maintains >50% forest influence and meets other spatial requirements from maximum cutblock size restrictions. The retention system is considered a “partial cutting” approach and is categorized as an “even-aged” system despite the resulting uneven-aged forest because the cut areas are regenerated and managed much like other even-aged systems.

The retention system normally uses a one-pass harvesting approach, but may also be prescribed with several harvesting entries. The three main variants of the retention system are: group, dispersed, and mixed. For safety, economic and ecological reasons, group retention is often preferred; however, all three variants have advantages for specific objectives.

**Wildlife**

Wildlife issues are twofold in scope: (1) habitat protection for large mammals and threatened or endangered species; and (2) biodiversity concerns related to conservation of animals and plants and the maintenance of ecosystem processes. Current knowledge is often limited and limiting and new knowledge requires a process of adaptive management. The main current issues are:

- identification and protection of specialized habitats for large mammals, primarily deer and elk
- identification and preservation of the best marbled murrelet nesting areas and release of previously protected areas that appears not to be used
- actions needed to maintain habitat for rare and endangered plants, animals, and ecosystem processes

The wildlife protection strategy is to:

- comply with the Forest and Range Practices Act and the FSP
- comply with government stated measures to manage WHAs, UWRs
- provide operations and agency personnel feedback on guidelines as part of an ongoing process of improving conservation
- liaise with government wildlife and habitat protection staff on wildlife issues, especially to identify and protect critical habitat
- continue assessments of ranges, habitat diversity, wildlife trees, etc., and protect significant values
• continue surveys to identify and preserve key marbled murrelet nesting sites and obtain release of protected sites that are apparently of little or no value
• manage riparian zones as directed by the stream indicators and objectives; as feasible, enhance protection on smaller streams particularly through the use of VR design.
• support other monitoring and research activities to increase knowledge of habitat resource requirements and the impacts of management activities on those

Fish Protection

The fishery resource value is generally high and protection of fish habitat and water quality ranks as a significant priority. Biological issues dominate in the sense of conserving fish stocks and habitat. At the same time, managers are also concerned with meeting the letter of the law. The issues are:

• To update classification of waters within the DFA. This includes: detailed site specific information for operational planning and a broader, but accurate portrayal of the impacts of riparian management for strategic analysis.
• Mitigation, enhancement, and habitat restoration.
• Cooperation with First Nations and other stakeholder groups.
• To determine measures for protecting endangered populations.
• Management of riparian areas.

The strategy for responding to these issues is to:

• Continue to undertake detailed stream inventories for operational plans.
• Continue to identify and implement enhancement, mitigation, and rehabilitation opportunities with available funding.
• Achieve full compliance in meeting the requirements of the FRPA and the FSP.
• Work with agencies to design and deliver training to woods workers.

Harvesting Adjacent to Parks

The general strategy for harvesting adjacent to all Parks is:

• Roads close to federal and provincial park boundaries will be deactivated after harvest.
• Cutblock boundaries along park boundaries will have a windthrow assessment.
• To either review the common boundary on site, with a provincial or federal park representative or obtain approval when adjoining

The additional strategy for the falling of danger trees along Park boundaries is as follows:

• If danger trees standing outside the park boundary are felled into the park, only the portion lying outside the park boundary may be yarded (the portion in the park must be left as CWD); and
• Damage to surrounding trees and vegetation will be minimized.
• No trees within the park will be felled.
• The annual review of next year’s harvest plan to forecast the impact to Indicator 5.1.A and to make adjustments if necessary
The additional strategy for harvesting adjacent to Pacific Rim National Park Reserve is:

- The portion of the common boundary between Pacific Rim National Park Reserve and TFL 44, from Tsusiat Lake to Black Lake that is adjacent or close to proposed cutblocks has been legally surveyed. The park boundary extending to the northeast from Tsusiat Lake is described as the height-of-land. This section of the boundary has been surveyed using a Global Positioning System (GPS). The boundary has been field reviewed by Parks Canada staff to 750m west of cutblock 7694. Parks Canada has agreed with the boundary location.

**Fire Control**

Since 1955 when the DFA’s original TFL licenses were awarded, fire problems have not been significant. Port Alberni Forest Operation’s primary objective is to prevent fires through good housekeeping, diligent equipment maintenance, and strict control of operations as fire danger rises. The goal is to contain all fires within 24 hours of detection. Fire prevention and control are governed by operating plans and procedures:

- Pre-suppression plans are prepared annually;
- Emergency plans exist for fires not controlled within 24 hours, and
- Ground and aerial patrols are made as required by regulation.

Port Alberni Forest Operation and its Contractors maintain and use their own fire suppression equipment. If needed, further equipment can be obtained from other operating units or government resources.

Port Alberni Forest Operation is connected to the government Fire Weather Information Network. Port Alberni Forest Operation also employs strategically located fire weather stations to monitor weather in the various operating areas. Data from these stations are used to modify or cease operations according to hazard rating, risk and fire danger rating.

**Forest Insect Control**

Similar to the fires, forest health problems have also not been significant. A black headed budworm outbreak in 1970 was closely watched for two years before the population collapsed and preparation for control abandoned.

Forest Defoliators – The last significant insect epidemic was in 1945-6 when hemlock looper killed mature timber on a significant part of the Nitinat, Pachena, Sarita, and Klanawa River watersheds. A significant percentage of the dead timber was salvaged. The black headed budworm reached epidemic levels in 1972 but then collapsed.

Insect populations tend to build up over a number of years. The company’s past experience has been that defoliation is normally reported by staff flying over the inaccessible old forest where such attacks normally start. Evidence of other problems, e.g., Rhizina and laminated root rots, have been identified and reported in the course of fieldwork. Follow up fieldwork has then determined the severity of the problem and decisions on any further action.

When defoliation is reported it is inspected more carefully, boundaries roughly mapped and recorded. If the attacked area increases and/or the extent of defoliation increase significantly, assistance is sought from FLNRO or Canadian Forest Service (CFS) specialists and plans made for salvage. If warranted, an aerial attack plan is prepared in conjunction with the pertinent federal and provincial agencies.
Balsam Woolly Adelgid — Mortality is generally found on drier sites of advanced and old growth stands of amabilis fir and sub-alpine fir in the CWHmm2 and MHmm1 subzones. Future yield losses will be minimized by favouring alternative species for plantations on affected sites.

Ambrosia Beetles — The DFA has had an active damage prevention program for over 30 years to minimize the significant financial loss these beetles can inflict. After early trials and operational spraying with a number of insecticides, damage is now controlled by careful management of inventories of susceptible logs.

Other Insects — Breeding trials have now produced Sitka spruce seedlots that are 85 to 95 percent resistant to Sitka spruce weevil. Weevil resistant seedlots will continue to be planted on ecologically appropriate sites.

**Forest Disease Control**

Wood volumes lost to disease in the old growth forest have been estimated as highly significant by the CFS. However, measurements from Western Forest Products permanent sample plots for nearly 30 years suggest that growth is balancing mortality.

In the new forests, a number of parasitic fungi can kill trees or degrade log quality and value. The most significant of these are hemlock mistletoe, laminated root rot; Annosus root rot, and Armillaria root disease. The design of new variable retention silviculture approaches must take into account the widespread incidence of mistletoe in old growth hemlock and in many of the 40 year plus second growth stands as this can pose a significant risk to the health of regenerating forest areas. Though Annosus is known to be widespread and though various measures were used when spacing or thinning in the 60s and 70s (high stumps and borax), no action is presently undertaken. Though Armillaria is endemic, assessments in Douglas-fir stands made by research staff in the 1950s found evidence of only scattered mortality, which appeared to decline or cease after canopy was formed. It was concluded this pathogen is not presently a cause for concern.

Active preventive measures are now limited to mistletoe and laminated root rot.

Strategies for addressing mistletoe include:

- Selecting retention or reserve areas, preferring stands with a zero or low level of infection.
- Prescribing the: removal or girdling of infected trees; and/or regeneration of non-susceptible species.
- Implementing strategies before susceptible regeneration is 3m in height.

Strategies for addressing infections of *Phellinus weirii*, including:

- Visually assessing second growth stands proposed for harvest for the presence of laminated root rot during engineering and SP field work.
  - If the presence is negligible, no further survey is required.
  - If the presence is identified as low, a walk through survey is required.
  - If the presence is high, a grid survey by a forest health specialist may be completed. A grid survey is not required if the location of centers is obvious (e.g. between two roads), if infection is so severe that the entire cutblock will be treated, or if the cutblock will be managed for a non-susceptible species for the next rotation.
- Laminated root rot in retention patches will be allowed if expected windthrow in the remaining stand is considered acceptable, and the first 10m from the boundary of the patch is planted with a non-susceptible species, or the stumps are removed from the ground. Group retention areas may also have infected trees if they are in the central portion of the group, at least 10 meters from the perimeter.
• Considering establishment of a deciduous stand for the next rotation where site characteristics are appropriate.
• Single trees selected for retention will have no visible infections and will be at least 10 meters from any visually infected tree.
• Maps outlining the incidence of root rot are kept on file when a detailed survey has been completed.
• Potential root-rot treatments by incidence level are:
  - Strata with very low to low (0% - 5%) incidence rates usually do not warrant treatment.
  - Strata with moderate levels of root-rot (6% - 15%), individual centers may be treated by stumping, or planting of alternate coniferous/deciduous species.
  - Strata with high or very high incidence rates (High = 16%-30%, VH = >30%), the entire stratum is usually treated as a single root rot center. Areas of concentrated root rot are generally felled. Root rot areas with gentle topography may be stumped post-harvest. Steeper areas and smaller dispersed centers are usually planted with alternate species that are more resistant to root rot than Fd.

**Windthrow Control**

Today’s small cutblock sizes and variable retention reserves within cutblocks expose more timber edge to potential damage from strong wind events. The strategy to minimize losses due to windthrow includes:

• Assessment of susceptibility to windthrow and application of the PAFO Windthrow Management Strategy.
• Determining the natural windthrow factors associated with a particular cutblock design (e.g., cutblock size, stand characteristics, soil properties, location and orientation to expected winds) at the site plan stages based on knowledge of historic wind patterns and assessments. Wind firmness is also a key factor guiding selection of groups and individual trees for in-stand retention.
• Determining the potential extend of windthrow associated with a particular cutblock if no mitigation is taken.
• Determining which forest management objectives may be impacted if windthrow occurs adjacent to a particular cutblock.
• Management practices are applied according to the assessed risk of windthrow. These practices may include feathering of edges, pruning of trees, leaving larger buffers around the forest resources identified to be managed, topping of trees, locating WTR in low windthrow risk areas, partial cutting, reconfiguring edges to a naturally wind firm edge, realigning boundaries to reduce the windthrow risk, partial salvage.
• Monitoring of windthrow and recovery of windthrow where practical and ecologically appropriate.
• Use of wind hazard maps.
• Training of field personnel to recognize the potential for windthrow.
Terrain Management

Terrain stability hazard mapping has been completed for the majority of the watersheds in the DFA. Areas that have not been mapped include the Walbran and Rosander areas. These areas have reconnaissance type terrain stability information such as ESA or steep slopes.

Strategies to minimize the incidence of landslides associated with harvesting include:

- Road construction methods such as full bench/end haul when building roads on unstable or potentially unstable terrain.
- Where roads are no longer required for access, deactivate and/or rehabilitate roads to reduce the risk of road failure and/or reduce site degradation.
- Identify any areas with erosion, slope stability, or sensitive soil concerns during engineering. Refer potential problem areas to a terrain specialist for a Terrain Stability Field Assessment (TSFA).
- Stabilize with grass seed and reforest slides characterized by non-consolidated (i.e. productive) material.
- Follow TSFA recommendations.
- Follow watershed terrain management strategies

Reforestation

Consistent with the silviculture management objectives, Port Alberni Forest Operation will regenerate the forest at densities that ensure full site coverage and high yields of quality timber. Port Alberni Forest Operation will bear the silviculture costs for basic silviculture in compliance with the Forest Act. Other treatments on crown land will be undertaken if government funding is available. The company expects to receive a share of the government fund proportionate to its contribution.

Species selection – Port Alberni Forest Operation bases species selection first of all on the silvicultural characteristics of the individual species and their adaptability to the particular site, including forest health considerations. The second criterion for selection is species value ranking. This is based on the company view of the wood qualities and desirability at harvest. Currently, cypress, cedar, and Douglas-fir rank highest. Species selection will be consistent with the stocking standards approved within the FSP.

Forest tree seed – Port Alberni Forest Operation attempts to maintain a five-year supply of seed for the range of species and seed zones. The priority will be for seed from the orchards of Coastal Tree Improvement Cooperative members. Where seed orchard seed may be unavailable in sufficient quantity, wild seed will be collected under supervision to ensure best quality.

Site Preparation – Anticipated site preparation necessary to renew the forest is prescribed post harvest. Site preparation methods that may be prescribed include mechanical piling or dispersal of slash, or accumulation burns and stumping. Each method is considered in terms of economics, environment, and government regulation before the optimal solution is prescribed.

Regeneration methods – Most sites are planted in order to attain early green-up, thereby freeing adjacent areas for harvest. Immediate planting is normally prescribed on highly productive sites because of the likelihood of weed invasion. Where it is anticipated that natural regeneration will not reach at least the minimal acceptable level two years before the end of the regeneration delay period, planting will be prescribed. Planting will also become increasingly prevalent in advanced growth amabilis stands within areas of balsam woolly adelgid.
Free growing assessment – The normal assessment regime for each site prior to claiming free growing status is:

- A post-harvest survey confirms whether or not the prescribed treatments regarding slash loading and disposal, site preparation, regeneration method, and timing still apply.
- Where natural regeneration has been prescribed, a stocking survey is made at least two years prior to the end of the regeneration delay period. If it appears the target will not be met, planting will be undertaken.
- A survival survey generally occurs about one year after planting. If necessary, a fill plant or a replant is scheduled.
- A regeneration performance survey is made to confirm stocking status after the survival survey and before the free growing survey. If needed, fill planting, weed control, and/or another assessment is scheduled.
- A final free growing survey is carried out near the end of the late free growing period.

### Road Building and Maintenance

Road building Standard Operating Procedures document plans/strategies for road construction and maintenance and for road deactivation. General strategies for the maintenance of roads include recapping, grading, adding or replacing culverts, roadside brushing, ditching short sections of road, applying dust control, bridge replacement, minor resurfacing and development of pits and quarries.

All permitted roads and bridges meet legislative requirements. New bridges and major stream crossings are reviewed by qualified professionals.

Where existing non-permitted roads are required for harvesting they are permitted and brought up to standard.

### Site Restoration

Roads and landings are maintained or deactivated according to the conditions of the Road Permit unless needed for other purposes. Backspar trails, abandoned roads and, as necessary and appropriate, exhausted or unused gravel pits, and log landings are restored by such techniques as ripping, return of spoil, spreading of debris, construction of anti-erosion barriers, and sowing of grass seed.

Non-permitted roads that predate the FPC are rated for urgency of restoration based on an evaluation of environmental risk and work is undertaken as government funding is granted.

### Soil Conservation

The DFA experiences some of the highest rainfall events in North America. Where these high rainfall events occur on steep terrain, there is potential for landslides and surface soil erosion. Inventories of areas of potential terrain instability have been completed for most of the DFA. Terrain stability mapping and evaluations of surface erosion potential have also been completed for most of the watersheds in the DFA. The issues are:

- Potentially unstable terrain — Landslides are a natural and inevitable phenomenon that contributes to the evolution of the landscape. Although landslides occur in both logged and unlogged terrain, logging and road building can increase their frequency. Impacts of landslides include acceleration of sediment delivery to streams, possible damage to fish and invertebrate habitat and productivity, loss of productive forest site, unsightly scars, and damage to roads, culverts, and bridges.
Surface soil erosion — Surface soil erosion is the wearing away of the earth’s surface by water, wind, and gravity and includes rill and gully erosion. “Accelerated” erosion, in excess of “geologic” erosion, results from human activities. Accelerated erosion causes on-site impacts (soil loss, nutrient loss, lower productivity) and off-site impacts (water quality, sedimentation, and habitat).

Soil disturbance — certain soil types are sensitive to disturbance from road building and yarding activities. If these sensitive sites are not identified in advance of forest development, then soil compaction, poor drainage, puddling, and soil displacement can result in loss of productive forest sites.

Port Alberni Forest Operation’s strategy for soil conservation is:

- Complete harvest plans in accordance with the Terrain Risk Management Strategy.
- Assess all sensitive terrain prior to road construction or harvesting to evaluate terrain stability and provide recommendations on:
  - whether or not development should proceed,
  - best road and cutting boundary locations or changes to proposed layout or road alignment,
  - riparian management areas,
  - possible mitigative actions and criteria,
  - road construction or harvesting constraints, and
  - Special road construction or harvesting techniques.
- Inspect drainage ditches and culverts regularly and take preventative measures to minimize the potential for debris flow initiation and soil erosion.
- Deactivate roads that are no longer needed for management access, forest protection, or other purposes.
- Identify potentially unstable (sensitive) sites.
- Where ground based harvesting is proposed, carry out site sensitivity assessments for soil compaction, soil displacement, surface soil erosion, and forest floor displacement.
- Where it is practical and economic, reduce the amount of permanent site degradation below 7%.
- De-activate roads that are not important for the road network.
- Carry out internal and external audits to evaluate road building practices and stream management.
Water Conservation

It is important to understand the type and extent of current, water-related problems in a watershed and to recognize the possible hydrologic impacts of proposed forestry-related development. Potential hydrologic impacts are of critical importance in community watersheds and in watersheds with high fisheries values. The fishery resource value is generally high and protection of fish habitat and water quality ranks as a significant priority. The issues are:

- **Quality** — the quality of water is determined by drinking water standards in a community watershed and by aquatic standards in watersheds with high fisheries values. In both types of watersheds, sediment input and delivery and herbicide and fertilizer applications are the primary concerns.
- **Quantity** — the hydrologic impact on water quantity from forest development is primarily focused on the timing of flow and potential changes to peak flows.

Port Alberni Forest Operation’s strategy for water conservation is:

- Develop operating guidelines in consultation with appropriate local, provincial or federal authorities, or follow the provisions of approved watershed development plans where a watershed supplies water for community use or where fish values are paramount.
- Locate, design, construct, and maintain roads, bridges, and culverts to preserve natural drainage patterns and to minimize impacts on water quality and quantity.
- Develop and implement road deactivation plans to minimize impacts on streams. Where necessary, grass seed, and/or plant seedlings to reduce erosion and sedimentation hazards.

Riparian Management

Riparian areas are used by many species of wildlife. These areas are reserved by way of no-harvest areas along streams. Generally, larger streams have greater levels of retention. Retention of trees may also be required where a stream is dependent on large woody debris for channel stability and/or stream bank stability.

The Riparian Management Area (RMA) consists of a Riparian Management Zone (RMZ), and where required, a Riparian Reserve Zone (RRZ). The widths of the RMAs are determined by the attributes of the adjacent riparian feature. Attributes such as gradient, fish presence, width of stream, and size of wetland may impact the size of the RMA and the requirement for a RRZ.

Riparian management strategies include:

- Wherever possible, locate road to avoid RMAs.
- Propose road locations through RMAs where no other option exists, or locating the road outside the RMA would create a higher risk of sediment delivery to streams.
- Vary retention specifications for RMZs according to site conditions.
- Undertake professional assessments as necessary.
- Incorporate recommendations of assessments into Harvest Instructions.

Strategies to protect fish habitat and non-fish streams may include:

- Basal area retention in RMZs based on riparian class and site-specific conditions.
- Partial cutting silviculture systems or no harvest buffers.
- Selecting trees to retain to reduce the risk of windthrow and to protect wildlife values.
Where there are significant concerns about windthrow in the RMZ: extend the boundaries of the RMZ to a windfirm boundary; eliminate sharp corners or indentation from the outer boundary of the RMZ; and/or use edge stabilization treatments including feathering, pruning, or topping.

- Additional practices such as: retention of all non-merchantable conifer trees, understory deciduous trees, shrubs, and herbaceous vegetation within 5m of the channel to the fullest extent possible; retention of wildlife trees; falling and yarding away; removal of introduced tops and small woody debris; felling of shallow rooted, windthrow-prone leaners across the stream so that the butt clears the channel or the stem spans both streambanks. Stems will be removed from the stream if it can be done without damage to the channel or bank and in compliance with the Fisheries Act.

**Contributions to Global Ecological Cycles**

Port Alberni Forest Operation’s economic objective is to realize the highest net value of timber from the forest on a safe and sustainable basis, while meeting the requirements for protection and/or conservation of other forest-based resources.

Variations in site conditions will ensure a diversity of stand conditions and hence a wide range of species, ages, and size of logs. Factors that contribute to this variability across the forest landscape include variations in site productivity and ecological type. They also include specific management requirements for different forest values.

**Forest Growth and Yield Plan**

Growth and Yield work continues, subject to government funding. Partially funded studies include:

- The establishment and measurement of one large scale (80 ha) and several edge studies examining the effects of different amounts and patterns of variable retention on growth of the next crop. A small pilot project will be undertaken to monitor (through random samples) the effects of variable retention on growth.
- A core of treated and natural permanent sample plots will be measured on a 10-yr cycle.
- A light model has been developed to examine the impact of variable retention on yield and a moisture sub-model is being developed.

**Benefits to Society**

Port Alberni Forest Operations will meet overall societal goals related to sustaining key social and ecological values, while harvesting the approved Annual Allowable Cut as required under the Forest Act.

Port Alberni Forest Operation demonstrates its commitment to these goals through Management and Forest Development and through the conduct of logging and other activities in accordance with approved plans and prescriptions. Through implementation of the Western Forest Strategy the company is committed to performance results of a higher standard than those required by law. The Forest Strategy includes, among other aspects, a transition to ecologically-based silviculture systems, increased old growth conservation, and expanded public consultation such as that conducted in writing this SFM Plan.
Forest Recreation

One objective is to periodically revise recreational value ratings or conduct new inventories to incorporate changes in value perceptions or management guidelines.

Consistent with government standards, the Port Alberni Forest Operation’s strategy is to:

- Identify new, significant recreational attractions in the course of inventory or development work and protect them.
- Cooperate with government and authorized caving organizations to protect cave entrances and underground cave features and assist in the management of public access.

A recreation analysis was completed in July 2002. Port Alberni Forest Operation has, in consultation with appropriate government staff in region and district offices, completed an update of all recreation resource inventories, including available information on cave/karst features to the end of 1996.

- Account for recreation in operational harvest plans and timber supply analyses.
- The recreation resource inventory was updated in 2001.
- The Recreation Sector (WIWAG) produced a "Recreation Access Inventory". It is posted on the Advisory Group's website.

Visual Landscape Management

Major visual landscape management issues in the DFA are associated with public travel corridors, settlements, parks and recreation use areas, and with addressing anomalies in the existing visual landscape database.

Forest harvesting and other operations will be managed to achieve established visual objectives. Port Alberni Forest Operation will work with government specialists to manage visual landscapes more efficiently – that is, to minimize impacts on timber supply while retaining visual values. This will include:

- Incorporating principles of landscape design in the planning process in areas of high visual sensitivity.
- Recognizing demand as well as supply when assessing appropriate standards for managing visual landscapes.
- Applying silviculture strategies to reduce the time to achieve visually effective green-up.

Road Access

Recreation users are very concerned about road access to preferred recreation areas. The recreation use of these areas is considered during development of deactivation plans. The goal is to balance environmental risk and recreation access. The objective is to maintain vehicle access to areas of high recreation use, while minimizing environmental risks.

Roads may be gated if there is equipment in the area to protect from vandalism, for safety concerns if timber is partially felled, or to control access to Provincial and National parks.

Strategies to address road access for recreation include:

- Identifying potential and known recreational use areas in the TFL.
- Maintaining established recreation areas with participation from government.
• Working with recognized caving organizations to protect cave entrances and underground features. Protect cave entrances and underground features by:
  - Restricting falling and yarding.
  - Altering blasting or road building techniques.
  - Excluding sensitive areas from harvesting.
  - Using water management techniques.
  - Using slash management practices.
• Developing site-specific measures to address recreation concerns.
• Seeking advice from the government where public comments indicate there are recreation concerns.
• Where the recreation resource is temporally sensitive, operate within timing windows where practicable. For example, harvesting may be restricted to off-peak periods of use where noise could detract from a wilderness experience such as hiking on the West Coast Trail. Site-specific factors as well as economic impacts are considered when determining if harvest can be delayed to periods of low recreational use.
• It may be necessary to adjust or relocate established trails to accommodate harvesting. Contact, seek input, and incorporate feedback from local recreation groups, individuals who have expressed an interest during the public review process, and government.
• Rehabilitating significant trails post-harvest.

First Nations

First Nations living in communities adjacent to Port Alberni Forest Operations or having traditional territories that encompass the DFA are provided opportunities for forest management involvement and economic benefits through:
• Information sharing in planning and in communication of forestry practices and planned activities.
• Employment opportunities in forest management activities subject to constraints of existing labour agreements. Section 6.2.2 of the Maa-nulth Final Agreement provides for each Maa-nulth First Nation to enter into arrangements for economic opportunities with third parties provided the arrangements are consistent with the Agreement.

Public Information and Involvement

In keeping with the expressed interest of the public in all aspects of forest resource inventory, management, and use, Port Alberni Forest Operations:
• Identifies and advises local and other involved public interest groups, local governments, First Nations, and interested individuals of opportunities for input to the various planning processes and solicits their feedback.
• Advertises and holds public information meetings to enable any member of the public to view and respond to Management Plan proposals and current performance.
• Financially supports and participates fully in activities of the West Island Woodlands Advisory Group. WIWAG is a facilitated, independent, broad-based community group formed with the express objectives of providing advice to Port Alberni Forest Operation on appropriate goals for sustainable forest management and of assessing and commenting on Port Alberni Forest Operation’s performance with respect to those goals.
Forest Monitoring & Research

The overall company objective in forest research is to obtain the knowledge to improve forest management and the conservation and protection of other forest resources and values. The strategy is to:

- Identify and recommend basic and applied research needs to the organizations that have the specific mandate to undertake the work.
- Prepare and submit research proposals for funding programs for projects of particular or strategic concern to the TFL 44 license area.
- Cooperate with research organizations in conducting basic and applied research.
- Test and develop practicable applications and uses of published research that are relevant to Western Forest Products management goals and responsibilities.

Significant areas of research include:

- Forest Ecology – The objectives of the forest ecology research program are to determine the effects of management activities on forest ecosystems, to improve our ability to predict ecosystem response, and to develop biologically sound silviculture prescriptions.
- Silviculture – The silviculture research program focuses on examining silvicultural practices for regeneration through a combination of planting and natural regeneration. Various trials—some with over 20 years of monitoring—examine species, stock types, prescribed burning, mechanical site preparation, vegetation control and fertilization.
- Forest Growth and Yield – The aim of this program is to quantify forest growth and yield across the range of site conditions on the company’s tenure. A recent focus of plot establishment has been to examine the impact of variable retention harvesting and edge effects on early establishment and growth.

Monitoring and research projects in which Western Forest Products is active in 2013 include:

Variable Retention Adaptive Management (VRAM)
- (R1163), Klanawa (R1217) Forest Structure Experimental Sites
- Regeneration performance
- Avian communities, carabid beetles, terrestrial gastropods, small streams

Salal Cedar Hemlock Integrated Research Program (SCHIRP)
- Suquash drainage trial – sulphur fertilizer effects (2013 – UBC Grayston – $WFP, $NSERC)
- SCHIRP installation, Transition trials, Kennedy Lake trials, Demonstration trials, Vaccinium trials
- Ecosystem function: mycorrhizal communities, carbon sequestration, soil moisture

Species at Risk
- Northern goshawk site monitoring, genetics (2013 – Manning – $WFP)
- Marbled murrelet habitat quality (2013 – SFU Lank – CFPA)
- Owl population monitoring (2013 – Matkoski – $WFP)
- Old-growth speckle-bellied lichen manuscript (2013 – VIU Beese – $WFP)
- Species Accounting System
- Breeding birds
Silviculture Strategies & Best Practices

- Climate change strategies and mitigation (2013 – VIU Beese – $WFP)
- Regeneration trials
- Cold storage trials
- Fertilization-at-planting trials
- Western red cedar – western hemlock sapling fertilization trials (2013 – MFLNRO Negreve – $MFLNRO)

Seed Orchard Pollination Dynamics

- Douglas-fir pollen dynamics
- Western red cedar pollen dynamics

Seed Orchard Pest Management


Tree Improvement studies

- Yellow cypress genetic analysis manuscript (2013 – Bultunis et al – $TIB)
- Yellow cypress clonal rootability (2013 – Cook – $WFP, $OTIP)

Growth and Yield

- LiDAR Enhanced Forest Inventory Project – TFL 6 (2013 – $WFP)
- Espacement
# Glossary

## Acronyms

<table>
<thead>
<tr>
<th>Acronym</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>AAC</td>
<td>Annual Allowable Cut</td>
</tr>
<tr>
<td>ADSS</td>
<td>Alberni District Secondary School</td>
</tr>
<tr>
<td>AIA</td>
<td>Archaeological Impact Assessment</td>
</tr>
<tr>
<td>AOA</td>
<td>Archaeological Overview Assessments</td>
</tr>
<tr>
<td>BEC</td>
<td>Biogeoclimatic Ecosystem Classification</td>
</tr>
<tr>
<td>BEO</td>
<td>Biodiversity Emphasis Option</td>
</tr>
<tr>
<td>CHR</td>
<td>Cultural Heritage Resources</td>
</tr>
<tr>
<td>CFS</td>
<td>Canadian Forest Service</td>
</tr>
<tr>
<td>CMT</td>
<td>Culturally Modified Tree</td>
</tr>
<tr>
<td>CRP</td>
<td>Cultural Referral Process</td>
</tr>
<tr>
<td>CSA</td>
<td>Canadian Standards Association</td>
</tr>
<tr>
<td>CWAP</td>
<td>Coastal Watershed Assessment Procedure</td>
</tr>
<tr>
<td>CWD</td>
<td>Course Woody Debris</td>
</tr>
<tr>
<td>CWS</td>
<td>Community Watersheds</td>
</tr>
<tr>
<td>EBITA</td>
<td>Earnings before Interest, Taxes, Depreciation &amp; Amortization</td>
</tr>
<tr>
<td>EMS</td>
<td>Environmental Management System</td>
</tr>
<tr>
<td>ESA</td>
<td>Environmentally Sensitive Areas</td>
</tr>
<tr>
<td>EVC</td>
<td>Existing Visual Condition</td>
</tr>
<tr>
<td>DFA</td>
<td>Defined Forest Area</td>
</tr>
<tr>
<td>DWR</td>
<td>Deer Winter Range</td>
</tr>
<tr>
<td>FC</td>
<td>Falling Corner</td>
</tr>
<tr>
<td>FEN</td>
<td>Forest Ecosystem Network</td>
</tr>
<tr>
<td>FG</td>
<td>Free Growing</td>
</tr>
<tr>
<td>FIA</td>
<td>Forest Investment Account</td>
</tr>
<tr>
<td>FPC</td>
<td>Forest Practices Code</td>
</tr>
<tr>
<td>FPPI</td>
<td>Forest Practice Planning Regulation</td>
</tr>
<tr>
<td>FRPA</td>
<td>Forest and Range Practices Act</td>
</tr>
<tr>
<td>FSP</td>
<td>Forest Stewardship Plan</td>
</tr>
<tr>
<td>GIS</td>
<td>Geographic Information System</td>
</tr>
<tr>
<td>GPS</td>
<td>Global Positioning System</td>
</tr>
<tr>
<td>HCV</td>
<td>High Conservation Value</td>
</tr>
<tr>
<td>ILMB</td>
<td>Integrated Land Management Bureau</td>
</tr>
<tr>
<td>ISO</td>
<td>International Organization for Standardization</td>
</tr>
<tr>
<td>LRSY</td>
<td>Long Run Sustained Yield</td>
</tr>
<tr>
<td>LTBL</td>
<td>Long Term Harvest Level</td>
</tr>
<tr>
<td>LTRP</td>
<td>Landscape Side Impact Routine Planning</td>
</tr>
<tr>
<td>LUC</td>
<td>Landscape Unit of Credibility</td>
</tr>
<tr>
<td>MC</td>
<td>Map Check</td>
</tr>
<tr>
<td>MTM</td>
<td>Management Treatment Map</td>
</tr>
<tr>
<td>MTA</td>
<td>Management Treatment Assignment</td>
</tr>
<tr>
<td>MOE</td>
<td>MoE BC Ministry of Environment</td>
</tr>
<tr>
<td>MoF</td>
<td>BC Ministry of Forests and Range</td>
</tr>
<tr>
<td>MP</td>
<td>Management Plan</td>
</tr>
<tr>
<td>NSC</td>
<td>Not Sufficiently Restocked</td>
</tr>
<tr>
<td>NTFP</td>
<td>Non-Timber Forest Product</td>
</tr>
<tr>
<td>OGMA</td>
<td>Old Growth Management Area</td>
</tr>
<tr>
<td>PMP</td>
<td>Pest Management Plan</td>
</tr>
<tr>
<td>RG</td>
<td>Regen</td>
</tr>
<tr>
<td>RMA</td>
<td>Riparian Management Area</td>
</tr>
<tr>
<td>RMZ</td>
<td>Riparian Management Zone</td>
</tr>
<tr>
<td>RRZ</td>
<td>Riparian Reserve Zone</td>
</tr>
<tr>
<td>SEI</td>
<td>Sensitive Ecosystem Inventory</td>
</tr>
<tr>
<td>SFM</td>
<td>Sustainable Forest Management</td>
</tr>
<tr>
<td>SFMP</td>
<td>Sustainable Forest Management Plan</td>
</tr>
<tr>
<td>SMZ</td>
<td>Special Management Zone</td>
</tr>
<tr>
<td>SOP</td>
<td>Standard Operating Procedure</td>
</tr>
<tr>
<td>SP</td>
<td>Silviculture Prescription (pre Dec 17-02) Site Plan (post Dec 17-02)</td>
</tr>
<tr>
<td>SU</td>
<td>Standards Units</td>
</tr>
<tr>
<td>SUP</td>
<td>Special Use Permits</td>
</tr>
<tr>
<td>TEK</td>
<td>Traditional Ecological Knowledge</td>
</tr>
<tr>
<td>TFL</td>
<td>Tree Farm License</td>
</tr>
<tr>
<td>TSFA</td>
<td>Terrain Stability Field Assessment</td>
</tr>
<tr>
<td>TUS</td>
<td>Traditional Use Study or Traditional Use Site</td>
</tr>
<tr>
<td>UWR</td>
<td>Ungulate Winter Range</td>
</tr>
<tr>
<td>VQO</td>
<td>Visual Quality Objective</td>
</tr>
<tr>
<td>VR</td>
<td>Variable Retention</td>
</tr>
<tr>
<td>WHA</td>
<td>Wildlife Habitat Area</td>
</tr>
<tr>
<td>WIT</td>
<td>West Island Timberlands</td>
</tr>
<tr>
<td>WIWAG</td>
<td>West Island Woodlands Advisory Group</td>
</tr>
<tr>
<td>WLAP</td>
<td>BC Ministry of Water, Land and Air Protection (now the Ministry of Environment)</td>
</tr>
<tr>
<td>WTP</td>
<td>Wildlife Tree Patch</td>
</tr>
</tbody>
</table>
Definition of terms

Aboriginal: “aboriginal peoples of Canada’ [which] includes Indian, Inuit and Métis peoples of Canada” (Constitution Act 1982 s35(2)).

Aboriginal Right: “in order to be an Aboriginal right an activity must be an element of a practice, custom, or tradition (or an element thereof) integral to the distinctive culture of an Aboriginal group claiming that right”. [R. v. Van der Peet, 1996].

Aboriginal Title: “is a right to the land itself, is a collective right to the land held by all members of an aboriginal organization. …encompasses the right to use the land pursuant to that title for a variety of purposes, which need not be aspects of those aboriginal practices, cultures and traditions which are integral to the distinctive aboriginal cultures”. [Delgamuukw v. British Columbia, 1997].


Adaptive Management: a learning approach to management that recognizes substantial uncertainties in managing forests and incorporates into decisions experience gained from the results of previous actions.

Allowable Annual Cut (AAC): The allowable rate of timber harvest from a specified area of land. The Chief Forester of British Columbia sets AACs for timber supply areas (TSAs) and tree farm licenses (TFLs) in accordance with Section 8 of the Forest Act.

At-risk species: See Species at-risk.

Biodiversity Emphasis Option (BEO): The provincial government assigns low, intermediate, or high BEOs to Landscape Units depending on a range of management priorities (i.e. timber production, wildlife habitat and biodiversity conservation). The main result is a designation of the area of old growth forest that should be maintained in the Landscape Unit.

Biogeoclimatic Ecosystem Classification (BEC): Developed in BC in 1965, the BEC System classifies areas of similar regional climate, expected climax plant communities and site factors such as soil moisture and soil nutrients. The subzone is the basic unit of this classification system. Within subzones, variants further identify more local climatic factors. A handbook can be obtained from http://www.for.gov.bc.ca/hfd/pubs/docs/lmh/lmh28.htm/

Biogeoclimatic zone: a geographic area having similar patterns of energy flow, vegetation and soils as a result of a broadly homogenous macroclimate.

Biogeoclimatic variant: A unit of ecosystem classification reflecting differences in regional climate resulting in differences in vegetation, soil and ecosystem productivity. (See Biogeoclimatic Ecosystem Classification).

Biological diversity: The diversity of plants, animals, and other living organisms in all their forms and levels of organization, including genes, species, ecosystems, and the evolutionary and functional processes that link them.

Biomass: the total amount (mass) of living matter in a given ecosystem, population, or sample. Note: In the context of sustainable forest management, biomass usually refers to plant matter.

Blue-listed: Refers to plants, animals, and plant communities assessed by the BC Conservation Data Centre or COSEWIC to be vulnerable.

Carbon budget: Account of carbon concentrations in cycles and sinks.
CENGEA: Provides resource planning and management software solutions for: Forestry; Agriculture; Bioenergy; Environment & Land Conservation  http://www.cengea.com/

Chief Forester: the assistant deputy minister of the deputy minister of the Ministry of Forests who is responsible for determining allowable annual cuts (AACs).

Coarse Woody Debris: all large deadwood in various stages of decomposition. Note: Coarse woody debris includes standing dead trees, fallen wood, stumps, and roots.

Coastal Watershed Assessment Procedure (CWAP): Assesses the impacts of forest practices on the hydrologic regime of a watershed. In particular, the potential for changes to peak stream flows, accelerated landslide activity, accelerated surface erosion, channel bank erosion and changes to channel morphology as a result of logging the riparian vegetation, and changes to the stream channel interaction from all these processes are assessed.

Compliance: the conduct or results of activities in accordance with legal requirements.

Conformance: meeting non-legal requirements such as policies, work instructions or standards (including the CSA standard).

Connectivity: A qualitative term describing the degree to which late successional ecosystems are linked to one another to form an interconnected network.

Criterion: Under the CSA standard for sustainable forest management, one of six distinguishable SFM characteristics (as defined by the Canadian Council of Forest Ministers: Defining Sustainable Forest Management: A Canadian Approach to Criteria and Indicators, Ottawa, 1995); also, a value that must be considered in setting objectives and in assessing performance.

Critical Element: Under the CSA standard for sustainable forest management, a subsidiary component of a criterion. (See criterion.).

Cultural heritage resource (CHR): An object, a site or the location of a traditional societal practice that is of historical, cultural or archaeological significance to the province, a community or an aboriginal people. Cultural heritage resources include archaeological sites, structural features, heritage landscape features and traditional use sites.

Culturally Modified Tree (CMT): Tree that has been altered by native people as part of their traditional use of the forest.

Cutblock: Defined in the Forest Practices Code of British Columbia Act as a specific area of land identified on a forest development plan, or in a license to cut, road permit, or Christmas tree permit, within which timber is to be or has been harvested. (Also see opening.)

Defined Forest Area (DFA): a specific area of forest, including land and water (regardless of ownership or tenure) to which the requirements of the CSA standard apply. The DFA may or may not consist of one or more contiguous blocks or parcels.

DFA-related Worker: any individual employed by the organization to work for wages or a salary who does not have a significant or substantial share of the ownership in the employer’s organization and does not function as a manager of the organization.

EBITDA: stands for “Earnings Before Interest, Taxes, Depreciation, and Amortization”. The equation for calculating EBITDA is: EBITDA = Sales - Cost of Goods Sold (excluding depreciation) - Overhead Costs. Another way to think of EBITDA is that it is a rough measure of the cash flow being generated by an operating unit.

Ecosystem: A functional unit consisting of all the living organisms (plants, animals and microbes) in a given area, and all the non-living physical and chemical factors of their environment, linked
together through nutrient cycling and energy flow. An ecosystem can be of any size – a log, pond, field, forest, or the earth’s biosphere – but it always functions as a whole unit.

**Element:** the subcategory used to define the scope of each SFM criterion. Note: Each SFM criterion contains several elements. The SFM elements were derived from the national-scale elements developed by the CCFM for more specific local applications.

**Environmentally Sensitive Area (ESA):** Area requiring special management attention to protect important scenic values, fish and wildlife resources, historical and cultural values, or other natural systems or processes. ESAs include unstable soils that may deteriorate unacceptably after harvesting, and areas of high value to non-timber resources such as fisheries, wildlife, water and recreation.

**Environmental Management System (EMS):** A structured system for identifying and ranking the environmental risk associated with management activities; creating and implementing control methods to manage that risk; monitoring and assessing performance; and taking corrective action to address deficiencies under a continual improvement program.

**Focal species:** species that warrant special conservation attention and are thus used to guide the management of ecosystems to conserve biodiversity. Note: Criteria for the selection of focal species can include ecological, socio-cultural, scientific, and economic considerations.

**Forecast:** An explicit statement of the expected future condition of an indicator.

**Forest influence area:** The area within an opening that is within one tree height of a timber edge.

**Forest Investment Account (FIA):** Successor program to Forest Renewal BC.

**Forest and Range Practices Act (FRPA):** The Forest and Range Practices Act and its regulations govern the activities of forest and range licensees in B.C. The statute sets the requirements for planning, road building, logging, reforestation, and grazing. FRPA and its regulations took effect on Jan. 31, 2004.

**Forest Stewardships Plan (FSP):** Under the Forest and Range Practices Act and its regulations, all major tenure holders – companies, groups or individuals with logging rights on Crown land – must prepare a forest stewardship plan. The FSP is the cornerstone of the results-based approach governing forest practices under the Act. In their plans, tenure holders must state explicitly how they will address government objectives for key forest values, such as soils and wildlife. These proposals are the “results” of the results-based framework. A FSP must address objectives set by government to preserve the integrity of the environment and to enable sustainable commercial forest and rangeland practices. Tenure holders address these objectives by crafting results or strategies, which are required to be measurable and enforceable, contributing to effective compliance and enforcement by government.

**Fragmentation:** The process of transforming large continuous forest patches into one or more smaller patches surrounded by disturbed areas. This occurs naturally through such agents as fire, landslides, windthrow and insect attack. In managed forests timber harvesting and related activities have contributed to fragmentation. (Also see Connectivity).

**Free Growing:** A stand of healthy trees of commercially valuable species, the growth of which is not impeded by competition from plants, shrubs or other trees. Silviculture regulations further define the exact parameters that a stand of trees must meet (such as species, density and size) to be considered free growing.

**Genetically modified organism (GMO):** an organism that, through human intervention in a laboratory, has had its genome or genetic code deliberately altered through the mechanical insertion of a specific identified sequence of genetic coding material (generally DNA) that has been...
either manufactured or physically excised from the genome of another organism. Note: Genetic modification can be used to alter a wide range of traits, including insect and disease resistance, herbicide tolerance, tissue composition, and growth rate (adapted from Alberta Forest Genetic Resources Council statement).

**Goal:** A broad, general statement that describes a desired state or condition related to one or more forest values.

**Green-up:** A reforested cutblock with a stand of trees that has attained the height specified in a higher level plan for the area or that, in the absence of a higher level plan, has attained a height of at least 3 meters is said to have achieved green-up.

**Guidebook:** Guidebooks consist of guidelines and recommendations on how to best achieve the requirements of the Forest Practices Code. They are not legally enforceable. However, specifications and procedures recommended by the guidebooks may be incorporated into plans, prescriptions and contracts in which case those specifications and procedures may become legally enforceable.

**High Conservation Value (HCV) area:** An area in which the conservation of any of numerous social or ecological values is deemed to have an especially high priority. Harvesting in HCV areas is typically very restricted and depending on the nature of the identified value(s) may be precluded entirely. Identification of HCV areas may result from information supplied by First Nations, government agencies, company personnel or other stakeholders. (See Environmentally Sensitive Area).

**Hoe-Chucking:** A hoe-chucking operation is where a machine picks up the logs and moves them over the ground so there is little or no ground disturbance.

**Indicator:** A measurable variable used to report progress toward the achievement of a goal.

**Inoperable lands:** Lands that are unsuited for timber production by virtue of their: elevation; topography; inaccessible location; low value of timber; small size of timber stands; steep or unstable soils that cannot be harvested without serious and irreversible damage to soil or water resources; or designation as parks, wilderness areas, or other uses incompatible with timber production.

**Invasive alien species:** plants, animals, or micro-organisms that have been introduced by human action outside their natural past or present distribution, and whose introduction or spread threatens the environment, the economy, or society, including human health. [CFIA, 2006]

**ISO standard:** Refers to ISO 14001, a generic international standard approved by the International Organization for Standardization to provide any organization with the elements of an effective Environmental Management System to support environmental protection and prevention of pollution.

**Landing:** An area modified as a place to accumulate logs before they are transported.

**Landscape level:** A watershed, or series of interacting watersheds or other natural ecological units. This term is used for conservation planning and is not associated with visual landscape management.

**Landscape unit:** For the purpose of the forest practices code, landscape units are planning areas delineated on the basis of topographic or geographic features. Typically they cover a watershed or series of watersheds, and range in size from 5000 to 100 000 ha.

**Localized populations:** Typically exhibit a gene pool that is distinct from less isolated populations.
Long Run Sustained Yield (LRSY): Maximum harvest level that can be sustained in perpetuity, based on harvesting at the age of culmination of mean annual increment and considering management assumptions.

Maa-Nulth Treaty: The treaty will bring certainty with respect to each Maa-nulth First Nation’s rights to use, own and manage lands and resources throughout its claimed traditional territory. It will provide the Maa-nulth First Nations with modern governance tools to build strong and workable relationships with other governments, including federal, provincial and local governments. [http://www.maanulth.ca/]

Mature forest: Stands of timber where the age of the leading species is greater than the specified cutting age. Cutting ages are established to meet forest management objectives.

MIR (Medical Incidence Rate): A recordable measure for which an employee receives first aid, medical aid, or medical treatment for a workplace incident that results in the employee unable to return to their regular duties or is required to performed restricted duties on the advice of a physician. Incidents resulting from a pre-existing injury or for unspecified pain management are not included in the MIR.

Migratory bird: the sperm, eggs, embryos, tissue cultures, and other parts of a migratory bird as defined in the Migratory Birds Convention Act, 1994.

Native species: a species that occurs naturally in an area; a species that is not introduced.

Non-timber forest products (NTFPs): All forest products except timber, including other materials obtained from trees such as resins and leaves, as well as any other plant and animal products.

Not Satisfactorily Restocked (NSR): Productive forest land that has been denuded and has failed, partially or completely to regenerate either naturally or by planting or seeding to the specified or desired free growing standards for the site.

Old growth forest: a forest that contains live and dead trees of various sizes, species, composition and age class structure. Old-growth forests, as part of a slowly changing but dynamic ecosystem, include climax forests but not sub-climax or mid-seral forests. The age and structure of old growth varies significantly by forest type and from one biogeoclimatic zone to another. As a rough measure, forests on the BC Coast that are aged 250 years or older and exhibit few or no signs of human intervention are generally termed old growth.

Opening: Usually used synonymously with cutblock (see above) to include all of an area that has been harvested or is designated for harvesting, including the trees retained singly or in groups within the area. Less often, used to describe the actual cleared area(s) within a cutblock.

Permanent access structure: A structure, including a road, bridge, landing, gravel pit or other similar structure, that provides access for timber harvesting. It is shown expressly or by necessary implication on a forest development plan, access management plan, logging plan, and road permit or silviculture prescription as remaining operational after timber harvesting activities on the area are complete.

Productive forest: Forest land that is capable of producing a merchantable stand of timber within a defined period of time.

Protected area: an area of land and/or sea specifically dedicated to the protection and maintenance of biological diversity and of natural and associated cultural resources, and managed through legal or other effective means. [IUCN, 1994]

Provenance: The geographical area and environment to which the parent trees and other vegetation are native, and within which their genetic constitution has been developed through natural selection.
Reforestation: Establishment of a new stand of trees after harvesting or natural disturbance by either planting or natural regeneration. Before receiving approval to harvest on crown lands, a forester must submit a Silviculture Prescription describing, among other things, the manner and time frame within which reforestation will be conducted.

Red-listed: Refers to plants, animals and plant communities assessed by the BC Conservation Data Centre to be extirpated, endangered or threatened.

Reserve zones: Zones where harvesting is not permitted.

Riparian: An area of land adjacent to a stream, river, lake or wetland that contains vegetation that, due to the presence of water, is distinctly different from the vegetation of adjacent upland areas.

S1-6 stream: Stream classification system for riparian management. S1 to S4 streams are fish streams or streams in a community watershed. S5 and S6 streams are not fish streams and are not in a community watershed. Each class also denotes a range of stream width: S1 is >20m, S2 is >5-20m, S3 is 1.5-5m and S4 is <1.5m; for streams that are non-fish bearing or not within a community watershed, S5 is >3m and S6 is <3m.

Second growth: Typically younger (i.e., less than 120 years on the BC Coast) forests that have been established by planting and/or natural regeneration after removal of a previous stand by fire, harvesting, insect attack or other cause. (See mature and old growth.)

Sensitive soils: Forest land areas that have a moderate to very high hazard for soil compaction, erosion, displacement, landslides or forest floor displacement.

Seral stage: an identifiable stage of vegetative recovery following a disturbance. Note: Disturbances include fire, blowdown, and timber harvest. Early seral is <40 years old; Mid seral is 40-80 years old in CWH zone and 40-120 years old in MH zone; Mature seral is 81-250 years old in CWH zone and 121-250 years old in MH zone; Old seral is >250 years old.

Silvics: Study of the life history and general characteristics of forest trees and stands with particular reference to site factors and population genetics. It is also the study of how trees establish, grow and behave in relation to sites, each other and other organisms.

Silviculture: The art and science of controlling the establishment, growth, composition, health and quality of forests and woodlands. Silviculture entails the manipulation of forest and woodland vegetation in stands and on landscapes to meet the diverse needs and values of landowners and society on a sustainable basis.

Silviculture Plan (SP): A site-specific integrated operational plan to carry out one or a series of silviculture treatments.

Silviculture system: A planned program of treatments throughout the life of the stand to achieve defined objectives. A silviculture system includes harvesting, regeneration and stand-tending. It covers all activities for the entire length of a rotation or cutting cycle. In BC this includes seven major categories: clearcut, patch-cut, coppice, seed tree, shelterwood, retention and selection.

Site series: A unit of ecosystem site classification that represents climatically uniform groups of ecosystems regardless of the actual vegetation residing.

Snag: A large standing dead tree.

Species at-risk: species defined as at risk by national and provincial legislation applicable to a given DFA.

Soil cover: Layer(s) of organic matter under various degrees of decomposition, which covers the mineral soil.
Species of special interest: Species deemed not at-risk whose habitat needs nevertheless require particular attention. Identification of these species is normally facilitated by regulatory agencies in consultation with stakeholders.

Stand level: Level of forest management at which a relatively homogenous land unit can be managed under a single prescription, or a set of treatments, to meet well-defined objectives.

Structural diversity: Variety of canopy layers (vertical structure) and spatial patchiness (horizontal structure).

Sustainable Forest Management (SFM): Management to maintain and enhance the long-term health of forest ecosystems, while providing ecological, economic, social, and cultural opportunities for the benefit of present and future generations.

Sustainable harvest level: the harvest level of forest products that, with consideration for ecological, economic, social, and cultural factors, leads to no significant reduction of the forest ecosystem’s capacity to support the same harvest level in perpetuity.

Target: A clear, specific statement of expected quantifiable results to be achieved within a defined period of time related to one or more objective. A target is commonly stated as a desired level of an indicator.

Timber Supply Analysis: An assessment of future timber supplies over long planning horizons (more than 200 years) by using timber supply models for different scenarios identified in the planning process.

Traditional ecological knowledge (TEK): Knowledge that aboriginal people have accumulated over countless generations of intimate contact with all aspects of local ecosystems, including plants, animals and other natural phenomena.

Value: A principle, standard, or quality considered worthwhile, desirable or otherwise important for consideration in management planning.

Variable Retention (VR): A relatively new approach to harvesting and silviculture systems that follows nature's model by always retaining part of the forest after harvesting. Standing trees are left in dispersed and/or grouped patterns to meet objectives such as retaining old growth structure, habitat protection and visual quality. Variable retention retains structural features (snags, large woody debris, live trees of varying sizes and canopy levels) as habitat for a host of forest organisms and maintains forest and residual tree influences. There are two main types of variable retention: dispersed retention, which retains individual trees scattered throughout a cutblock, and aggregate (or group) retention, which retains trees in patches of intact forest.

Visual Quality Objective (VQO): An approved resource management objective that reflects a desired level of visual quality based on the physical and sociological characteristics of the area; refers to the degree of acceptable human alteration to the characteristic landscape.

Watershed: the total land area from which water drains into a particular stream or river. [Hubbard et al., 1998].

Wildlife tree: A standing live or dead tree with special characteristics that provide valuable habitat for the conservation or enhancement of wildlife.

Windthrow: Trees uprooted as a result of wind events.

Yarding: In logging, the hauling of felled timber to the landing or temporary storage site from where trucks (usually) transport it to the mill site. Yarding methods include cable yarding, ground skidding, and aerial methods such as helicopter yarding.
References used in compiling this glossary:

BC Ministry of Forests and BC Environment.

BC Ministry of Forests and BC Environment.

BC Ministry of Forests and Range.
2006 Glossary of Forestry Terms Website:
http://www.for.gov.bc.ca/hfd/library/documents/glossary/

Canadian Maritime Regional Initiative of the Canadian FSC Working Group.

Canadian Standards Association.

Forest Stewardship Council, A.C.

Land Use Coordination Office.

Pojar, J., K. Klinka, and D.V. Meidinger.

Slope Stability Table Group.
1996. Terrain stability mapping in BC: A review and suggested methods for landslide hazard and risk mapping. BC Resources Inventory Committee

Stryd, Arnoud.