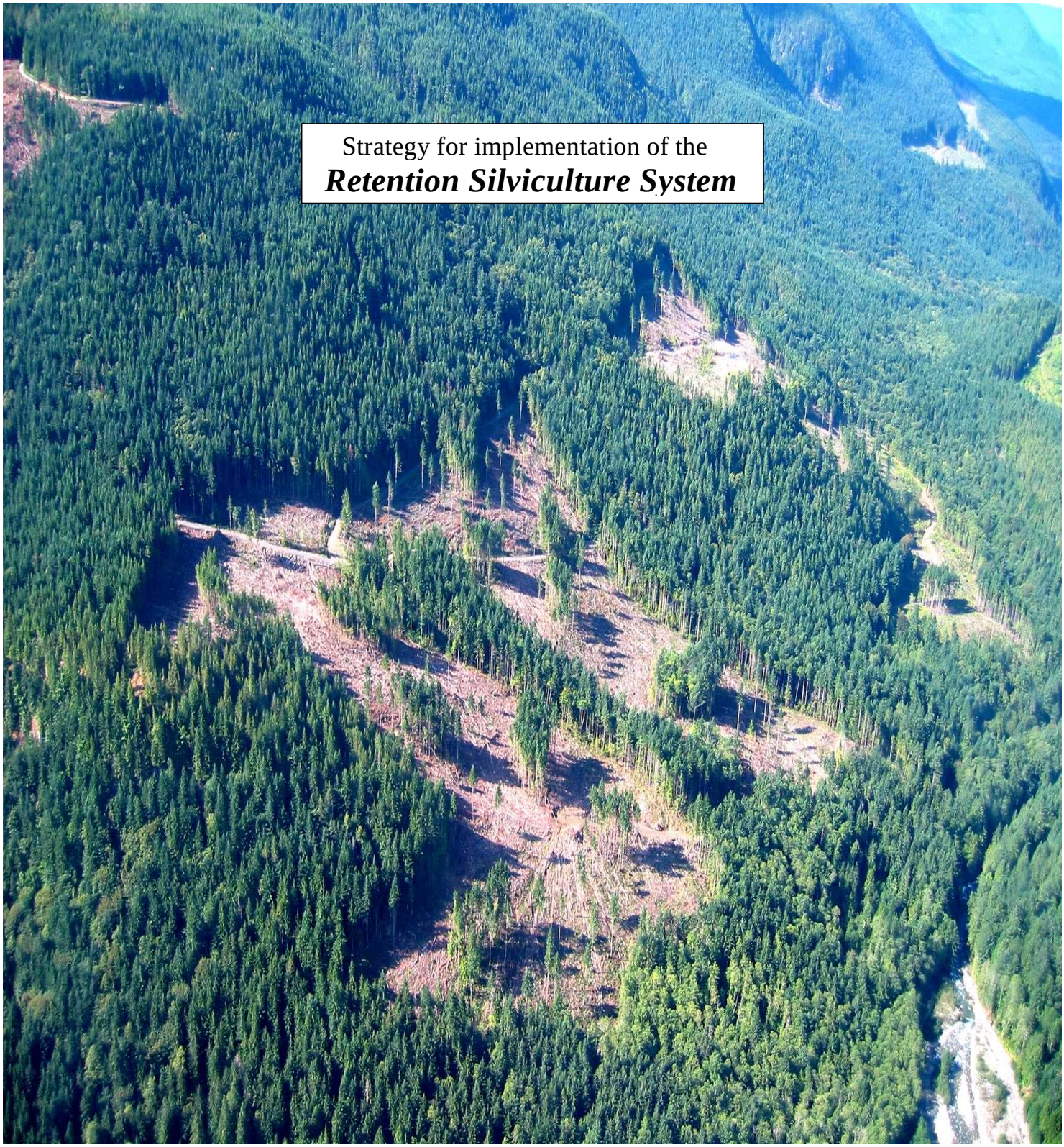
Chilliwack Forest District

B. C. Timber Sales Program



Strategy for implementation of the

Retention Silviculture System

Chilliwack Forest District Small Business Forest Enterprise Program

Strategy for implementing the RETENTION Silviculture System

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1.0 INTRODUCTION

The Chilliwack Forest District Small Business Forest Enterprise Program (CFDSBFEP) is embarking on a new strategic direction for the start of the new millennia. This direction will be consistent with regional and provincial strategic plans to provide excellence in the SBFEP. Excellence in forest management is one of the cornerstones of the new strategy a key part of our EMS Environmental Policy under ISO 14001 Certification. Retention silviculture systems are seen as a viable choice towards the goal of achieving sustainable forest ecosystems.

Retention systems were first widely promulgated in the Pacific Northwest by Dr. Jerry Franklin , U. of W. in the early 1990's. The Clayoquot Sound Scientific Panel (1995) also recommended these concepts. Franklin et. al (1997) describe in detail the concepts and rationale behind variable retention A number of forest companies in the U.S. have been practising retention harvesting for several years (eg. Plum Creek Timber Co.- Zielke, 1993) and some companies in B.C., notably MB Ltd (Weyerhauser Ltd.) are beginning to use this system. The Operational Planning Regulation was recently amended to include a definition for "Retention" silviculture system. This definition has two criteria:

1. That individual trees and/or groups of trees be maintained over the area of the cutblock for at least one rotation in order to maintain structural diversity, and
2. That more than one half of the total area of the cutblock is left 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.

A strategy for use of non-clearcut silviculture systems in the Chilliwack Forest District was developed in 1995 ("Silviculture Systems Strategy, Use of Non-Clearcut Systems , Chilliwack Forest District, September, 1995"). For a number of reasons it met with limited success. Prior to implementing this strategy the most widely applied silviculture system in the Chilliwack Forest District was **Clearcut with Reserves**. Most of the reserves have been established as Wildlife Tree Patches on the perimeter of clearcut areas and the level of retention has been set by an interim policy (D.M. letter dated December 14,

1995). Retention rates range from 10% to 18%, based on biogeoclimatic subzone or variant. The CFDSBFEP intends to apply the Retention silviculture system on a broad basis throughout most operating areas Retention rates and distribution parameters may be revised once Landscape Unit Plans/Objectives are in place. . Other non-clearcut silviculture systems will still be applied where appropriate or required. This document is intended to provide initial guidelines for implementation of this new strategy.

2.0 PREAMBLE

2.1 The Concepts of Retention

There may be any number of different reasons for retaining trees on a cutblock. Retention levels can range from 0% (eg.clearcut) to near 100% (eg. selective removal of high grade products), depending on stand level management objectives. For example, objectives may include the maintenance of specific wildlife habitat requirements (Northern Spotted Owl, deer, grizzly bear, etc.) or for fulfilling visual quality objectives. In this document we concentrate on the objective of **maintenance of ecosystem processes,** as this has a close relationship to sustainability. There are often several objectives desired for a given area. The objective with the highest retention requirement will likely fulfill other lower requirement objectives. (e.g. 70% retention objective for maintenance of Northern Spotted Owl habitat will also likely fulfill objectives such as Scenic Area management and maintenance of ecosystem processes)

Research has shown that **structural complexity** is very important to forest ecosystem maintenance. Structural complexity is lost when an area is clearcut with no reserves or retention. The structural features that are important include large diameter trees and snags (wildlife trees), coarse woody debris (on the forest floor), multiple canopy layers and canopy gaps. Franklin et. al. (1997) state that there are three main purposes for leaving biological legacies of old growth:

2.1.1 Lifeboating

The concept of keeping small islands or fingers of the pre-existing old growth functioning ecosystem from which the harvested area can be colonized (e.g. by mycorrhizal fungi, which are essential for tree growth). These "islands" also ameliorate microclimatic conditions on at least part of the cutblock (compared to clearcut conditions). The influence of residual trees is generally considered to be one tree height.

2.1.2 Structural Enrichment

The important structural features mentioned above are lost when an area is clearcut and take a relatively long time to re-establish. By retaining some area with these structures, structurally enriched stands can be maintained over most of a rotation.

2.1.3 Enhancing Connectivity

The concept of maintaining a more favourable condition on all of the managed landscape for the movement of organisms compared to the traditional approach of maintaining only corridors of old growth for their movement. If the clearcut area is the "sea", the retention patches make the sea shallower and provide "stepping stones" across it.

Given the above concepts there are four issues that need clarification:

- Exactly what structures to retain,
- how much of each of these structures to retain,
- the spatial distribution of retained areas, and
- what are the constraints to implementation.

2.1.4 What Structures to Retain?

One of the most important structures to maintain are **large diameter live trees**, especially those with distinctive features such as rot or large branches. **Wildlife trees** (snags) are of course important for existing habitat**. Coarse woody debris**, **undisturbed forest floor** and **understory species** are all

important. These structures can best be retained in a patch that has all of these present, or as many as possible. A recommended strategy is to retain a high value wildlife tree (or trees) with at least the required no-work-zone around it (them).

2.1.5 How much to retain?

There is very limited information on appropriate retention levels, however some research has shown that a minimum of 15% of the cutblock should be retained where there are no other significant resource values (recommended by the Scientific Panel for Sustainable Forest Practices in Clayoquot Sound, 1995). MB Ltd. (Weyerhauser Ltd.) are using a range of 10-20% in their timber zone.

2.1.6 Spatial Pattern

The main types of retention pattern are **dispersed** (individual trees) and **aggregate** (groups of trees). The Scientific Panel for Sustainable Forest Practices in Clayoquot Sound (1995) recommended aggregate patches well dispersed through the cutblock, ranging in size from 0.1 to 1.0ha. and no more than two tree heights apart. Franklin et. al. (1997) state that typical retention patches are 0.05 to 1.0 ha and that many operations are employing aggregate retention over dispersed due to perceived advantages.

The advantages of aggregate over dispersed include that aggregate retention:

- Is more likely to be windfirm,
- Is more likely to retain all the desired structures,
- Is more efficient, less costly and safer to implement,
- Allows for more efficient post harvest forest management practices such as aerial herbicide and fertilization (because the intervening harvested area is treated as a clearcut),
- Allows for management of forest health and fire concerns, and
- Will have less impact on growth of regeneration.

2.1.7 Dealing with Constraints

2.1.7.1 Wind

Windthrow hazard is a concern for any silviculture system, but particularly so for the Retention system. Trees in a stand that are suddenly left exposed to wind are vulnerable. Windthrow cannot be eliminated, however, as with many other forest management issues, effects can be mitigated by careful planning and treatment.

The following considerations should be made, especially in areas with a moderate to high windthrow hazard:

- As mentioned above, aggregate retention is more likely to remain windfirm. Dispersed retention is appropriate where the retained trees are sound and have been exposed to wind due to their dominance (eg. Fd vets).
- Consider teardrop-shaped patches oriented with the prevailing wind direction.
- Try to develop patches horizontally as well as vertically. Horizontally oriented patches are more difficult for cable-yarding systems, but this orientation is usually with the wind direction and may be better aesthetically.
- Try to locate patches in more sheltered microsites if possible (e.g. not on ridges).
- Try to locate patches so that salvage can be done in the event of significant windthrow.
- If the retention patch is >.25ha then consider feathering the edge(s), removing most windthrow-prone trees and not more than 30% of the basal area of the patch.
- Consider pruning the highest value retention trees that have a high risk of windthrow.
- Avoid locating patches in areas with wet (seepage) soils or thin soils that restrict rooting depth.
- Choose species for retention based on their inherent rooting stability (in order of preference: Fd, Pw, decid., Cw, Yc, Bg,Ba, Hm, Hw)

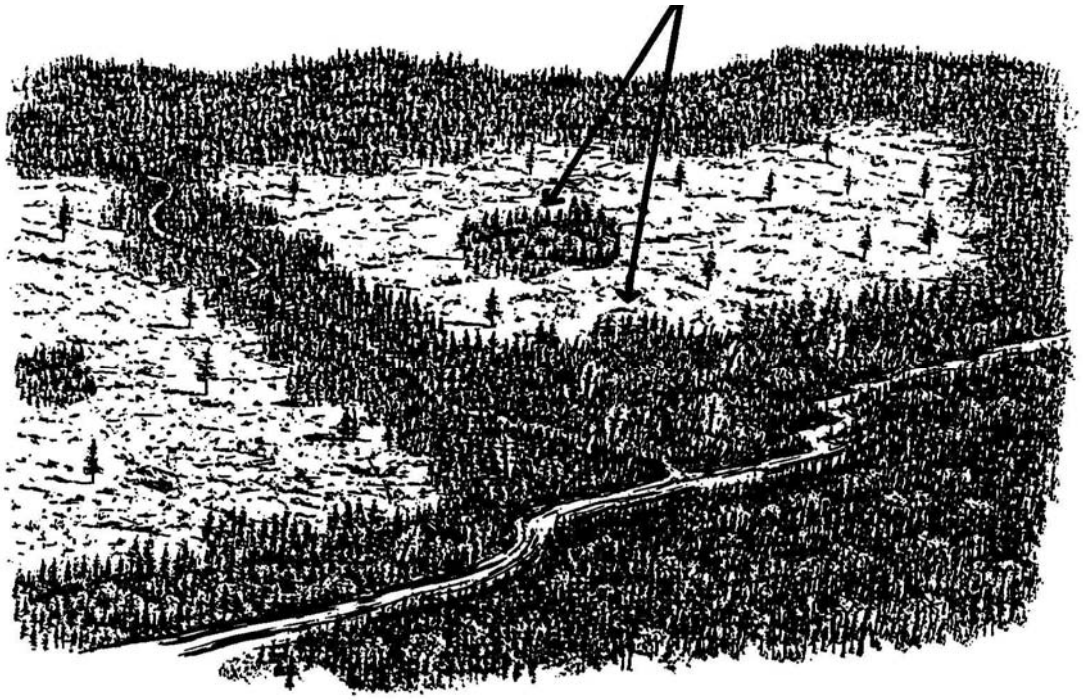
- refer to the Windthrow Handbook for British Columbia forests (Stathers, R.J., et. al., 1994) for additional guidance.

2.1.7.2 Safety

- Safety concerns take precedence over any other objectives and activities must abide by WCB regulations. Ideal retention patches will contain high value Wildlife Tree(s) together with a designated "no work zone" (as per current Wildlife Danger Tree Assessment recommendation).
- Implementation of the Retention system requires a proactive positive approach. A high level of supervision and communication between all parties during all phases of harvest is essential, particularly for the falling phase. Foresters and Engineers must be knowledgeable about falling and yarding constraints during block layout and conversely logging operators must understand the management objectives for their area of operation.
- Where feasible, marking of retention patches/trees will be done with "soft" boundaries in order to provide fallers with as much flexibility as possible to safely organize their work site. If danger trees are marked for retention the prescription will allow the faller to substitute another tree or trees to be retained based on safety.
- It is generally preferable to orient openings along contours, particularly on steep ground, to facilitate safer falling, bucking and yarding. Avoid layout that requires trees to be felled downhill or uphill as bucking cannot be completed safely on steep ground.
- Flight paths for logging helicopters and yarding corridors for conventional yarding (cable and ground-based) must be considered in the planning phase and should be laid out on the ground in critical situations.

- Retention targets with amounts and patterns of dispersal are to be clearly identified on SP and/or Faller/Logger maps. These will be drawn on map and expressed in area (hectares) and number of patches for aggregate retention and basal area and/or stems/groups per ha or stems/groups per block.
- The Critical Factors information sheet and/or Fallers/Loggers map will include any known safety concerns (i.e. steep ground, blowdown, rainfall shutdown, etc.), restrictions regarding the falling, bucking or yarding of trees and/or danger trees along falling boundaries or in reserve/retention areas.
- It is recommended that at least one member of the logging crew be a Certified Wildlife/Danger Tree Assessor.

"Internal" and "external" Wildlife Trees with designated No Work Zones may be designated as *Retention Patches* or *WTP Reserves*.



- Steep terrain and restrictive harvest systems (limited ability to harvest around retained trees) will limit the ability to establish retention patches in desired locations. Consideration should be given to employing less restrictive harvest systems where possible. From least restrictive to most restrictive: Heli-grapple, Heli-hand choke, Ground-based systems, Skyline systems, Highlead.

2.1.7.3 Forest Health Issues

- If the block is being managed for a component of Hw, do not retain dispersed Hw that may be infected with Hw Dwarf Mistletoe, and consider buffering or sanitizing edges of aggregates.
- In areas with root disease, particularly Laminated Root Disease, ensure that all infected trees (visibly infected plus 10m buffer) are removed from the disease centers that are prescribed for treatment. Consider managing some areas (both within cut area and retention area) with root disease as a means to provide "natural" biodiversity elements to the stand over time. Disease centers must be clearly mapped and treatments prescribed in the SP.
- Douglas-fir Bark Beetle may become problematic if subsequent windthrow occurs. Retention patches that have moderate attack would likely not diminish in functionality.
- The area influenced by the "north edge effect" will likely increase and consideration should be given to managing for shade-tolerant species within this area. In most cases this area will be too small to warrant a separate standards unit.
- Harvesting systems should be designed to minimize damage to retained trees.

3.0 OUR STRATEGY

All silviculture systems will be considered for prescriptions in order to achieve site specific management objectives. In the absence of objectives leading to other non-clearcut systems the retention silviculture system will be applied across the District, in order to help maintain structural diversity at the stand level.

3.1 Establishment Pattern

- Aggregate retention will be the primary type, with patch sizes ranging from 0.25 ha to 1.0 ha and located not more than 4 tree heights from each other or a cutblock boundary. Patch size <0.25ha will be considered as "dispersed retention". Spatial distribution (maximum 4 tree height) is the most important criteria. See Appendix 2, *Examples of Retention.* Small blocks (approximately 5 ha) may not require retention within the cutting boundary (< 4 treee ht. Across) and no WTP reserve requirements external to the cutting boundary, as per current interim guidelines (See Appendix 1)
- Retention Patch location will be chosen considering the aforementioned best attributes for **safety, species and structure, feasibility, windfirmness and salvage opportunity and aesthetics**.
- Retention levels will range from 10-20% of TAUP. Retention Patches are not considered to be Reserves or WTPs as referred to in legislation.
- Retention patches will **compliment and be an integral component of the current interim requirements for WTP** reserves (See Appendix 1, *Interim WTP Retention Rates for the Chilliwack Forest District*). For example if the requirement is for 10% WTP and retention patches=15%, then the WTP retention requirement has been met. If the WTP retention requirement is 18% and retention patches = 10%, then an additional WTP (or retention patches) of at least 8% should be established. Retention patches that are not representative of the stand being harvested should not be counted as contributing to WTP retention requirements.
- A windthrow assessment will be carried out for every block, according to current guidelines (initially use “Windthrow Handbook for British Columbia Forests”, Stathers, R.J., T.P. Rollerson and S.J. Mitchell, B.C. Min. of Forests, B.C. Working Paper 9401). Assessments should be carried out early in the layout process so that block and retention patch design can incorporate windthrow concerns. Windthrow management prescriptions will be included in SPs.

- Dispersed retention will be considered where appropriate either alone or in combination with aggregate. If dispersed is the sole type of retention it should be a minimum of 5% of preharvest basal area, with individual trees no more than 2 tree heights from each other or a patch or cutblock boundary. Dispersed retention areas will not contribute to current interim requirements for WTPs.
- FPC – required Riparian Reserve Zones and RMZ's that retain >50% basal area, that are within the Total Area Under Prescription will be included in calculation of retention level, as well as "internal" or "external" WTP reserves that are designated for the cutblock.
- The CFDSBFEP will work closely with operators (loggers) on each site to ensure that operational considerations are taken into account. Operators may take an active role in locating retention patches (see Sec. 2.1.7.2 – Safety).
- SP maps will include an illustration of the area under forest influence [i.e. 1 tree height from retained tree(s)] and indicate the area expressed as percent of total area under prescription.
- Patches will be located a minimum of 1 tree height from cutblock boundary where feasible.
- Rates of retention will be applied in second growth forests similar to that in old growth forests. The pattern of retention in second growth stands will be dictated by the objectives of harvesting (eg. forest health management, offsite species, etc.). Retained trees will help accelerate the creation/restoration of old growth ecosystem attributes.

3.2 Adaptive Management

This new strategy will present challenges from the planning stages through to operational and post harvest phases. It is important that we constantly learn how to improve the prescriptive and operational aspects of adopting the retention system. We will do this by using our existing monitoring plans and information systems (ISIS). Our EMS also provides a "continuous improvement cycle". Prescribing foresters will take part in the monitoring process, so that future SPs can be adapted where necessary. Prescribing foresters will include an adaptive management component in SPs where there is doubt about being able to meet prescribed standards (that have been developed primarily on the basis of clearcut conditions). The efficacy of retention systems for achieving the main stated objective of sustaining ecosystem processes is beyond the scope and resources of the CFDSBFEP. However, there will soon be a sizeable population of cutblocks upon which more formal research may be applied (i.e. by MOF Research Branch). This strategy will be dynamic and will be modified on an ongoing basis as new information becomes available. It will be formally reviewed at least annually.

3.3 Communication Plan

One of the driving forces behind this new strategy is the public's perception about the negative aspects associated with clearcutting. It is therefore important that our intentions are communicated and results demonstrated to the public. We will do this by:

- Regular press releases and updates to our website that outline this new strategy and illustrate examples of our progress towards putting it into practice.
- Using every opportunity to "show and tell" interested parties what we are doing (eg. at FDP meetings, during tours, at school presentations, etc.)
- Initiate and maintain a special bulletin area in the public reception area of the District office relating to the use of non-clearcut silviculture systems.

- Successes (and “failures”) will be communicated to other licensees in the Fraser TSA through periodic meetings of the TSA Steering Committee.
- Periodic updates will be provided to BCTSP managers..

3.4 Conclusion

The public is becoming increasingly knowledgeable and sensitive to forest management issues. With increasing demand for non-timber forest resources, such as fish and water, wildlife (especially species listed as threatened or endangered), visual aesthetics and recreation opportunities, as well as maintenance of biological diversity and ecosystem processes, our approach to forest management practices, including choice of silviculture system, is changing. This strategy represents one more step towards achieving a fundamental change. If we are successful in communicating these changes, public perception (at local and international levels) will be to view our industry (specifically the CFDSBFEP) as practising good environmental stewardship. Success depends on our being proactive, responsive, innovative and adaptable.

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