

Kispiox Timber Supply Area Timber Supply Review

Data Package

October 2000

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District Manager
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A handwritten signature in black ink, appearing to read "G. F. Townsend", with a large, sweeping flourish extending from the end.

Director
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1. Introduction

This data package outlines the basic information and assumptions required for the Kispiox timber supply area (TSA) timber supply analysis.

The completed data package contains inputs that describe current performance for the timber supply area. For the timber supply review, "current performance" can be defined by:

- the current forest management regime — the productive forest land available for timber harvesting, the silviculture treatments, the harvesting systems and the integrated resource management guidelines used in the area;
- the standards used to approve or reject forest development plans;
- fully implemented land-use plans;
- land-use decisions approved by Cabinet;
- approved higher level plans under the *Forest Practices Code*, and
- other approved B.C. Forest Service and joint agency forest management practices and policy.

The purpose of the timber supply review program is to model "what is" not "what if". Changes in forest management objectives and data, when and if they occur, will be captured in future timber supply analyses.

Each section of this data package contains:

- 1) a short explanation of the data required;
- 2) a data table; and,
- 3) a discussion of data sources and other comments.

This data package, while representing the best available knowledge and information today, is subject to change. As noted in several sections, until the timber harvesting land base is determined it is not possible to finalize the values shown in some of the tables in this package. In these cases, only the criteria are shown, and the columns for the missing values are shaded gray. In addition, if any major changes to management regimes occur over the next few months, an attempt will be made to incorporate them into the timber supply analysis. The final timber supply analysis report will include a technical appendix that highlights any changes made to this package. Section 7, "Critical Issues and Sensitivity Analyses," identifies areas of uncertainty with respect to the data, and outlines intended sensitivity analysis.

2. Current Forest Management Considerations and Issues

2.1 Base case management assumptions

The assumptions described in the following sections reflect current performance with respect to the status of forest land, forest management practices and knowledge of timber growth and yield. A base case harvest forecast will be developed using these assumptions, and will serve as a baseline for assessing the impacts of uncertainty in the assumptions.

2.2 Major forest management considerations and issues

The major forest management issues and considerations in the Kispiox TSA are listed in the table below. Where issues are defined within legislation, regulations or standards, they will be incorporated into the base case. In cases of important uncertainties in defining current management, critical issue analysis may be done. Also, it may be difficult to quantify or assess some issues for computer modelling, in which case sensitivity analysis may assist in assessing the timber supply implications and assigning degrees of risk to timber supply during allowable annual cut determination.

2. Current Forest Management Considerations and Issues

Table 1. Major forest management considerations and issues

Consideration/issue	Description
Landscape-level biodiversity	Draft landscape unit (LU) boundaries have been defined. In the analysis, a weighted biodiversity emphasis option assignment will be used. A critical issue analysis will examine the impact of applying draft biodiversity emphasis options.
Riparian areas	Requirements from the <i>Forest Practices Code</i> for riparian reserve zones and riparian management zones will be included in the analysis.
Stand-level biodiversity	The wildlife tree requirements of the <i>Landscape Unit Planning Guide</i> and <i>Kispiox Land and Resource Management Plan</i> (LRMP) will be represented, as per current practice.
Deer winter range	Requirements for security cover, thermal cover and forage, as prescribed in the <i>Kispiox LRMP</i> , will be modelled for mapped winter range habitat.
Visual quality objectives and visual landscape inventory	Forest cover requirements originating from the <i>Forest Practices Code</i> (scenic areas) and the LRMP (recommended visual quality classes) will be included in the analysis.
Cutblock adjacency and green-up constraints	Requirements from the <i>Kispiox LRMP</i> and the <i>Forest Practices Code</i> for green-up height will be included in the analysis.
Kispiox Land and Resource Management Plan (LRMP)	LRMP management objectives and directions that are currently implemented will be included in the analysis.
Babine Local Resource Use Plan (LRUP)	Directions provided in the Babine LRUP will be modelled, including high value grizzly bear habitat.
Community watersheds	Requirements from the <i>Forest Practices Code</i> for community watersheds will be included in the analysis.
Volume estimates for mature stands	The results of the <i>Kispiox TSA Inventory Audit</i> will be examined in a critical issue analysis.

3. Inventories

3.1 Background information

Table 2 lists the inventories that will be used to determine the timber harvesting land base and to model forest management activities.

Table 2. Inventory information

Data	Source	Vintage	Update	Datum
Forest cover	Ministry of Forests (MoF)	1992	1997	NAD83
Landscape units and biodiversity emphasis assignment	MoF/Ministry of Environment, Lands and Parks (MELP)	1998/1999		NAD83
Riparian reserve and management areas	MoF	1999		NAD83
Visual landscape inventory	MoF	1999		NAD83
Telegraph Trail	MoF	1995	1999	NAD83
Mill Creek sensitive area	MoF	1998		NAD83
Babine wetland buffers	MoF	1998		NAD83
Babine treatment units	Babine LRUP	1993		NAD27
Babine sub-drainages	Babine LRUP	1993	1999	NAD83
Resource management zones from LRMP	Kispiox LRMP	1996		NAD27
Community watersheds	MoF	1996		NAD27
Chart areas	MoF	unknown	1999	NAD27
New parks	MELP	1998/1999		NAD83
Seven Sisters protected area	MoF	1999		NAD83
Harvest priority areas	MoF	1999		NAD83
Mule deer winter range	MoF	1999		NAD83
Terrain stability mapping	MoF	1999		NAD83

Data source and comments:

Landscape unit boundaries and their respective biodiversity emphasis assignments have not been established by the district manager. The draft information will be used to perform sensitivity analysis related to landscape-level biodiversity.

Riparian reserve zones and management zones were generated with a *Geographic Information System (GIS)* analysis using *Terrain Resource Information Management (TRIM)* and slope data.

A visual landscape inventory was finalized for the entire TSA in 1999. This inventory identifies the visual condition, characteristics and sensitivity to alteration of many areas.

The Telegraph Trail has high archaeological values.

As approved by the district manager in 1998, the *Mill Creek Sensitive Area Plan* describes special management constraints to be applied in the Mill Creek sensitive area.

3. Inventories

The *Babine Local Resource Use Plan* (LRUP) identifies six treatment units (Riparian Ecosystems, Forest Ecosystem Networks, Linkage Areas, High Grizzly Bear Habitat, Moderate Grizzly Bear Habitat, and the Integrated Resource management zones) and a special management zone. These all have specific management objectives. The *Babine LRUP* also specifies special management objectives in a number of sub-drainages: Shedin, Shenismike, Shelagyote North, Shelagyote South, and Gail. Management strategies for important grizzly bear habitat are also identified in the *Babine LRUP*.

The *Kispiox Land and Resource Management Plan* (LRMP), approved by Cabinet in 1996, identifies specific management objectives for three resource management zones: special management zones, community watersheds and integrated resource management zone.

In the Big Slide Chart Area, located within the *Babine LRUP* area, specific management constraints are applied.

Four new parks have been established since the last timber supply review: Swan Lake/Kispiox River Park, Babine River Park, Kitwanga Mountain Park, and Bulkley Junction Park. A fifth area, Catherine Creek, was designated as an ecological reserve. As these parks and the ecological reserve are not identified in the forest cover inventory; the information from the non-standard overlay will be used to determine the portion of land not administered by the B.C.F.S. for timber supply.

The Seven Sisters area has been deferred from logging since 1987. A land use consensus decision was reached in 1997 and approved by Cabinet in March of 1999. Under this consensus, 42 208 hectares are to be protected from logging and mining developments. The area is scheduled for official designation as a park in 2000.

The mule deer winter range mapping will be used to define the area subject to forest cover requirements from the LRMP.

The harvest priority map will be used to identify which areas will not be available for harvest for the next decade due to access constraints.

Terrain stability mapping, completed in 1999, will be used to determine the location and size of reductions to the land base to account for unstable terrain.

4. Management Zones and Analysis Units

4.1 Management zones, groups and objectives

Management zones are used to differentiate areas with distinct management emphasis. For example, a zone may be based on a harvesting or silviculture system, visual quality objective or wildlife consideration. Sometimes, an area of forest is subject to more than one management objective. In the timber supply model, groups can be used to represent and track different combinations of areas, thereby allowing application of overlapping management objectives. Areas subject to each objective will be placed into a group or a mutually exclusive management zone appropriate for the specific situation. In addition, the role of forest land considered unavailable for timber harvesting will be considered when evaluating forest cover objectives.

Further information on the forest cover requirements to be applied to these areas can be found in Section 6.4, "Integrated resource management."

Table 3. Objectives to be tracked

Objectives	Inventory definition
Landscape-level biodiversity by landscape unit and BEC variant	Non-standard mapped layer — see Table 2.
Visual quality objectives by landscape unit and visual quality class as modified by visual sensitivity class	Non-standard mapped layer — see Table 2.
Babine LRUP treatment units and sub-drainages	Non-standard mapped layer — see Table 2.
Community watershed	Non-standard mapped layer — see Table 2.
Deer winter range	Non-standard mapped layer — see Table 2.
LRMP Integrated Resource Management objectives by landscape unit – old growth	Non-standard mapped layer — see Table 2.
LRMP Integrated Resource Management objectives by landscape unit – equivalent clearcut area (ECA)	Non-standard mapped layer — see Table 2.
LRMP Integrated Resource Management objectives by landscape unit – adjacency/green-up	Non-standard mapped layer — see Table 2.
Mill Creek Sensitive Area (SA) objectives	Non-standard mapped layer — see Table 2.

4. Management Zones and Analysis Units

4.2 Analysis units

An analysis unit is composed of forest stands that have similar tree species composition, timber growing capability and treatment regimes. Each analysis unit is assigned its own timber volume projections (yield tables) for existing and future stands. Yield tables for existing natural stands will be derived using the variable density yield projection (VDYP) yield model. Yield tables for recent plantations and future stands will be derived using the table interpolation program for stand yields (TIPSY).

The following table defines the analysis units to be used for existing stands.

Table 4. Definition of analysis units for existing natural stands

Analysis unit	Criteria		
	Inventory type groups	Site index range (m @ 50 years)	Age class
1. Hemlock – good	12-17	≥ 20.0	≤ 7
2. Hemlock – medium	12-17	14.0 – 19.9	≤ 7
3. Hemlock – poor	12-17	< 14.0	≤ 7
4. Fir – good	18-20	≥ 21.0	≤ 7
5. Fir – medium	18-20	15.0 – 20.9	≤ 7
6. Fir – poor	18-20	< 15.0	≤ 7
7. Spruce – good	21-26	≥ 27.0	≤ 7
8. Spruce – medium	21-26	16.0 – 26.9	≤ 7
9. Spruce – poor	21-26	< 16.0	≤ 7
10. Pine – good	28-31	≥ 22.0	≤ 7
11. Pine – medium	28-31	15.0 – 21.9	≤ 7
12. Pine – poor	28-31	< 15.0	≤ 7
13. Cedar – good	9-11	≥ 20.0	≤ 7
14. Cedar – medium	9-11	15.0 – 19.9	≤ 7
15. Cedar – poor	9-11	< 15.0	≤ 7
16. Cottonwood/coniferous – good	35	≥ 37.0	All
16. Cottonwood/coniferous – medium	35	28.0 – 36.9	All
16. Cottonwood/coniferous – poor	35	< 28.0	All
51. Old Hemlock – good	12-17	≥ 20.0	8 & 9
52. Old Hemlock – medium	12-17	14.0 – 19.9	8 & 9
53. Old Hemlock – poor	12-17	< 14.0	8 & 9
54. Old Fir – good	18-20	≥ 21.0	8 & 9

continued

4. Management Zones and Analysis Units

Table 4. Definition of analysis units for existing natural stands (concluded)

Analysis unit	Criteria		
	Inventory type groups	Site index range (m @ 50 years)	Age class
55. Old Fir – medium	18-20	15.0 – 20.9	8 & 9
56. Old Fir – poor	18-20	< 15.0	8 & 9
57. Old Spruce – good	21-26	≥ 27.0	8 & 9
58. Old Spruce – medium	21-26	16.0 – 26.9	8 & 9
59. Old Spruce – poor	21-26	< 16.0	8 & 9
60. Old Pine – good	28-31	≥ 22.0	8 & 9
61. Old Pine – medium	28-31	15.0 – 21.9	8 & 9
62. Old Pine – poor	28-31	< 15.0	8 & 9
63. Old Cedar – good	9-11	≥ 20.0	8 & 9
64. Old Cedar – medium	9-11	15.0 – 19.9	8 & 9
65. Old Cedar – poor	9-11	< 15.0	8 & 9

Data source and comments:

Fir denotes true firs (*Abies lasiocarpa* and *A. amabilis*), not Douglas-fir.

Separate analysis units will be created for the old-growth component (age class 8 and 9; i.e., 141 years and older) of each coniferous analysis units. This will facilitate the critical issue analysis of old-growth site index adjustments following harvest.

The timber supply analyst may decide to split analysis units where there are significant differences in site productivity, or to represent different treatment regimes. Analysis units may be combined where yield tables are similar, or if areas in individual units are small.

5. Timber Harvesting Land Base Definition

5.1 Identification of the timber harvesting land base

This section outlines the steps used to identify the timber harvesting land base (THLB), that is, the productive forest expected to support timber harvesting within the Kispiox timber supply area. The timber harvesting land base for the Kispiox TSA is determined by separating out the following categories of areas that do not contribute to timber harvesting. Land may be unavailable for timber harvesting for three principle reasons:

- it is not administered by the Forest Service for timber supply (e.g., private land, parks, etc.);
- it is not suitable for timber production; and
- it is required for other forest values.

Land may also be added to the timber harvesting land base:

- by management activities that improve productivity or operability (e.g., the stocking of land currently classified as non-commercial brush);
- by the acquisition of productive forest land (e.g., timber licence reversions).

The classification of 'unavailable for timber harvesting' applies only to land where no harvesting is anticipated. Any area in which some timber harvesting is expected to occur will remain in the timber harvesting land base, even if the area is subject to stringent constraints. Such constraints will be represented in the timber supply analysis.

After all areas that do not contribute to the timber harvesting land base have been identified, any additional lands are added to the land base. The resulting productive forest land base is defined as the "current timber harvesting land base" for the TSA.

5.2 Details on land base classification

5.2.1 Land not administered by the British Columbia Forest Service for timber supply

Ownership codes are used to identify whether the land can be considered to contribute to timber supply. Generally, only ownership codes 62C and 69C contribute to the TSA timber supply. These codes indicate crown land in a forest management unit and miscellaneous reserves (including recreation sites), respectively. All areas with other ownership codes will be removed from the land base considered available for timber supply. New parks and ecological reserves that were created since the last timber supply review, and which have not had their ownership updated in the forest cover inventory, will also be removed. These include Swan Lake/Kispiox River, Kitwanga Mountain, Babine River Corridor, and Bulkley Junction parks and Catherine Creek Ecological Reserve. On March 18, 1999, Cabinet announced that about 42 200 hectares of land in the Seven Sisters area would be fully protected. This area is expected to be legally established as a park by Order-in-Council (OIC) during 2000, so it is considered to be unavailable for timber supply and will be removed from the timber harvesting land base.

5.2.2 Land classified as non-forest

Areas with projected type identity 6 are non-forest or non-productive forest, and areas with projected type identity 8 have no typing available. These categories include alpine areas, lakes, swamps, rivers, rock, and ice, which do not contribute to timber supply.

5. Timber Harvesting Land Base Definition

5.2.3 Non-commercial cover

Areas with projected type identity 5 are occupied by non-commercial brush species. These areas are considered to be unlikely sites for timber production and are excluded from the area considered available for timber harvesting.

5.2.4 Environmentally sensitive areas

Some forest lands are environmentally sensitive and/or significantly valuable for other resources. These areas are identified and delineated during a forest inventory as environmentally sensitive areas (ESAs). The ESA system uses the following categories: soil (Es), forest regeneration problems (Ep), snow avalanche (Ea), recreation (Er), wildlife (Ew), water (Eh) and fisheries (fisheries symbols). With the exception of avalanche and fisheries, two ESA categories are recognized: high and moderately sensitive.

Environmental sensitivity may reduce or preclude harvesting on identified sites, which can be accounted for through per cent area reductions or specific evaluation of individual ESA polygons for harvesting opportunity.

Table 5 identifies the proportion of ESAs in various categories that are unavailable for harvesting.

Table 5. Land base exclusions for environmentally sensitive areas

ESA category	ESA description	Reduction per cent (%)
Ea	Areas having severe snow chute and avalanche problems.	100
Classes V and U from Terrain Stability Mapping	Area with a high likelihood of landslide initiation following timber harvesting or road construction.	100
Classes IV and P from Terrain Stability Mapping	Area with a moderate likelihood of landslide initiation following timber harvesting or road construction.	95

Data source and comments:

The current ESAs were mapped in the early 1970's and were seldom used in forest resources management planning as other mapping data provided far more valuable information. There was also some uncertainty about the reliability of the ESA classification, particularly for the soil and regeneration categories. This recognition led the Chief Forester to direct district staff to "re-examine environmentally sensitive areas and their corresponding incorporation in or exclusion from the timber harvesting land base" in his 1996 *Rationale for Allowable Annual Cut (AAC) Determination in the Kispiox Timber Supply Area (TSA)*.

The results of this re-examination are presented below for the soil and regeneration categories:

5. Timber Harvesting Land Base Definition

Soil

Both the ESA classification systems for soil and *Terrain Stability Mapping* (TSM) share the same objective of identifying all unstable or potentially unstable areas. Terrain stability mapping was conducted in most physically and economically operable areas under forest development and is currently used to identify areas considered unavailable for timber harvesting and areas requiring further assessments.

A contractor was hired in the summer of 1998 to gather all the terrain stability information currently available for the Kispiox TSA. Where necessary, TSM data was digitized from hard copy maps or translated into one common *Geographic Information System* (GIS) format. After conducting office and field assessments, new line work was added for those areas within the operability lines where TSM had not yet been completed. Only sensitive soil units (i.e., stability classes IV or V from detailed mapping projects and classes P and U from reconnaissance projects) were considered. All terrain stability interpretations were converted to current standards for TSM (e.g., classes P and U were re-classified as classes IV and V).

Sites having a high likelihood of landslide, and a portion of sites classified as potentially unstable are currently considered unavailable for timber harvesting. All sites classified as unstable (class V) and 95% of potentially unstable sites (class IV) will be removed from the timber harvesting land base.

Regeneration

All forest sites that are extremely difficult to regenerate and sites having extended regeneration delays that would lead to unacceptable crop rotations are considered for Ep designation (*Forest Inventory Manual*). Areas with severe regeneration problems are characterised by geoclimatic conditions that may affect moisture and nutrient quantity and availability, and frost heaving. These conditions — high elevations, talus slopes, lowland swampy areas, sand dunes, and floodplains — minimize regeneration potential and tree growth capacity. Sites having moderate regeneration problems are not inoperable or unproductive. Rather, they are constrained by the potential for excessive brush, or the presence of damaging wildlife or domestic cattle populations.

At the time of the previous allowable annual cut determination, an analysis conducted by district staff showed that extensive logging occurred in areas classified as having regeneration problems in the inventory. Further, district staff conducted random field checks on seventeen sites classified as sensitive. Information on biogeoclimatic classification and site units was recorded. None of these sites had characteristics indicating that they would be difficult to regenerate. All areas that were found to be rocky or wet were beside streams and swampy areas that would be incorporated as riparian reserves or management zones. A review of recent management practices confirms this.

Silviculture records were also reviewed for harvested areas designated as Ep (Table 5a). The openings reviewed were all classified as having severe regeneration problems, but only a small portion (8%) is still considered not satisfactorily restocked (NSR). It is anticipated that all areas currently NSR will be regenerated within the prescribed delays.

5. Timber Harvesting Land Base Definition

Table 5a. Breakdown of extremely sensitive area (regeneration) on representative map 103P069

Ep	# of polygons	Polygon area (hectares)	# Openings	Gross area (hectares)	Net area (hectares)	NSR total (hectares)	SR total (hectares)	FG area (hectares)
—	N/A	N/A	22	1 097.6	261.2	12.9	816.1	302
1	41	981.6	19	2 844.3	2 141.3	225.2	2 012.1	1 185.1
2	27	3 172.7	25	1 631.8	1 100	42.5	1 181.1	325.9

Note: SR is satisfactorily restocked and FG is free-growing.

These findings support the data suggesting that the current classification for ESA (regeneration) is inaccurate, and that many areas having potential regeneration problems are included in riparian reserves and/or wildlife tree patches (WTP). A large portion of the reductions associated with severe regeneration problems will therefore be accounted for through riparian and stand-level biodiversity reductions in the analysis.

Some areas harvested in the past have failed to regenerate satisfactorily or achieve free-growing, or have been re-classified as non-productive or non-commercial. To account for this and the fact that some areas may not be harvested due to potential regeneration problems not accounted for elsewhere, a further analysis was conducted on all blocks logged since October 1, 1990 and having a regeneration delay date prior to October 1, 1999 (in both Cranberry and Kispiox TSAs). The results show that, of 205 blocks (8339 hectares), only 11 have NSR status reported. However, only three of those eleven blocks (for a total of 55.3 hectares) are NSR because of missing "planting results" in the database, thereby suggesting potential ground issues but not necessarily a result of regeneration difficulties that would warrant an Ep classification. Without field assessments the ESA status is unknown at this time. It is critical to note that in every case, these blocks have been planted and were not identified as having potential regeneration problems.

A secondary analysis of this same sample showed that only 41 blocks, where regeneration delay has been met, have *Silviculture Prescription* (SP) amendments. It was important to investigate if regeneration delay had been achieved through methods other than natural means (by amending SP standards). Of these amendments, on only one (for 1.5 hectares) had the status of the logged net area changed from reforest (NAR) to non-productive (NP), further verifying that the Ep classification overstated regeneration difficulties.

The findings described above suggest that no further land base reductions are needed to account for regeneration problems.

Wildlife

ESAs for wildlife (Ew) have been replaced by specific habitat mapping, such as critical deer winter range or grizzly bear habitat. Parts of these areas will be removed from the timber harvesting land base (Table 11, "Exclusion of specific, geographically defined areas") and parts of them will be assigned specific forest cover requirements.

5. Timber Harvesting Land Base Definition

5.2.5 Inoperable areas

Operability codes are generally based on the presence or absence of physical barriers or limitations to harvesting, appropriate logging methods (e.g., cable), and the merchantability of stands. Table 6 lists the operability classes that are removed from the timber harvesting land base.

Table 6. Description of inoperable areas

Inventory description	Code	Reduction per cent (%)
Operability	I or N	100

Data source and comments:

The operability lines were established in 1988. Areas with slopes greater than 70%, rock outcrops, steep gullies, avalanche tracks, and isolated small stands of timber were all considered as economically or physically inoperable. Areas with average volumes below 150 – 200 cubic metres per hectare, and areas where road building would be too difficult or too costly were also considered to be inoperable. These criteria still represent current management practices although a minor adjustment of the operability lines was done in 1999 to account for physical accessibility constraints in a small portion of the TSA.

Helicopter logging was not considered when the current operability lines were established. However, some areas currently classified as inoperable have potential for helicopter logging, and have been identified as such on some recent *Forest Development Plan* submissions. Cutting permit applications for these proposed areas have not yet been submitted, and as the potential harvest is linked to high market value, it is unknown when logging may occur.

Given the uncertainty related to helicopter logging in the Kispiox TSA, the potential effect of helicopter logging on the timber supply will be tested through a sensitivity analysis (timber harvesting land base changes).

5.2.6 Sites with low timber growing potential

Sites may have low productivity either because of inherent site factors (nutrient availability, exposure, excessive moisture, etc.), or because they are not fully occupied by commercial tree species. Typically, these stands are intermixed with other stands within the forested land base. As these stands are not considered to be harvestable, they need to be identified and removed from the timber harvesting land base.

Table 7. Description of sites with low timber growing potential

Zone/ group	Inventory type group	Characteristics			
		Age (years)	Volume (m ³ /hectare)	Site index	Reduction per cent (%)
All	9-11 Cedar	> 200	< 200	< 10.0	100
All	12-17 Hemlock	> 200	< 200	< 7.8	100
All	18-20 Fir	> 200	< 200	< 9.0	100
All	21-26 Spruce	> 200	< 200	< 7.2	100
All	28-31 Pine	> 200	< 200	< 9.5	100
All	35 Cottonwood/coniferous	> 200	< 200	< 19.0	100

5. Timber Harvesting Land Base Definition

Data source and comments:

A review of current forest management practices reveals that stands that do not achieve a minimum coniferous volume of 200 cubic metres per hectare are not suitable for harvest. VDYP was used to determine the minimum site index at which each species group would produce 200 cubic metres per hectare at age 200. All stands below the minimum site index will be removed from the timber harvesting land base, except for NSR areas (where the site index information is uncertain), young managed stands, and those stands that currently have more than 200 cubic metres per hectare of coniferous volume.

5.2.7 Problem forest types

Problem forest types are stands that are physically operable and exceed low site criteria yet are not currently utilized or have marginal merchantability. These types are wholly excluded from the timber harvesting land base.

Table 8. *Problem forest types criteria*

Description	Inventory type group	Characteristics	
		Stocking class	Reduction per cent (%)
Low/dense stocking pine	28-31	2, 3, 4	100
Low stocking other species	9-21, 23-26, 35	2	100
Deciduous stands other than cottonwood/coniferous stands	36-45	—	100

A review of current management practices reveals that all coniferous stands with fewer than 76 stems per hectare with a diameter at breast height of at least 27 cm are not harvested. A further subdivision of this category (stocking class 3 and 4) applies to lodgepole pine leading stands to characterize stagnant (stocking class 3) stands or stands with low density and few large stems (stocking class 4).

Except for cottonwood/coniferous stands (inventory type group 35), deciduous stands do not contain sufficient coniferous volume to be merchantable.

NSR areas will not be excluded based on these problem forest type criteria because of uncertain species composition information.

5.2.8 Wildlife habitat reductions

Managing Identified Wildlife: Procedures and Measures describes management prescriptions including core "no harvesting" areas around nesting sites or other valuable habitats for endangered species. However, no wildlife habitat areas have been identified in the Kispiox TSA under the *Identified Wildlife Management Strategy* at this time.

Treatment units 1, 2 and 4 of the Babine LRUP have wildlife management objectives in addition to biodiversity and riparian objectives. These exclusions are all accounted for in Table 11 (Section 5.2.11, "Exclusion of specific, geographically defined areas").

Objectives for deer winter range are discussed in Section 6.4.1, "Forest cover requirements."

5. Timber Harvesting Land Base Definition

5.2.9 Cultural heritage resource reductions

Table 9 lists the areas with cultural heritage values that are removed from that area considered available for timber harvesting.

Table 9. *Cultural heritage resources*

Location	Excluded area (hectares)	Reason for exclusion
Telegraph Trail	100 metres on each side of the trail	Current management practices exclude harvesting along the trail.

Data source and comments:

The *Telegraph Trail Management Plan*, approved by the district manager in 1995, specifies that a buffer of 100 metres must be left on each side of the trail. The Telegraph Trail is also in the process of being established under the *Heritage Act of B.C.*

The Old Kuldo Interpretative Trail accesses an ancient village site along the Skeena River. Review of the buffers of the Telegraph Trail and the riparian reserve zone of the Skeena River, show that this area is being protected through other land base exclusions, and no further exclusions will be applied.

There are several known sites with cultural heritage value in the Kispiox timber supply area. As cultural heritage inventory studies, archaeological impact assessments, and traditional-use survey results become available, they will be considered in the timber supply review process.

5.2.10 Riparian reserve and management zones

Table 10 lists the area reductions that will be applied to account for riparian reserve zones and riparian management zones along streams and around lakes and wetlands. These areas include:

- areas identified by a stream classification and mapping project for riparian reserve zones or riparian management zones under the *Forest Practices Code*;
- riparian no-harvest areas from the Babine LRUP;
- floodplain areas.

5. Timber Harvesting Land Base Definition

Table 10. Riparian reserve zones

Riparian class	TRIM definition	Gradient	RRZ (metres)	RRZ per cent (%) reduction	RMZ (metres)	RMZ per cent (%) reduction
Low bench	Floodplains of Kitwanga, Kitsequecla, Kispiox, Suskwa, Sicintine, Shelagyote, Cranberry rivers	All	All	100	0	0
Mid bench	Floodplains of Kitwanga, Kitsequecla, Kispiox, Suskwa, Sicintine, Shelagyote, Cranberry rivers	All	All	100	0	0
High bench	Floodplains of Kitwanga, Kitsequecla, Kispiox, Suskwa, Sicintine, Shelagyote, Cranberry rivers	All	0	0	All	25
S1	Skeena, Kispiox, Babine, Sicintine, Kitsequecla, Kitwanga and Suskwa rivers	All	50	100	20	25
S2	River/stream left bank and right bank	All	25	100	20	25
S3/S4	River/stream — definite	< 20%	10	100	25	25
S4	River/stream — indefinite and intermittent	< 20%	0	0	30	25
S6	River/stream — definite, indefinite, and intermittent	> 20%	0	0	20	5
L1	> 5 hectares	N/A	10	100	0	0
L3	< 5 hectares	N/A	0	0	30	25
W1	> 5 hectares	N/A	10	100	40	15
W3	< 5 hectares	N/A	0	0	30	15
W5	Wetland complex	N/A	10	100	40	15

Data source and comments

A GIS analysis was completed for the Kispiox TSA in 1999 using TRIM and slope data to determine the extent of riparian area in the TSA. Fish inventory information was incorporated into the analysis, where available. The resulting map layer consists of stream buffers that identify riparian reserve zones (RRZ) and riparian management zones (RMZ). The assumptions used to create the coverage are presented in the above table and are consistent with the *Forest Practices Code*. A separate floodplain mapping project identified high-, mid- and low-bench areas. Discussions between the Kispiox Forest District staff and the MELP Forest Ecosystem Specialist led to agreement (and district operating procedure) that harvesting was feasible in high bench areas, so they are treated as a RMZ, whereas mid and low benches are treated as a RRZ.

5. Timber Harvesting Land Base Definition

Current management practice (reflected through a district operating procedure) involves 25% retention within all riparian management zones from S1 to S4. Only 5% retention is required on S6 streams.

The GIS analysis was not able to differentiate between S5 and S6 streams. Streams having > 20% gradient and > 3 metres wide (S5) are unusual in this district and have been combined with the S6 streams for the analysis. The GIS data do not identify the wetland class for wetland RMZs, so all wetland RMZs have a common reduction factor of 15%, which reflects an average percentage retention for W1, W3 and W5 wetlands.

5.2.11 Exclusion of specific, geographically defined areas

Table 11 describes additional areas to be excluded from the timber harvesting land base to account for area exclusions not discussed in previous sections.

Table 11. *Exclusion of specific, geographically defined areas*

Inventory source	Area description	Excluded area (hectares)	Reason for exclusion
Babine LRUP	TU ^a 1: Riparian Ecosystems	All	No harvest
Babine LRUP	TU 2: Forest Ecosystem Networks	All	No harvest
Babine LRUP	TU 4: High Value Grizzly Bear Habitat	100 metres buffer around all wetlands	No harvest
Non-standard mapping	Mill Creek Sensitive Area — Cedar stand and reserve zone	All	No harvest

(a) TU = treatment unit.

Data source and comments:

Treatment Unit 1 (Riparian Ecosystem, upland buffers/movement corridors) and Treatment Unit 2 (Forest Ecosystem Networks) are no harvest zones according to the Babine LRUP and current management practices.

To provide screening for grizzly bears in Treatment Unit 4 (High Value Grizzly Bear Habitat) of the *Babine LRUP*, the plan requires that a 100-metre buffer be retained around all high value wetlands in and around cutblocks, and that roads be constructed no closer than 150 metres to high value wetland habitat. For the analysis, a 100-metre buffer around all wetlands in TU 4 will be assumed, since timber harvesting can occur between roads and wetlands as long as a 100-metre buffer is retained.

The *Mill Creek Sensitive Area Plan*, approved by the district manager in 1998, reserves from harvest a rare cedar stand and adjacent reserve zone.

5.2.12 Roads, trails and landings

Separate estimates are made to reflect the loss in productive forest land due to existing and future roads, trails and landings (RTL). Existing RTL estimates are applied as reductions to the current productive forest considered available for harvesting. Future RTL reductions are applied after stands are harvested for the first time in the timber supply model.

5. Timber Harvesting Land Base Definition

Table 12. Estimates for existing and future roads, trails, and landings

Existing RTLs	Road length (kilometres)	Road width (metres)	Total RTLs area (hectares)	Reduction area for age classes 1 and 2 (hectares)	Reduction area for age classes 3+ (hectares)
Secondary roads	315.9	25	789.8	94.2	695.6
Logging roads	2665.6	20	5 331.2	635.8	4 695.4
Trails	1 698.5	10	1 698.5	1 698.5	
Landings			1 133.3	1 133.3	
Total			8 952.8	3 561.8	5 391

Future RTLs	Reduction per cent (%)	Age class
		≥ 3

Data source and comments:

Existing roads, trails and landings

Road lengths for secondary roads, logging roads, and trails were obtained by measuring, by mapsheet, the length of roads with the INVSPECS computer program. All roads are current to 1997 on the inventory files. Road width estimates were obtained from district engineering staff.

The area occupied by landings was obtained from silviculture records and Soil Conservation Surveys conducted in 1995, 1997, and 1998. These surveys show that the average area occupied by landings was 1.4% of the gross cutblock area surveyed. According to the silviculture databases, the total gross cutblock area for the TSA is 80 952.5 hectares. Assuming the same percentage of landings in the un-surveyed cutblocks, the area occupied by landings amounts to 1133.3 hectares.

The Soil Conservation Surveys also showed that 4.4% of the gross cutblock area is occupied by RTLs. This amounts to 3561.9 hectares (4.4% x 80 952 hectares). The balance of the RTLs (8953 – 3562 = 5391 hectares) represents roads outside of cutblocks. The area of RTLs within cutblocks will be removed from stands less than 41 years of age (age classes 1 and 2). The area of RTLs outside of cutblocks will be removed from stands 41 years old and older (age classes 3-). This removal will only be applied to the allocated chart areas (chart not equal 'blank') outside of community watersheds and LRMP special management zones.

Future roads, trails and landings

Once this step is reached in the netdown process, the analyst will calculate the area of timber harvesting land base outside of allocated chart areas, community watersheds and special management zones. The proportion of this timber harvesting land base occupied by existing RTLs (8953 hectares) will be calculated, and that percentage will be applied to account for future RTLs as mature stands are projected for harvest for the first time in the timber supply model.

A preliminary estimate of the reduction for future roads is 7.3%, but this will be refined during the timber supply analysis process.

6. Current Forest Management Assumptions

6.1 Harvesting

6.1.1 Current AAC attributable to the TSA

The current AAC for the Kispiox TSA is 1 092 611 cubic metres per year. Since the last AAC determination, 6406 cubic metres per year has been allocated to new or expanded Woodlot Licences (total Woodlot Licence AAC is now 13 795 cubic metres per year). Therefore, the current harvest level (which excludes allocated Woodlot Licences) for this analysis is considered to be 1 086 205 cubic metres per year.

6.1.2 Utilization levels

The utilization levels define the maximum stump height, minimum top diameter (inside bark) and minimum diameter at breast height by species and are used in the analysis to calculate merchantable volume.

Table 13. Utilization levels

Analysis unit	Utilization		
	Minimum dbh (cm)	Maximum stump height (cm)	Minimum top dib (cm)
All pine	12.5	30	10
All other species	17.5	30	10

Data source and comments:

The above table represents current management practices.

6.1.3 Volume exclusions for mixed species stands

The purpose of this section is to identify any species in mixed species stands that are unmerchantable. The unharvested portion of a stand does not contribute to the estimated stand volume. Table 14 shows which species, or portions thereof, are excluded from affected stands.

Table 14. Volume exclusions for mixed species types

Inventory type group	Species	Volume exclusion (%)
All	All deciduous except cottonwood	100
All	Cottonwood	50

Data source and comments

Cottonwood is the only deciduous species that is commercially harvested along with coniferous species. Since much of the volume is left standing for biodiversity objectives or felled to waste, it is estimated that only 50% of the cottonwood volume in mixed wood stands is utilized. This proportion is based on a comparison of cruised and scale volumes for cottonwood in a sample of mixed wood stands.

6. Current Forest Management Assumptions

6.1.4 Minimum harvestable age derivation

The minimum harvestable age is the time required for a stand to grow to a harvestable size. While harvesting may occur in stands at the minimum ages to meet forest level objectives (e.g., maintaining overall harvest levels for a short period of time or avoiding large changes in harvest levels), most stands will not be harvested until past the minimum ages because of management objectives for other resource values (e.g., requirements for the retention of older forest). Table 15 shows the criterion to be used in deriving minimum harvestable ages.

Table 15. Minimum harvestable age criteria

Analysis unit	Minimum criteria			Minimum harvestable age
	Height class	Diameter	Volume (m ³ /hectare)	
All			200	

Data source and comments:

A review of Silviculture Prescription and Cutting Permit applications for the 1994-1999 period reveals that only stands having a volume of 200 cubic metres per hectare and more are harvested.

6.1.5 Harvest scheduling priorities

Table 16 shows the priorities or minimum harvest levels applicable to certain management zones or analysis units to reflect insect infestations, salvage operations or similar forest management activity.

Table 16. Priorities for scheduling the harvest

Description	Management zone or location	Analysis unit	Period (years)	Scheduling priority
Remote area with no infrastructure (portions of Atna LU and Atna/Shelagyote SMZ)	Harvest priority coverage = 'No'	All	10	No harvest
Unallocated areas	Licensee = 'unallocated'	All	5	No harvest
Big Slide Chart	Chart name = 'Big Slide'	All	70	No harvest

Data source and comments:

A large portion of the Atna Landscape Unit and a portion of the Atna/Shelagyote Special Management Zone have not yet been accessed and it is estimated that it will take a minimum of ten years before any road system can be developed in the area. This area should therefore not be considered available for harvest in the timber supply model until year 11.

Unallocated areas have never been harvested, have no Forest Development Plan in progress or approved, and have not yet undergone a Timber Allocation Plan. These areas will not be harvested in the next five years, as they are currently physically inaccessible. All other areas in the TSA are accessed or expected to be within five years, except for the Atna deferral area as described above.

Logging activities in the Big Slide Chart area, located within the Babine LRUP zone, were completed in 1999. As per the LRUP direction and current management practices, this area will not be available for harvest for the next 70 years.

6. Current Forest Management Assumptions

6.1.6 Silvicultural systems

Table 17 lists the silvicultural systems currently employed in the Kispiox TSA and the respective silvicultural regime.

Table 17. *Silvicultural systems*

Silvicultural system	Eligible analysis units or locations	Per cent (%) retention	# of entries	Time between entries (years)
Clearcut and clearcut with reserves	78% of area in coniferous analysis units and 100% of deciduous analysis units	0 (see notes)	1	N/A
Even age patch cuts (> 1 hectare)	4% of area in coniferous analysis units	50	2	30
Uneven age partial cutting	18% of area in coniferous analysis units	67	3	30
Non-clearcut system	Babine LRUP TU 3	75	4	25
Non-clearcut system	Mill Creek Management Zone	50	2	50

Data source and comments:

For 1987 to 1999, FTAS records indicate that 94% of the area harvested was harvested using clearcut or clearcut with reserve systems. The remaining area was harvested by non-clearcut systems. However there is a significant difference for 1996 to 1998. If only those three years are used, the percentage of clearcut and clearcut with reserves drops to 78%. This trend of increasing partial cutting continues in the current (approved) Forest Development Plans. The percentages for 1996 to 1998 are used as they reflect the *Forest Practices Code* and best represent current management.

Tree patches and reserves left with clearcut systems overlap with riparian reserve and management zones and wildlife tree patches. No further land base or timber yield reductions are required to account for these reserves.

The Babine LRUP states that only single tree selection will be allowed in treatment unit 3 (Linkage Area). This has been interpreted as non-clearcut systems.

The Mill Creek sensitive area management zone objectives and strategies state that a non-clearcut system with 50% basal area removal is permitted.

Areas within coniferous analysis units outside of Babine LRUP treatment unit 3, and Mill Creek management zone will be randomly assigned to analysis units for clearcut, small patch, and uneven-aged partial cutting to meet the target percentages shown in Table 17.

6. Current Forest Management Assumptions

6.2 Unsalvaged losses

Table 18 shows the estimate of average annual unsalvaged volume loss to insect and disease epidemics, fires, wind damage or other agents on the timber harvesting land base. The unsalvaged loss column reflects only areas where the volume is not expected to be recovered or salvaged.

Table 18. *Unsalvaged losses*

Cause of loss	Total loss (m ³ /year)	Annual unsalvaged loss (m ³ /year)
Wildfire	254 224	12 105
Balsam bark beetle		
Windthrow	15 674	735
Total	269 898	12 840

Data source and comments:

Wildfire unsalvaged losses

Data was obtained from the inventory file for fires from 1978 to 1988, and from the Northwest Fire Centre for the period 1989 to 1998. The total activity period for this analysis covers the years 1978 to 1998 (21 years). The inventory file contains records of wildfire and salvage activity beginning in 1958. Wildfire/salvage activity for 1958 to 1977 was not used in data compilation due to the extraordinarily high fire activity during 1958 to 1961 period and the absence of reliable data covering the period 1962 to 1977 (i.e., large number of fires and area burned and no records available respectively). Data selection was limited to the timber harvesting land base of the Kispiox TSA.

Windthrow unsalvaged losses

Data was extracted from the inventory, and the total activity period covers 1971 to 1991 (21 years). No records related to windthrow are available in the inventory for periods prior to 1971 or after 1991. Data selection was limited to the timber harvesting land base of the Kispiox TSA. Cutblock-edge blowdown was not quantified, as no reliable data sources exist.

To estimate the volume losses, the total area burned or blown down was calculated. For the same areas, the size of the area salvaged was calculated. The difference represents the unsalvaged area. Volume losses were estimated by using the average volume per hectare for all merchantable stands in the TSA from the draft *Kispiox TSA Inventory Audit* (387 cubic metres per hectare).

A volume loss study for the balsam bark beetle is currently underway. The results will be considered if they become available prior to the beginning of the analysis process.

6. Current Forest Management Assumptions

6.3 Silviculture

6.3.1 Regeneration activities in managed stands

Recent plantations and future stands will be grown on managed stand yield tables (MSYTs) produced using the Forest Service TIPSy growth and yield model. The table below contains the inputs required to produce MSYTs for the analysis. A MSYT may be built from a number of tables if more than one regeneration method is used within an analysis unit. When this is the case, tables are produced for the different regeneration methods (each method and species combination) and are then aggregated into one table.

The specifications contained in Table 19 apply only to stands managed under the clearcut and even-aged patch cut silvicultural systems. The even-aged patch cut system creates sufficiently large openings that there is no shading of regeneration. Analysis units managed under the uneven-aged partial cut and non-clearcut systems result in shading of regeneration. For those analysis units, the original VDYP yield tables adjusted for the partial harvesting regime will be used.

For partial cutting systems, Table 17, "Silvicultural systems" lists the levels of retention and return intervals to be used in the analysis.

Table 19. Regeneration assumptions by analysis unit

Existing analysis unit ^a	Regen. analysis unit	Site index (m @ 50 years)	Description	Regen. delay (years)	OAFs ^b		Method	Species		Density (sph)		
					1	2		Type	%	Code	%	Initial
1, 101 51, 151	101 151	21.4 21.5	Hemlock good site	5	15	5	Plant	100	Hw PI Sw	30 30 40	3000	30% to 1600
2, 102 52, 152	102 152	16.6 15.6	Hemlock medium site	5	15	5	Plant	100	Hw PI Sw	40 20 40	3000	30% to 1600
3, 103 53, 153	103 153	12.1 10.7	Hemlock poor site	5	15	5	Plant	100	Hw PI Sw	40 20 40	3000	30% to 1600
4, 104 54, 154	104 154	22.7 23.1	Fir good site	0	15	5	Plant	100	Hw Sw	40 60	3000	30% to 1600
5, 105 55, 155	105 155	17.0 16.4	Fir medium site	5	15	5	Plant	100	BI Hw PI Sw	15 15 10 60	3000	30% to 1600
6, 106 56, 156	106 156	12.9 10.5	Fir poor site	5	15	5	Plant	100	BI Sw	20 80	3000	30% to 1600
7, 107 57, 157	107 157	28.9 29.2	Spruce good site	0	15	5	Plant	100	PI Sw	30 70	3000	30% to 1600

(a) See Table 4 and discussion below for a description of the meaning of analysis unit numbers.

(b) Operational adjustment factors (OAFs) are used to adjust timber yield estimates to account for operational factors. OAF1 is a constant percentage reduction to account for small unproductive areas within stands, uneven stem distribution and endemic losses that do not increase with age. OAF2 accounts for losses that increase with stand age, for example decay due to disease. In this case OAF2 increases from 0 at stand establishment and passes through 5% at 100 years of age.

continued

6. Current Forest Management Assumptions

Table 19. Regeneration assumptions by analysis unit (concluded)

Existing analysis unit ^a	Regen. analysis unit	Site index (m @ 50 years)	Description	Regen. delay (years)	OAFs ^b %		Method	Species		Density (sph)		
					1	2		Type	%	Code	%	Initial
8, 108 58, 158	108 158	19.6 18.9	Spruce medium site	0	15	5	Plant	100	Hw PI Sw	20 40 40	3000	30% to 1600
9, 109 59, 159	109 159	13.7 11.9	Spruce poor site	0	15	5	Plant	100	Cw Hw Sw	10 70 20	3000	30% to 1600
10, 110 60, 160	110 160	22.9 23.5	Pine good site	0	15	5	Plant	100	PI Sw	70 30	3000	30% to 1600
11, 111 61, 161	111 161	17.8 16.9	Pine medium site	0	15	5	Plant	100	PI Sw	70 30	3000	30% to 1600
12, 112 62, 162	112 162	12.0 12.9	Pine poor site	0	15	5	Plant	100	BI PI Sw	10 60 30	3000	30% to 1600
13, 113 63, 163	113 163	22.0 20.4	Cedar good site	0	15	5	Plant	100	Cw Sw	50 50	3000	30% to 1600
14, 114 64, 164	114 164	16.8 16.6	Cedar medium site	0	15	5	Plant	100	Cw PI Sw	20 50 30	3000	30% to 1600
15, 115 65, 165	115 165	13.3 12.7	Cedar poor site	0	15	5	Plant	100	Cw PI Sw	30 50 20	3000	30% to 1600
16, 116	116	21.4	Cottonwood– coniferous good site	0	15	5	Plant	100	Hw Sw	80 20	3000	30% to 1600
17, 117	117	19.6	Cottonwood– coniferous medium site	0	15	5	Plant	100	Cw Hw Sw	15 15 70	3000	30% to 1600
18, 118	118	12.0	Cottonwood– coniferous poor site	0	15	5	Plant	100	PI	100	3000	30% to 1600

(a) See Table 4 and discussion below for a description of the meaning of analysis unit numbers.

(c) Operational adjustment factors (OAFs) are used to adjust timber yield estimates to account for operational factors. OAF1 is a constant percentage reduction to account for small unproductive areas within stands, uneven stem distribution and endemic losses that do not increase with age. OAF2 accounts for losses that increase with stand age, for example decay due to disease. In this case OAF2 increases from 0 at stand establishment and passes through 5% at 100 years of age.

6. Current Forest Management Assumptions

Data source and comments:

The area-weighted mean site index for each existing natural stand analysis unit (i.e., 1-65) will be used to generate timber yield tables for the corresponding regenerated analysis unit (i.e., 101-165). For coniferous analysis units, the site index applies to the original leading species in the analysis unit. For deciduous analysis units, the site index shown for the analysis unit that corresponds with the regenerated leading species (e.g., Hw for analysis unit 16) will be used. All site indices will be converted to appropriate site indices for the other species being planted in each regenerated analysis unit. The timber supply analyst may aggregate analysis units if yield tables are similar.

All the land in the Kispiox TSA is planted with conifers. However, the records of crop development indicate that a proportion of land still develops into stands with different composition than anticipated. This evolution can be attributed to a combination of natural regeneration and release of advanced natural regeneration. This is most obvious in two cases. Harvested hemlock timber types, although typically planted with spruce and pine, develop at 5-20 years into leading-hemlock stands. The other case is balsam (fir) in the ESSF zones. Fir has not been planted historically, however, these stands have frequently returned to leading fir. Regeneration delay was increased in these situations to account for natural ingress. Natural ingress of all species is common in the ICH zone.

There are occasions, specific to backlog blocks, where the deciduous component is considered acceptable. This is evident where previous timber types were deciduous leading. However, deciduous ingress will not be modelled explicitly. Deciduous ingress, if any, cannot exceed 10% in managed stands, so it is assumed that it does not compete with the coniferous species at the densities shown in Table 19. It is further assumed that the deciduous volume of managed stands will not be harvested in the future, so it is not included in the regeneration specifications.

Regeneration delay for most stand types is met by planting one-year-old stock one season after harvest. Analysis of planting between 1996 and 1999 for all licensees throughout the Kispiox Forest District show that the average time between harvesting and planting is 1.02 years (ICH is 1.0, CWH is 1.04, and ESSF is 0.94).

Blocks are currently being planted in a "mixed bag" method. An analysis of all blocks planted by the Kispiox Forest District between 1996 and 1999 shows that in the ESSF zone, an average of 1.7 species planted per block. However, this translates to 43% of the blocks are planted with single species, yet this represents only 25% of the area. In the ICH zone, on the other hand, an average of 2.8 species is planted on each block. Only 13% of the blocks (19% of the area) are planted with single species.

The species listed in the "species code" in Table 19 refer to the leading species of the regenerated stands. This was derived through an *Integrated Silviculture Information System* (ISIS) and *Major License Silvicultural Information System* (MLSIS) analysis of all regenerated blocks within the Kispiox TSA, in which the data set was first sorted by previous timber type and site class, and then within each of these categories by silviculture label-leading species. It was then possible to calculate the amount of area regenerated to each species and then convert that value to per cent of land regenerated to each species.

6. Current Forest Management Assumptions

The density of 3000 stems per hectare accounts for planting densities of 1200 to 1600 plus ingress. Planting densities for the past 3 years, in both the Kispiox and neighbouring Cranberry TSAs combined indicate that first-plant blocks are being planted to 1338 stems per hectare in the ICH and 1579 stems per hectares in the ESSF. Within the district programs, spacing is considered when countable conifers have exceeded 3000 stems per hectare and often is performed in conjunction with brushing treatments to improve economic efficiencies. Spacing reduces stand density to a target of 1600 stems. It is expected that licensees will only space when density exceeds the maximum density of 10,000 stems per hectares allowed in the standards. As SBFEP currently represents 22% of the Kispiox TSA harvest volume, thinning should occur on 30% of the regenerated stands to account for SBFEP and periodic licensee spacing.

Prior to the analysis, district staff will determine the proportion of seedlings planted in the Kispiox timber supply area that are from seed orchards producing improved stock. The expected percentage increase in use of improved stock over the next 10 years will also be determined. The analysis will account for the current use of genetically improved stock by seed planning unit.

For partial cutting systems, Table 17, "Silvicultural systems" lists the levels of retention and return intervals to be used for the analysis.

6.3.2 Immature plantation history

This section identifies areas of existing immature forest where the density (stems per hectare) has been controlled and therefore should be assigned to a managed stand yield table (MSYT).

Table 20. Immature plantation history

Analysis unit	Area managed (%)				
	Age 1 – 10	Age 11 – 20	Age 21 – 30	Age 31 – 40	Age 40+
All	100	100	0	0	0

Data source and comments

For the purposes of this timber supply review, stands older than 20 years will be considered unmanaged. Under the current FRBC funding structure and levels, only 1000 hectares per year of backlog land (harvested pre-1987) has been brushed and/or spaced over the last 2 years. Indications are that this level will not be increased for the 2000 field season and beyond. This could result in backlog conifer stands currently classified as satisfactorily restocked being overcome with deciduous competition. The potential timber supply impact of decreased funding levels for brushing and/or spacing will be tested through a critical issue analysis (reduce conifer component by 40%, which is equivalent to shifting stocking from the target — 1200 sph — to the minimum — 700 sph).

6.3.3 Not satisfactorily restocked (NSR) areas

Some land classified in the Kispiox TSA forest cover inventory as type identity 4 or 9 is included in the current timber harvesting land base. These type identities indicate not satisfactorily restocked land base. This section identifies the total area of NSR currently existing in the timber harvesting land base, and the estimated rate at which the NSR area will be restocked.

6. Current Forest Management Assumptions

Table 21. Not satisfactorily restocked (NSR) areas

Analysis unit	Inventory NSR (hectares)	ISIS NSR (hectares)	Area of NSR (hectares) (years from now)			
			Restocked	1 – 5	5 – 10	11 – 30
Backlog NSR outside timber harvesting land base						
N/A	3 150	1 706	1 444	285	285	1 136
Backlog NSR inside timber harvesting land base						
2	220	173	47	86	87	
5	265	209	56	105	104	
8	451	355	96	177	178	
15	188	148	40	74	74	
Subtotal	1 124	885	239	442	443	
Current NSR inside timber harvesting land base						
102	1 261	993	268	993		
105	3 462	2 726	736	2 726		
111	781	615	166	615		
114	245	193	52	193		
Subtotal	5 749	4 527	1 222	4 527		
Total	10 023	7 118	2 905	5 254	728	1 136

Data source and comments:

Backlog NSR consists of 884.9 hectares on blocks harvested prior to October 1987. Planting backlog NSR is currently subject to funding pressures. The last two years have seen increased expenses and effort particularly for the development of *Backlog Silviculture Prescriptions* and layout. Treatment priorities are in flux as a result of insecure backlog funding levels (and funding agencies). Budgets and staffing levels have been limiting to treatment capacity, as illustrated by the following backlog planting figures:

Planting year	Backlog area planted (hectares)
1996	80.1
1997	219.0
1998	138.0
1999	58.7
2000	0.0 (planned)

6. Current Forest Management Assumptions

Current NSR applies to blocks logged between October 1987 and September 9, 1999. The inventory label for leading species was used to assign analysis units. According to ISIS, there are 4527 hectares of current NSR.

Information on SBFEP NSR was derived in one of two ways. Planted blocks classified as NSR were sorted by inventory label species and site index. Blocks that had been harvested and not yet planted were sorted by preferred species as prescribed in the SP. Site index was assigned based on pre-harvest estimates.

It was not possible to attain inventory labels for current NSR for licensees other than SBFEP. As a result, analysis units were sorted on the basis of the primary preferred species as prescribed in the SP.

All NSR area is managed under a clearcut silvicultural system.

The total Inventory NSR area in Table 21 includes only areas within the timber harvesting land base or areas outside of the timber harvesting land base that contribute to landscape-level biodiversity (i.e., Crown ownerships 61, 62, 69). Analysis units were determined from ISIS species and site index information described above, and were amalgamated where individual analysis unit areas were small. Analysis units were assigned to the inventory NSR inside the timber harvesting land base in the same proportion as they exist for the corresponding ISIS NSR. Backlog NSR outside the timber harvesting land base will all be assigned to a single analysis unit because timber yields do not need to be tracked outside of the timber harvesting land base.

NSR areas in the inventory data set will be randomly assigned to analysis units and age classes according to the information presented in Table 21.

6.4 Integrated resource management

6.4.1 Forest cover requirements

As noted in Section 4.1, "Management zones, groups and objectives," forest cover requirements may be examined at a number of different levels, including landscape units, wildlife areas, and visual quality areas. With the requirement to retain different forest characteristics across the landscape, it is important to identify how non-contributing forest (productive forest which does not contribute to the timber harvesting land base) may be considered in the forest cover requirements (i.e., maximum allowable disturbance or minimum area retention).

The following tables describe the forest cover requirements to be applied.

6. Current Forest Management Assumptions

Table 22a. Forest cover requirements

Zone or group or resource emphasis	Maximum allowable disturbance (% area)	Green-up height (metres) or age ^a (years) ^a	Minimum retained area (%)	Minimum age for retention (years)	Land base to which constraints apply
IRM – cutblock adjacency	33	3 metres			Timber harvesting land base
Retention VQO	See Table 22c	6 metres			Crown forested
Partial retention VQO	See Table 22c	6 metres			Crown forested
Community watersheds					
Dale Creek	21	6 metres / 34 years			Total area
Juniper Creek	21	6 metres / 38 years			
Kits Creek	21	6 metres / 32 years			
Quirmas Creek	21	6 metres / 38 years			
Sikedakh Creek	21	6 metres / 35 years			
Station Creek	21	6 metres / 29 years			
Ten Link Creek	21	6 metres / 35 years			
Two Mile Creek	21	6 metres / 30 years			
Babine LRUP — SBS					
Gail Subdrainage	50	20 years	30	80	Crown forested
Shenismike	50	20 years	30	80	
Shelagyote North	50	20 years	30	80	
Shelagyote South	50	20 years	30	80	
Shedin	50	20 years	30	80	
Babine LRUP — ESSF					
Gail Subdrainage	30	20 years	50	80	Crown forested
Shenismike	30	20 years	50	80	
Shelagyote North	30	20 years	50	80	
Shelagyote South	30	20 years	50	80	
Shedin	30	20 years	50	80	
Babine SMZ			30	140	Crown forested
Deer winter range			6	150	Crown forested
Landscape units — old growth (Kispiox LRMP)			12	200	Crown forested
Landscape units — water quality	15	6 metres See Table 22d for age			Total forested

(a) All green-up ages in Tables 22a., 22c., and 22d. are preliminary and will be refined prior to the commencement of the timber supply analysis.

6. Current Forest Management Assumptions

Data source and comments:

The requirement for cutblock adjacency will be applied to stands managed under the clearcut and small patch cut silvicultural systems within the integrated resource management (IRM) zone of each landscape unit. The IRM zone is defined as the area in the timber harvesting land base outside of VQOs and community watersheds. The deer winter range area is considered part of the IRM zone for applying cutblock adjacency requirements. Green-up height will be converted to a unique green-up age for each landscape unit (Table 22c.). The *Kispiox LRMP* and the *Forest Practices Code* specify these requirements. Where silvicultural systems involving over 40% retention are used, the area will not be subject to green-up requirements.

Visual quality objectives (VQO) green-up requirements were identified through field analysis of existing cutblocks within the TSA. Green-up height will be converted to a unique green-up age for each combination of landscape unit and VQO (Table 22c). Modification 1 and 2 were developed by the district as part of the visual impact mitigation strategy. The VQOs were assigned as shown in Table 22b.

Table 22b. Assignment of VQOs

Final visual sensitivity class	Recommended VQO	% alteration by VAC ^a (planimetric)		
		Low	Medium	High
1	Retention	1.1	3.0	5.0
2	Retention	1.1	3.0	5.0
3	Partial retention	5.1	10.0	15.0
3	Modification 1	5.1	11.5	18.0
4	Modification 2	15.1	20.0	25.0
5	Modification 2	15.1	20.0	25.0

(a) VAC = visual absorption capacity.

The maximum allowable disturbance and green-up age for each combination of landscape unit and VQO is calculated by area weighting the per cent alteration shown in Table 22b. The results of these calculations are shown in Table 22c.

6. Current Forest Management Assumptions

Table 22c. IRM green-up ages and maximum allowable disturbance and green-up ages in VQOs

Landscape unit	IRM green-up ages ^a (years to 3 metres)	VQO maximum allowable disturbance (%) and green-up age (years)			
		Retention	Partial retention	Modification 1	Modification 2
Atna	28		5.1% / 44 years	10.7% / 44 years	
Babine	26				
Babine River	26	1.4% / 29 years	7.4% / 38 years	7.7% / 37 years	20.0% / 31 years
Cranberry River	21	3.0% / 25 years	10.0% / 24 years	12.8% / 31 years	20.0% / 37 years
Deep Canoe	22		10.0% / 38 years		
Gail	26		9.9% / 37 years	10.8% / 41 years	
Hanawald	26		9.3% / 43 years	7.2% / 42 years	
Hazelton	18	1.7% / 28 years	9.5% / 31 years	11.6% / 30 years	24.6% / 27 years
Juniper	17		8.4% / 43 years	8.4% / 31 years	
Kispiox	20		10.1% / 35 years	13.9% / 33 years	20.6% / 35 years
Kitsegucla	22		10.0% / 36 years	12.1% / 32 years	25.0% / 29 years
Kitwancool	20		5.1% / 44 years	10.2% / 31 years	20.0% / 30 years
Kitwanga	19	1.1% / 28 years		11.2% / 32 years	
Kuldo	25		10.0% / 37 years	11.5% / 33 years	
Larkworthy	24	1.3% / 36 years	7.8% / 37 years	11.1% / 36 years	
McCully	23	3.0% / 34 years	10.0% / 30 years	11.5% / 38 years	20.0% / 30 years
Moonlit	21	2.3% / 30 years	9.4% / 29 years	11.3% / 29 years	
Natlan	23			11.5% / 36 years	25.0% / 34 years
Seven Sisters	20	3.0% / 32 years	6.0% / 34 years	11.4% / 31 years	
Shedin	25	2.0% / 39 years	7.6% / 38 years	6.3% / 37 years	
Shegunia	24	3.0% / 36 years			
Sheladamus	26	1.1% / 38 years	5.1% / 38 years		
Shelagyote	28	1.1% / 44 years	5.1% / 40 years	10.6% / 44 years	
Sicintine	27	1.1% / 37 years	5.1% / 40 years		
Skeena Crossing	18	3.0% / 31 years	11.8% / 33 years	11.7% / 30 years	22.2% / 27 years
Skeena West	13		5.1% / 39 years	10.8% / 27 years	
Suskwa	22	1.1% / 36 years	5.5% / 37 years	11.5% / 28 years	25.0% / 38 years
Sweetin	23	2.3% / 40 years	10.0% / 35 years		20.0% / 32 years
Tenas	21	1.9% / 34 years	9.0% / 36 years	9.7% / 35 years	20.0% / 40 years
Upper Cranberry	23			9.3% / 34 years	
Upper Kispiox	22	2.3% / 39 years		8.2% / 34 years	

(a) All green-up ages are preliminary and will be refined prior to the commencement of the timber supply analysis.

6. Current Forest Management Assumptions

The maximum allowable disturbance value will be applied to the entire forested land base, so no adjustment to the per cent requirements is required to account for the total forest to harvestable forest (green operable) ratio. No adjustment is required for dispersion of operable and non-operable forest because Visual Absorption Capacity (VAC) accounts for dispersion.

The requirements for community watersheds and landscape unit water quality assume an equivalent clearcut area (ECA) of 30% and 22% respectively. The *Kispiox LRMP* specifies the landscape unit water quality requirement. The maximum allowable disturbance listed in Table 22a in both cases is based on interpretation of the percentage recovery by height guidelines presented in the *Watershed Assessment Procedures Guidebook* (1999), Appendix A, and a calculation developed by Timber Supply Branch. The equation accounts for the gradual recovery of harvested areas, and approximates the forest cover requirement applicable to a 6-metre stand height that would achieve the desired ECA. The requirement for community watersheds in Table 22a indicates that this requirement is applied to the total area. Since the timber supply model only considers the forested area, the requirement will be adjusted to reflect the ratio of forested-to-total area. The green-up ages for landscape unit water quality are shown in Table 22d.

Table 22d. Green-up ages for landscape unit water quality

Landscape unit	Green-up age (years) ^a
Skeena West	21
Juniper	26
Skeena Crossing, Hazelton	28
Kitwanga	29
Kitwancool	30
Kispiox, Moonlit, Seven Sisters	31
Cranberry River	32
Kitseguecla, Tenas	33
Suskwa, Upper Cranberry	34
Deep Canoe, McCully, Upper Kispiox	35
Natlan, Sweetin	36
Larkworthy, Shegunia	37
Babine, Babine River, Gail, Hanawald	39
Kuldo, Shedin, Sheladamus	40
Sicintine	41
Shelagyote	42
Atna	43

(a) All green-up ages are preliminary and will be refined prior to the commencement of the timber supply analysis.

6. Current Forest Management Assumptions

The *Babine LRUP* specifies seral stage retention targets, by biogeoclimatic zone, within each subdrainage within the LRUP area. The *Babine LRUP* specifies seral stage and rotation length requirements for the special management zone.

The *Kispiox LRMP* states that 15% of high value deer winter range be managed on a rotation of 150 years. Of that 15%, at least 40% must be older than 150 years at all times. Therefore, a minimum of 6% of high value deer winter range must be older than 150 years at any time.

The *Kispiox LRMP* states that a minimum of 12% of the forested area within a landscape unit must be older than 200 years at any time.

Old-seral requirements for landscape-level biodiversity are shown in Table 22e. In areas where non-clearcut systems are used, only areas with greater than 70% retention will contribute to the old-seral requirement. These requirements will be applied by landscape unit and BEC variant.

Table 22e. Old-seral requirements by biogeoclimatic variant

Biogeoclimatic variant	Natural disturbance type	Old-seral requirement (%) starting in year			Age (years)	Land base to which constraints apply
		1	71	141		
ESSF wv MH mm2	1	14.2	17.1	19.9	> 250	Crown forested area
CWH ws2 ESSF mc ICH mc1 ICH mc2	2	6.7	8.1	9.4	> 250	Crown forested area
SBS mc2	3	8.2	9.9	11.5	> 140	Crown forested area

The percentages in Table 22e are calculated as follows:

Year 1: $\text{low \%} * 0.333 * 0.45 + \text{medium \%} * 0.45 + \text{high \%} * 0.10$

Year 71: $\text{low \%} * 0.667 * 0.45 + \text{medium \%} * 0.45 + \text{high \%} * 0.10$

Year 141: $\text{low \%} * 0.45 + \text{medium \%} * 0.45 + \text{high \%} * 0.10$

where low %, medium % and high % are the old-seral requirements for low-, medium- and high-BEOs contained in the *Forest Practices Code Landscape Unit Planning Guide (LUPG)*.

Although current policy is not to apply the mature plus old-seral requirement, a critical issue analysis will examine its impact on timber supply. An average mature plus old seral requirement will be applied by biogeoclimatic variant within each landscape unit. This will be calculated in the same manner as the old-seral requirement, except that the entire requirement will apply beginning immediately (i.e., the retention percentages shown in Table 22e for year 141 when the full old-seral requirement applies). The mature plus old requirements are shown in Table 22f.

6. Current Forest Management Assumptions

Table 22f. Mature plus old seral requirements by biogeoclimatic variant

Biogeoclimatic variant	Natural disturbance type	Mature+old seral requirement (%) (starting in year 1)	Age (years)	Land base to which constraints apply
ESSF wv MH mm2	1	30.2	> 120	Crown forested area
CWH ws2	2	28.1	> 80	Crown forested area
ESSF mc		23.1	> 120	
ICH mc1		25.3	> 100	
ICH mc2		25.3	> 100	
SBS mc2	3	18.7	> 100	Crown forested area

For a critical issue analysis, the old and mature plus old seral requirements recommended in the *LUPG* for the draft BEOs outlined in Table 23, will be applied instead of an average BEO for each landscape unit.

Table 23. Draft landscape units and biodiversity emphasis assignment

Biodiversity emphasis assignment (1999)	Landscape units		
Low	Atna Deep Canoe Gail Hanawald Juniper Kispiox	Kitwancool Kitwanga Kuldo Larkworthy Moonlit Natlan	Seven Sisters Shedin Skeena West Upper Cranberry Upper Kispiox
Intermediate	Cranberry River Hazelton McCully Shegunia	Sheladamus Sicintine Skeena Crossing	Suskwa Sweetin Tenas
High	Babine River	Kitsequecla	Shelagyote

6. Current Forest Management Assumptions

6.5 Wildlife trees and other reserves

According to recommendations in the LUPG, trees are left standing in cutblocks to maintain structural attributes for wildlife habitat and stand-level biodiversity. However, Kispiox forest district staff have found that some unmapped marginally- or non-productive forest areas and other reserves (e.g. small riparian areas) are being retained in addition to areas left specifically as wildlife tree patches. During the surveys for wildlife trees, it was not possible to distinguish areas left specifically to meet stand-level biodiversity objectives from other areas.

Table 24 summarizes the portion of stand area that is currently being retained in wildlife tree and marginally productive forest patches. This retention will be represented in the analysis by land base and/or volume reductions in order to account for the contributions of the patches to both stand- and landscape-level biodiversity.

Table 24. Reductions to reflect volume retention for wildlife trees and other reserves

Management zone	Analysis unit	Persistence	% recommended in LUPG	Residual volume or area estimate on the timber harvesting land base (%)
All	All	Long term	3	10.9

Data source and comments:

Wildlife tree patch (WTP) retention requirements for the Kispiox Forest District are outlined in a biodiversity district operating procedure (DOP). This DOP is consistent with the *Draft Provincial Wildlife Tree Policy and Management Recommendations, December 1999* prepared by the Forest Practices Branch (MoF) and the Habitat Branch (MELP). Current management practices reflect the DOP.

Within the TSA, forest patches are reserved from harvest for a number of reasons. These include, but are not limited to, maintenance of riparian habitat around small unmapped waterbodies, removal of non-productive and inoperable areas, and management for other non-timber resources.

A review of all blocks logged between 1992 and 1997 with in-block retention (148 blocks), showed that on average, 7.1% was retained as wildlife tree patches. A subsequent review was conducted to calculate the percentage of WTP retained on 179 blocks harvested between January 1, 1997 and August 1, 2000. This second review shows that WTPs occupy about 11% of the net forested area of the blocks. Patches contributing only to stand-level retention (less than two hectares) account for 3.8% of the net forested area, while patches contributing to both stand- and landscape-level retention (greater than two hectares) account for 7.1% of the total. For the purpose of this timber supply review, the results from the second WTP analysis will be modelled. Estimates of wildlife tree patch retention over the next five years, as identified in forest development plans, show that the per cent retention indicated in the second study will be maintained or increased.

The following areas were not included in the calculation of WTP: aggregate harvest units larger than 150 hectares, partial cut areas with a mature residual component, areas reserved for future entry, and areas already accounted for in timber supply deductions (e.g., Telegraph Trail, and riparian areas identified on TRIM maps). Where non-productive or non-forested areas were not quantifiable in the area summary, maps, or the silviculture prescription, it was assumed that the entire reserve was forested. Where non-forested or non-productive areas were apparent within a reserve, but had been separated in the area summary, these areas were measured and deducted from the forested area. Thus, the net forested area used in WTP calculations does not include non-commercial, non-productive, and inoperable areas, riparian reserves and management zones, cultural heritage features, or roads.

6. Current Forest Management Assumptions

Table A3.1 of the *LUPG* recommends an average 3% WTP retention for the Kispiox TSA. Current management practice is 7.9% higher than recommended in the guidebook for the following reasons:

1. Areas are identified during silviculture prescription development that are unavailable for timber harvesting. These may be small riparian areas, low productivity sites, or wet soils that are situated within a forest stand that is otherwise classified as available for timber harvesting using forest cover inventory attributes.
2. For timber supply review, the per cent retention would normally be reduced to account for overlap with areas outside of the timber harvesting land base (e.g., riparian areas, low timber productivity). A review of WTPs identified in silviculture prescriptions compared with the forest inventory shows that these riparian areas, low productivity sites and wet soils are not identified on the forest inventory and are not accounted for by any other netdowns. The difference in scales used for silviculture prescription development (1:5,000) and the forest inventory (1:20,000) is the cause of this discrepancy.
3. A large percentage of the WTPs (7.1%) meet landscape-level biodiversity objectives outlined in the *LRMP* (see Table 22a, "Forest cover requirements").

In the timber supply model, the 7.1% portion of the retained patches that contributes to landscape-level biodiversity will also contribute to the old-growth forest cover requirements from the *Kispiox LRMP* (Table 22a), as well as the old-seral forest cover requirements (Table 22e). A critical issue analysis will examine the impact of a 3.8% WTP requirement (those that contribute only to stand-level biodiversity) in conjunction with these old-growth forest cover requirements.

7. Critical Issue and Sensitivity Analyses

Critical issue analysis is used to determine the timber supply impact of defined issues. For example, a land use decision may be pending that includes the designation of new protected areas. There may be uncertainty about the decision, but the size and location of the proposed protected areas is known with certainty. Table 25 lists the intended critical issue analyses.

Sensitivity analysis can provide a measure of the timber supply impact of uncertainty in management assumptions and/or data. In sensitivity analysis, the magnitude and direction of the uncertainty is unknown, so both upper and lower limits are tested. By developing and testing a number of sensitivity analyses, it is possible to determine which variables most affect results. Table 26 lists the sensitivity analyses to be performed.

Table 25. Critical issues

Issue to be tested	Method
Landscape-level biodiversity — draft biodiversity emphasis options	Test draft BEOs — old-seral requirements only (with drawdown in low BEO).
Landscape-level biodiversity — old-seral requirements	No drawdown in low BEO (using draft BEOs).
Landscape-level biodiversity — mature plus old seral requirements	Test requirements using draft BEOs.
Landscape-level biodiversity — all seral stage requirements (early, mature plus old, old)	Test requirements using draft BEOs.
Landscape-level biodiversity — LRMP old-growth requirement and wildlife tree patches	Test 12 % LRMP old-growth requirement over the entire Crown forested land base while testing a 3.8% WTP retention. Test recommended WTP per cent retention from the LUPG / old-seral forest cover requirement.
Landscape-level biodiversity — LRMP old-growth requirement and wildlife tree patches	Test 12% LRMP old-growth requirement over the entire crown forested land base while testing a 3.8% WTP retention. Test recommended WTP per cent retention from the LUPG / old-seral forest cover requirement.
Deferrals (Atna landscape unit and unallocated chart areas)	Test timber supply sensitivity of deferrals — test with no deferrals.
Botanical forest products (pine mushrooms)	Retention of basal area in ICHmc and CWHws, Hw & PI stands, poor site index, and < 150 years old to be determined prior to commencement of the analysis.
Conifer composition of backlog silviculture stands	Reduce conifer component by 40% to test the impact of reduced stand tending funding on stocking levels (equivalent to shifting stocking from targets –1200 sph to minimums – 700 sph).
Riparian reserve zones	Add high bench to riparian reserve zone.
Riparian management zone	Reduce % retained in the RMZ of S1 to S4 to 15%.
Existing stand yields	– 13% (inventory audit).

7. Critical Issue and Sensitivity Analyses

Table 26. Sensitivity issues

Issue to be tested	Sensitivity levels
Minimum harvestable age definition	+ 25 cubic metres per hectare
Regenerated stand yields	+ 15%
Age when forest achieves "old" forest characteristics	+ 20 years
Timber harvesting land base changes	+ 10%
Visual quality objectives	Lower and upper range for allowable disturbance for all VQOs regardless of visual absorption capacity.
Harvest flow alternatives	Various alternatives to the base case, including harvest flow recommended by the Kispiox TSA Harvest Level Committee in 1993.
Site index for older stands	Adjust for old stands following harvest using the results of the provincial <i>Old Growth Site Index</i> (OGSI) study.
Green-up periods	+ 5 years
Adjacency guidelines	Find the threshold for maximum disturbed area that disrupts timber supply.

Data source and comments:

The critical issue analysis for existing stand yields is based on the inventory audit report for the Kispiox TSA.

In July 1993, the Kispiox TSA Harvest Level Committee recommended an immediate reduction of the AAC of 2% per year until the long-term harvest level is reached.