

# **Merritt Timber Supply Area Timber Supply Review**

## **Data Package**

September 1999



District Manager  
Merritt Forest District



Director  
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# 1. Introduction

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This data package outlines the basic information and assumptions that are required for the Merritt Timber Supply Area (TSA) timber supply analysis.

The completed data package contains those inputs that are a part of current performance for the timber supply area. For the purpose of 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 (5-year development) plans;
- fully implemented land-use plans;
- land-use decisions approved by Cabinet;
- approved higher level plans under the Forest Practices Code (FPC); and
- other approved B.C. Forest Service and joint agency forest management practices and policies.

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 is organized in the following way:

- 1) A short explanation of the data required;
- 2) Data table; and
- 3) The source of the data and comments.

The information presented in this data package, while representing the best available knowledge and information today, is subject to change. In some sections the criteria for determining various factors (e.g., minimum harvestable ages) are shown, but final values will not be known until the inventory file has been received, the timber harvesting land base determined, and timber yield tables generated. In addition, if any major changes to management regimes occur over the next few months the timber supply analysis will attempt to capture these changes. The final timber supply analysis report will include a technical appendix that highlights any changes made to this package.

## 2. Current Forest Management Considerations and Issues

### 2.1 Base case management assumptions

The analysis assumptions described below reflect current performance with respect to the status of forest land, forest management practices and knowledge of timber growth and yield. The base case harvest forecast will be developed from these assumptions, and will be used as a baseline. Section 7, “Sensitivity Analyses,” outlines areas of uncertainty in data and assumptions, and outlines intended sensitivity analysis.

### 2.1 Statement of major forest management considerations and issues

Table 1 lists the major forest management considerations for the Merritt TSA. Where issues are defined within legislation, regulations or standards, a timber supply assessment will be made. If there are important uncertainties in defining current management, sensitivity analysis may assist in assessing the potential timber supply implications and assigning degrees of risk to timber supply.

Table 1 Major forest management considerations

| Consideration/Issue                    | Description                                                                                                                                                                                                                                                                                                                |
|----------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Landscape and stand level biodiversity | Biodiversity values at both the stand and landscape level are to be maintained according to guidance found in the Biodiversity Guidebook, the Landscape Unit Planning Guide, and additional policy direction regarding the implementation of biodiversity management. Draft landscape units will be used in the base case. |
| Community watersheds                   | To protect the drinking water which originates in designated community watersheds, a maximum level of disturbance (hydrologic green-up) will be modeled for each community watershed.                                                                                                                                      |
| Visual quality objectives              | Scenic areas with Visual Quality Objectives (VQO's) will be modeled to account for the maintenance of the scenic resource.                                                                                                                                                                                                 |
| Ungulate winter range                  | Defined areas are managed in order to maintain ungulate winter range. These areas will be modeled with appropriate forest cover constraints.                                                                                                                                                                               |
| Lakeshore management areas             | Lakeshore Management Zones and Lake Classifications under the approved Merritt TSA Lakes Classification Process will be modeled to account for forest management occurring around lakes.                                                                                                                                   |
| Riparian management areas              | The FPC directs management practices within riparian management areas along streams, and around wetlands and lakes. A “riparian zone” which incorporates the reserve and management zones will be modeled.                                                                                                                 |
| Protected areas                        | Existing parks and ecological reserves will be excluded from the timber harvesting land base in the base case. Proposed protected areas will be assessed through sensitivity analysis.                                                                                                                                     |

## 3. Inventories

### 3.1 Background information

Tables 2 and 3 list the inventories that will be used to define the timber harvesting land base and model forest management activities.

Table 2. Forest inventory information

| Data                                 | Mapsheets / letter block                                                                                                                     | Year of re-inventory | Re-inventory photo age | Updated to | Projection date |
|--------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------|----------------------|------------------------|------------|-----------------|
| <b>A. Merritt Forest District</b>    |                                                                                                                                              |                      |                        |            |                 |
| <b>FC1s</b>                          | <b>82L:</b> 001, 011, 021, 031                                                                                                               | 1991                 | 1991                   | 1992       | 1999            |
| - Forest cover                       |                                                                                                                                              |                      |                        |            |                 |
| - Operability                        | <b>82E</b> 031, 041, 051                                                                                                                     | 1991                 | 1991                   | 1992       | 1999            |
| - Biogeoclimatic classifications     |                                                                                                                                              |                      |                        |            |                 |
| - Ownership                          | <b>92H:</b> 007, 008, 017, 018, 026, 027, 028, 029, 030, 035, 036, 037, 038, 039, 040, 045, 048, 049, 050, 055, 058, 059, 060, 084, 085, 094 | 1991                 | 1991                   | 1998       | 1999            |
| - Public sustained yield unit (PSYU) |                                                                                                                                              |                      |                        |            |                 |
| - Roads                              |                                                                                                                                              |                      |                        |            |                 |
| - District / TSA boundaries          |                                                                                                                                              |                      |                        |            |                 |
|                                      | <b>92H:</b> 046, 047, 056, 057, 065, 066, 067, 068, 069, 070, 075, 076, 077, 078, 079, 086, 087, 088, 089, 095, 096, 097, 098, 099           | 1991                 | 1991                   | 1997       | 1999            |
|                                      | <b>92I:</b> 004, 005, 006, 007, 008, 009, 010, 015, 016, 017, 018, 019, 020, 025, 026, 027, 028, 029, 030, 035, 036, 037                     | 1991                 | 1991                   | 1997       | 1999            |
|                                      | <b>92I:</b> 014, 024, 034, 038, 039, 040, 044, 045, 046, 047                                                                                 | 1991                 | 1991                   | 1992       | 1999            |

### 3. Inventories

Table 3. Non-corporate inventory information

| Data                                                                  | Source                                                | Date created   | Update | Scale    |
|-----------------------------------------------------------------------|-------------------------------------------------------|----------------|--------|----------|
| Stream riparian buffers for classified streams                        | MOF Merritt                                           | 1999           |        | 1:20 000 |
| Biogeoclimatic ecosystem classifications                              | Research Branch                                       | 1990           | 1994   | 1:20 000 |
| Community watersheds                                                  | MELP, Water Management Branch                         |                | 1999   | 1:20 000 |
| Visual quality objectives (VQOs)                                      | MOF Merritt                                           | 1995           | 1998   | 1:20 000 |
| Operability lines                                                     | MOF Merritt                                           | 1997-98        | 1998   | 1:20 000 |
| Terrain stability                                                     | MOF Merritt                                           | 1996-1998      |        | 1:20 000 |
| Parks and ecological reserves                                         | MOF / Ministry of Environment, Lands and Parks (MELP) | 1995/1996/1998 |        | 1:20 000 |
| Proposed protected areas (areas of interest and approved study areas) | MOF/MELP                                              | 1995           | 1998   | 1:20 000 |
| Stoyoma Mountain area                                                 | MOF Merritt                                           | 1994           |        | 1:20 000 |
| Ungulate winter range                                                 | MOF/MELP                                              | 1994           |        | 1:50 000 |
| Landscape unit boundaries and draft biodiversity emphases             | MOF/MELP                                              | 1996           | 1998   | 1:20 000 |
| Hudson Bay designated heritage trail                                  | MOF                                                   | 1994           |        | 1:20 000 |
| New woodlots                                                          | MOF                                                   | 1999           |        | 1:20 000 |
| Elk movement corridors                                                | MELP                                                  | 1998           |        | 1:20 000 |
| Archaeological sites                                                  | Small Business, Tourism and Culture                   | 1996           |        | 1:20 000 |
| Lawless Creek wildfire #639                                           | MOF                                                   | 1998           | 1998   | 1:20 000 |
| Steep slope >65% mapping                                              | MOF                                                   | 1999           |        | 1:20 000 |

Data source and comments:

The following information is not contained within the current MOF inventory:

- proposed protected areas, landscape units, mule deer winter range areas, community watersheds and intakes, Stoyoma Mountain area, terrain stability mapping, steep slope mapping, visually sensitive areas, woodlots, stream, lake and wetland buffers.

This information will be merged with the standard inventory file to produce the inventory file to be used in this analysis. All of this information resides in the Merritt Forest District.

## 4. Division of the Area into Management Zones

### 4.1 Management zones, groupings and objectives

Management zones represent areas with distinct management emphasis. For example, a zone may be based on a harvesting system, silviculture system, visual quality objective or wildlife consideration. Sometimes one area of forest is subject to more than one management objective. A grouping function in the FSSIM model allows for application of overlapping management objectives. The timber supply analyst will decide whether to put an objective into a group or a mutually exclusive management zone after data assessment. The non-contributing forest (land considered unavailable for timber harvesting) may be included for consideration in attaining some types of 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 4. Management objective zones and groupings

| Zone/group                                      | Values | Management issue                                                                                                                        |
|-------------------------------------------------|--------|-----------------------------------------------------------------------------------------------------------------------------------------|
| Landscape units                                 | 1-14   | There are 14 draft landscape units, 12 of which are partitioned by two or more draft biodiversity emphasis options (BEOs).              |
| Biogeoclimatic (BGC) variants / NDTs            | 1-27   | Each biogeoclimatic subzone/variant will have its own numeric identifier. These BEC units also make up natural disturbance types (NDT). |
| Community watersheds                            | 1-9    | Each community watershed will have its own numeric identifier.                                                                          |
| VQOs                                            | 1-4    | Each VQO — preservation, retention, partial retention, modification, will have its own numeric identifier.                              |
| Standard management                             | 1      | The standard integrated resource management zone.                                                                                       |
| Ungulate winter range                           | 1      | Areas managed for ungulate winter range                                                                                                 |
| Lakeshore management zones for classified lakes | 4      | Lakes classified by the District Manager through the Merritt TSA Lakes Classification Process.                                          |

### 4.2 Analysis units

An analysis unit represents a combination of stands dominated by specific tree species or a silvicultural regime, with a specific timber growing capability — as indicated by the inventory type group and site index in the forest inventory file. Each analysis unit is assigned separate timber volume projections (yield tables) for both existing and future stands. Analysis units for the conventional and smallwood pine land bases have been developed to assess the contributing land base for each area. Table 5 identifies draft analysis units. After determining the timber harvesting land base the timber supply analyst will determine the final analysis unit definitions.

## 4. Division of the Area into Management Zones

Table 5. Analysis units

| Analysis unit (leading species)                  | Criteria              |                                                            |                  |                             |             |
|--------------------------------------------------|-----------------------|------------------------------------------------------------|------------------|-----------------------------|-------------|
|                                                  | Inventory type groups | Biogeoclimatic (BGC)                                       | Site class (old) | Site index range (m@50 yrs) | Age (years) |
| A. Conventional harvest land base                |                       |                                                            |                  |                             |             |
| 1. Fir (Fd) / Yellow pine (Py) / Dry – selection | 1, 6, 7, 8, 32 – 34   | BG, PPxh, IDFxh, IDFdk1                                    | All              | All                         | All         |
| 2. Fir (Fd) Yellow pine (Py) / Dry – small patch | 1, 6, 7 - 8, 32 – 34  | IDFdk2, MSxk, except for FS, FH, FC, FB or FPL type groups | All              | All                         | All         |
| 3. Fir (Fd) / Wet - young                        | 1, 2 - 4, 6 – 8       | All except those specified in analysis units 1 and 2       | Good / medium    | 15.1+                       | < 141       |
| 4. Fir (Fd) / Wet - old                          | 1, 2 - 4, 6 – 8       | All except those specified in analysis units 1 and 2       | Good / medium    | 15.1+                       | ≥ 141       |
| 5. Fir (Fd) / Wet - young                        | 1, 2 - 4, 6 – 8       | All except those specified in analysis units 1 and 2       | Poor / low       | 0-15.0                      | <141        |
| 6. Fir (Fd) / Wet - old                          | 1, 2 - 4, 6 - 8       | All except those specified in analysis units 1 and 2       | Poor / low       | 0-15.0                      | ≥ 141       |
| 7. Pine (Pl) / Fir (Fd) - young                  | 5, 29                 | All                                                        | Good / medium    | 15.1+                       | < 141       |
| 8. Pine (Pl) / Fir (Fd) - old                    | 5, 29                 | All                                                        | Good / medium    | 15.1+                       | ≥ 141       |
| 9. Pine (Pl) / Fir (Fd) -young                   | 5, 29                 | All                                                        | Poor / low       | 0 - 15.0                    | < 141       |
| 10. Pine (Pl) / Fir (Fd) - old                   | 5, 29                 | All                                                        | Poor / low       | 0 - 15.0                    | ≥ 141       |
| 11. Pine (Pl) / Spruce (S) - young               | 25, 30, 31            | All                                                        | Good / medium    | 15.1+                       | < 141       |
| 12. Pine (Pl) / Spruce (S) - old                 | 25, 30, 31            | All                                                        | Good / medium    | 15.1+                       | ≥ 141       |
| 13. Pine (Pl) / Spruce (S) - young               | 25, 30, 31            | All                                                        | Poor / low       | 0 - 15.0                    | < 141       |
| 14. Pine (Pl) / Spruce (S) – old                 | 25, 30, 31            | All                                                        | Poor / low       | 0 - 15.0                    | ≥ 141       |

*continued*

## 4. Division of the Area into Management Zones

Table 5. Analysis units (continued)

|                                               |                                                                 | Criteria                   |                      |                  |                             |             |
|-----------------------------------------------|-----------------------------------------------------------------|----------------------------|----------------------|------------------|-----------------------------|-------------|
| Analysis unit (leading species)               |                                                                 | Inventory type groups      | Biogeoclimatic (BGC) | Site class (old) | Site index range (m@50 yrs) | Age (years) |
| A. Conventional harvest land base (continued) |                                                                 |                            |                      |                  |                             |             |
| 15                                            | Pine (Pl)<br>- young                                            | 28                         | All                  | Good / medium    | 15.1+                       | < 141       |
| 16                                            | Pine (Pl)<br>- old                                              | 28                         | All                  | Good / medium    | 15.1+                       | ≥ 141       |
| 17                                            | Pine (Pl)<br>- young                                            | 28                         | All                  | Poor / low       | 0-15.0                      | < 141       |
| 18                                            | Pine (Pl)<br>- old                                              | 28                         | All                  | Poor / low       | 0-15.0                      | ≥ 141       |
| 19                                            | Balsam (B) /<br>Hemlock (Hw) –<br>young                         | 12 - 20                    | All                  | Good / medium    | 13.1+                       | < 141       |
| 20                                            | Balsam (B) /<br>Hemlock (Hw) - old                              | 12 - 20                    | All                  | Good / medium    | 13.1+                       | ≥ 141       |
| 21                                            | Balsam (B) /<br>Hemlock (Hw) –<br>young                         | 12 - 20                    | All                  | Poor / low       | 0-13.0                      | < 141       |
| 22                                            | Balsam (B) /<br>Hemlock (Hw) – old                              | 12 - 20                    | All                  | Poor / low       | 0-13.0                      | ≥ 141       |
| 23                                            | Spruce (S) / Western<br>White Pine (Pw) /<br>Cedar (Cw) - young | 9 - 11, 21 -<br>24, 26, 27 | All                  | Good / medium    | 14.1+                       | < 141       |
| 24                                            | Spruce (S) / Western<br>White Pine (Pw) /<br>Cedar (Cw) - old   | 9 - 11, 21 -<br>24, 26, 27 | All                  | Good / medium    | 14.1+                       | ≥ 141       |
| 25                                            | Spruce (S) / Western<br>White Pine (Pw) /<br>Cedar (Cw) - young | 9 - 11, 21 -<br>24, 26, 27 | All                  | Poor / low       | 0-14.0                      | < 141       |
| 26                                            | Spruce (S) / Western<br>White Pine (Pw) /<br>Cedar (Cw) - old   | 9 - 11, 21 -<br>24, 26, 27 | All                  | Poor / low       | 0-14.0                      | ≥ 141       |

*continued*

## 4. Division of the Area into Management Zones

Table 5. Analysis units (concluded)

|                             |                              | Criteria              |     |                                              |                             |             |
|-----------------------------|------------------------------|-----------------------|-----|----------------------------------------------|-----------------------------|-------------|
|                             |                              | Inventory type groups | BGC | Site class (old)                             | Site index range (m@50 yrs) | Age (years) |
| B. Smallwood pine partition |                              |                       |     |                                              |                             |             |
| 27                          | Pine (PI)<br>leading - young | 28 - 31               | All | See smallwood definition in<br>Table 6 below |                             | < 141       |
| 28                          | Pine (PI)<br>leading – old   | 28 - 31               | All | See smallwood definition in<br>Table 6 below |                             | ≥ 141       |

Data source and comments:

The site index ranges used to define the analysis units are approximate. Once the timber harvesting land base has been defined a more detailed analysis will be performed to confirm the values shown.

Table 6 lists the criteria used to define the smallwood partition:

Table 6. Stand types in the smallwood partition

| Criteria                    |                                 |              |                        |                           |
|-----------------------------|---------------------------------|--------------|------------------------|---------------------------|
| Inventory<br>type<br>groups | New site<br>index<br>(m@50 yrs) | Age<br>class | New<br>height<br>class | Crown<br>closure<br>class |
| 28 - 31                     | < 10                            | 1            |                        |                           |
| 28 - 31                     | < 10                            | 2 - 3        |                        |                           |
| 28 - 31                     | ≤ 14                            | 4 - 9        | < 3                    |                           |
| 28 - 31                     | ≤ 13.4                          | 4 - 9        | < 3                    | ≥ 8                       |

## 5. Timber Harvesting Land Base Definition

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### 5.1 Identification of the timber harvesting land base

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

- it is not administered by the British Columbia 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 which improve productivity or operability (e.g., the stocking of land currently classified as non-commercial brush);
- by the addition of productive forest land (e.g., timber license reversions).

The classification “unavailable for timber harvesting” is applied only to land where no harvesting is anticipated to occur. Any area in which some timber harvesting will occur remains in the timber harvesting land base, even if the area will be subject to stringent constraints. Any such constraints will be reflected in the analysis.

The area remaining after identifying all the areas that do not contribute to timber supply, and adding any suitable area, is defined as the "timber harvesting land base" for the TSA.

### 5.2 Details on land base classification

#### 5.2.1 Land base contributing to timber supply and biodiversity seral-stage requirements

Ownership codes are generally used to identify whether the land can be considered to contribute to timber supply. Ownership codes 61, 62, 69, 90 and 99 respectively indicate Crown land in: areas classified for use, recreation and enjoyment of public (UREP); forest management units; miscellaneous reserves; grazing leases; and miscellaneous leases. All areas with other ownership codes will be removed from the land base considered available for timber supply. Areas under woodlot license will be deducted from the TSA timber harvesting land base, since their AAC is determined independently of the timber supply review process.

Additional ownerships which will contribute towards biodiversity / seral-stage requirements but not the timber harvesting land base are ownership codes 51 (national parks), 60 (ecological reserves), and 63-68 (provincial parks).

#### 5.2.2 Land classified as non-forest

Type identity 6 areas (non-productive land) such as alpine, lakes, rocks, etc., and type identity 8 area (no typing available) will be excluded from the land base considered for timber supply. Type identity 8 area may be included for the land contributing to biodiversity requirements if any is found to be forested.

## 5. Timber Harvesting Land Base Definition

### 5.2.3 Non-commercial cover

Type identity 5 represents those areas currently occupied by non-commercial brush species. These areas are considered to be unlikely sites for timber production, and no rehabilitation is planned, thus they will be 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 classifications: soil (Es), forest regeneration problems (Ep), snow avalanche (Ea), recreation (Er), water (Eh) and wildlife (Ew). Two ESA categories are recognized: high (ESA1) and moderately (ESA2) sensitive or valuable.

Harvesting opportunity is often reduced on ESAs. Two strategies for accounting for ESAs are: percent area reductions, and the evaluation of specific ESA polygons for harvesting opportunity. Table 7 identifies the ESA types where harvesting will not likely occur, and which will be deducted from the timber harvesting land base.

Table 7. Description of environmentally sensitive areas

| ESA category | ESA description     | Reduction per cent (%) |
|--------------|---------------------|------------------------|
| Es1          | Soils — high        | 100                    |
| Er1          | Recreation — high   | 100                    |
| Ep1          | Regeneration — high | 100                    |
| Ew1          | Wildlife — high     | 100                    |
| Ea1          | Avalanche — high    | 100                    |
| Eh1          | Water — high        | 100                    |

Data source and comments:

It is expected that certain ESAs may be replaced by alternative classifications and mapping over the next few years. Until such time that this information is collected, any existing mapping and classification data (e.g., terrain — see discussion of inoperable areas — and wildlife habitat) will be used in addition to ESA1 classifications.

All moderately sensitive areas (ESA2) will be fully included in the timber harvesting land base. To facilitate mapping of the forest land base, attempts were made to provide information on site-specific availability (that is, either available or unavailable) rather than using partial deductions, where possible. During site-specific operational planning, small portions of some ESA2s are likely to be excluded from timber harvesting. It is also likely that minor portions of some ESA1s may be available for harvesting, which offsets the inclusion of all ESA2s. On balance, the approach outlined in Table 7 reflects practices in the Merritt TSA, while allowing clearer mapping of the timber harvesting land base.

For the purposes of this document, environmentally sensitive area reductions were established by the Ministry of Forests (MoF) staff in collaboration with the Ministry of Environment, Lands and Parks (MELP). The percentages reflect site sensitivity to forest management, value for other resources, and current management practices.

## 5. Timber Harvesting Land Base Definition

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### 5.2.5 Areas considered inoperable

Operable and inoperable codes are generally used to describe the presence or absence of physical barriers or limitations to harvesting, appropriate logging methods (e.g. cable), and the merchantability of stands.

In addition to operable/inoperable codes, more detailed terrain stability mapping has been conducted in certain areas of the Merritt TSA. This mapping includes a degree of field verification and classifies areas as to their degree of potential instability. Areas identified as terrain class V will be removed from the timber harvesting land base.

Table 8. *Description of inoperable areas*

| Inventory description    | Code | Reduction per cent (%) |
|--------------------------|------|------------------------|
| Inoperable               | I    | 100                    |
| Slopes greater than >65% |      | 100                    |
| Terrain class V          |      | 100                    |

Data source and comments:

Operability lines for the Merritt TSA were originally delineated by the Ministry of Forests in 1991 and were completed in 1998. Slopes greater than 65% for areas (polygons) one hectare and greater in size will be assumed to be inoperable, except where terrain stability mapping has been completed, and will take precedence over slope information.

Terrain classification mapping has been completed for the Hedley/McNulty, Spius River, and Tulameen areas. Terrain class V will be considered completely inoperable.

### 5.2.6 Forest types not currently being harvested

“Problem” forest types are stands that are physically operable but are not currently utilized because they are not merchantable, or have low timber growing potential. As these stands are not considered to be harvestable, they will be wholly excluded from the timber harvesting land base.

## 5. Timber Harvesting Land Base Definition

Table 9. Forest types not currently being harvested

| Species                      | Inventory type group | New site index (m@50 yrs) | Age class        | Height class  | Crown closure class | Per cent (%) excluded |
|------------------------------|----------------------|---------------------------|------------------|---------------|---------------------|-----------------------|
| All coniferous               | 1 - 27, 32 - 34      | < 10                      | 1 - 3 (0-60 yrs) |               |                     | 100                   |
| Pine (PI) leading            | 28 - 31              | < 8                       | 1 - 3            |               |                     | 100                   |
| Fir (Fd) leading             | 1 - 8                | < 12.7 <sup>a</sup>       | 4 - 9 (>60 yrs)  | < 3 (<28.5 m) |                     | 100                   |
| Balsam (B) / Spruce (S)      | 9 - 27               | < 14.0 <sup>b</sup>       | 4 - 9            | < 3           |                     | 100                   |
| Pine (PI) leading            | 28 - 31              | < 8                       | 4 - 9            | < 3           |                     | 100                   |
| Yellow pine (Py) / Larch (L) | 32 - 34              | < 12.0 <sup>c</sup>       | 4 - 9            | < 3           |                     | 100                   |
| Hemlock (Hw) / Balsam (B)    | 12 - 19              | < 13.7 <sup>d</sup>       | 4 - 9            |               |                     | 100                   |
| All coniferous               | 1 - 27, 32 - 34      | < 14.1 <sup>e</sup>       | 4 - 9            |               | < 3                 | 100                   |
| Deciduous leading            | 35 - 42              |                           |                  |               |                     | 100                   |

Note: New site index thresholds were determined based on the old base-age-100 site indices originally used to define unmerchantable types:

- Calculated using Site Tools v3.0, with Interior, Interior Douglas-fir, total age = 100 years, height = 18 m.
- Calculated using Site Tools v3.0, with Interior, Sub-alpine fir, total age = 100 years, height = 19 m.
- Calculated using Site Tools v3.0, with Interior, Western larch, total age = 100 years, height = 19 m.
- Calculated using Site Tools v3.0, with Interior, Western hemlock, total age = 100 years, height = 21 m.
- Uses value from Site Tools v3.0, with Interior, Lodgepole pine, total age = 100 years, height = 19.5 m.

## 5. Timber Harvesting Land Base Definition

### 5.2.7 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. Reductions to account for existing roads, trails and landings are applied to the current productive forest considered available for harvesting. Reductions for future roads, trails and landings are applied after stands are harvested for the first time in the simulation model. Percentages of the area will be removed from specified age classes and zones. Estimates account only for the area that will be permanently removed from the timber harvesting land base.

Table 10. Estimates for existing and future roads, trails and landings

| Description                                                           | Loss on timber harvesting land base due to roads, trails and landings (%) |
|-----------------------------------------------------------------------|---------------------------------------------------------------------------|
| Existing roads in polygons >40 years of age                           | 0.4                                                                       |
| Existing landings and on-block disturbance for areas ≤40 years of age | 9.3                                                                       |
| Future roads, landings and on-block disturbance                       | 6.9                                                                       |

Data source and comments:

The above estimates were determined by the Regional Research Pedologist through measurements performed on eight watersheds within the Merritt Forest District, and studies performed elsewhere in the Kamloops Forest Region.

### 5.2.8 Cultural heritage resources

An archaeological overview assessment has not been completed for the Merritt TSA. However in 1998, an archeological site inventory project was assembled from existing inventory information from the Ministry of Small Business, Tourism and Culture's Heritage Conservation Branch. To account for forest management practices used near these sites, a 50-m radius no harvest buffer will be applied around each site.

### 5.2.9 Riparian reserve and management zones

Specific areas will be removed from the productive forest land base to account for riparian reserve and management zones, as outlined in Tables 11a and 11b.

## 5. Timber Harvesting Land Base Definition

Table 11a. Estimates for riparian reserve and management zones for streams, wetlands and lakes

| Reserve zones to be removed from the productive forest land base       |                                                      |                                                         |                                      |                                                   |
|------------------------------------------------------------------------|------------------------------------------------------|---------------------------------------------------------|--------------------------------------|---------------------------------------------------|
| Riparian classification                                                | Riparian reserve zone (RRZ) width (metres each side) | Riparian management zone (RMZ) width (metres each side) | RMZ maximum basal area retention (%) | Combined riparian buffer width (metres each side) |
| <b>Streams</b>                                                         |                                                      |                                                         |                                      |                                                   |
| S1 streams                                                             | 50                                                   | 20                                                      | 50                                   | 60                                                |
| S2 streams                                                             | 30                                                   | 20                                                      | 50                                   | 40                                                |
| S3 streams                                                             | 20                                                   | 20                                                      | 50                                   | 30                                                |
| S4 streams                                                             | 0                                                    | 10                                                      | 100                                  | 10                                                |
|                                                                        | 0                                                    | 20                                                      | 25                                   | 5                                                 |
|                                                                        |                                                      |                                                         |                                      | (15 combined)                                     |
| S5 streams                                                             | 0                                                    | 30                                                      | 25                                   | 8                                                 |
| S6 streams                                                             | 0                                                    | 20                                                      | 5                                    | 0                                                 |
| Streams that have not yet been classified                              |                                                      |                                                         |                                      | 10                                                |
| <b>Wetlands</b>                                                        |                                                      |                                                         |                                      |                                                   |
| All wetlands                                                           | 10                                                   | 30                                                      | 25                                   | 18                                                |
| <b>Lakes</b>                                                           |                                                      |                                                         |                                      |                                                   |
| L1 lakes (>5ha)                                                        | 10                                                   | 0                                                       | 0                                    | 10                                                |
| L2 lakes (1-5ha in BG, PP, IDFxh)                                      | 10                                                   | 20                                                      | 25                                   | 15                                                |
| L3 lakes (1-5ha not in above L2 BEC zones)                             | 0                                                    | 30                                                      | 25                                   | 8                                                 |
| L4 lakes (0.25-1ha in BG, PP, IDFxh BEC zones)                         | 0                                                    | 30                                                      | 25                                   | 8                                                 |
| Lakes >3ha classified through Merritt TSA Lakes Classification Process |                                                      | (see Table 11b)                                         |                                      |                                                   |

## 5. Timber Harvesting Land Base Definition

Table 11b. Estimates for riparian reserve and management zones for lakes classified through the Merritt TSA Lakes Classification Process

| Lakes classified through the Merritt TSA Lakes Classification Process |                                                                                             |                           |                                                    |
|-----------------------------------------------------------------------|---------------------------------------------------------------------------------------------|---------------------------|----------------------------------------------------|
|                                                                       | Lakeshore management zone (m)<br>(width of LMZ beyond RRZ where<br>applicable) <sup>a</sup> | Basal area retention<br>% | Modeled riparian<br>buffer width (100%<br>removed) |
| All A class lakes                                                     | 200                                                                                         | 100                       | 200                                                |
| All B class lakes                                                     | 200                                                                                         | 50                        | 100                                                |
| All C class lakes                                                     | 200                                                                                         | 25                        | 50                                                 |
| All D class lakes                                                     | 200                                                                                         | 10                        | 20                                                 |
| All E class lakes                                                     | 200                                                                                         | 5                         | 10                                                 |

(a) The complete management zone includes both the LMZ buffer zone and the riparian reserve.

### Data source and comments:

Retention levels for streams, wetlands and lakes reflect a combination of best management practices and recommended maximum basal area retention as described in the *Riparian Management Area Guidebook*. Modeled riparian buffer widths will account for both reserve zones (where one exists), and management zones. An effective buffer for management zones will reflect the recommended maximum basal area retention and best riparian management practices. For example, the riparian buffer along a stream with a 10-metre riparian reserve zone and a 20-metre management zone with 50% basal area retention will be modeled as a 20-metre total buffer width.

Stream riparian buffers will be applied to all available classified stream data. Where this data is not available, a 10-metre riparian buffer will be applied to all existing streams within the Terrain Resource Information Mapping system (TRIM) base. The 10-metre riparian buffer width was determined based on a GIS-estimated average riparian zone width using existing stream classification data across several watersheds (approximately 7% of the TSA). This 10-metre width includes 1 metre to account for not modeling a riparian buffer on classified S6 streams.

An 18-metre riparian buffer will be applied to all wetlands. This width will be modeled for all wetlands even though W3 and W4 wetlands do not require a reserve zone. This is due to the large number of additional smaller wetlands that are not captured in the inventory, but are being managed with a “reserve” zone.

Consistent with the Merritt TSA Lakes Classification Process, all lakes classified through this process have a lakeshore management zone (LMZ) that extends beyond the riparian reserve zone (where one exists) by a distance of approximately 200 metres. Harvesting is not permitted within the LMZ of Class A lakes, and basal area retention amounts are prescribed for class B, C, D and E lakes.

## 5. Timber Harvesting Land Base Definition

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### 5.2.10 Exclusion of specific, geographically defined areas

Areas recognized by legislation or Order-in-Council as not contributing to the timber harvesting land base, for example, established parks, are excluded from the timber harvesting land base. However, areas that have been deferred from harvesting because they are contentious or are under study (e.g., planning deferrals, potential parks) are normally not deducted, to avoid speculating on the outcome of government decisions, and are considered available for timber harvesting over the longer term for the analysis. Any changes in official designation will be incorporated in future timber supply reviews.

Specific areas that are unavailable for harvesting, but that have not been identified elsewhere are listed in the following table.

*Table 12. Exclusion of specific, geographically defined areas*

| Location descriptor                     | Excluded total land base area | Reason for exclusion                                                                                                 |
|-----------------------------------------|-------------------------------|----------------------------------------------------------------------------------------------------------------------|
| Hudson's Bay Trail (designated portion) | 100 metres each side of trail | As described in draft Hudson Bay Trail Management Plan                                                               |
| Water intakes for community watersheds  | 1.57 hectare/intake           | Forest Practices Code regulatory requirement requires 100-m no harvest buffer upslope of community watershed intakes |

## 6. Current Forest Management Assumptions

### 6.1 Harvesting

#### 6.1.1 Utilization levels

Timber utilization levels define the standards and, license requirements currently in place for wood utilization. Maximum stump height, minimum top diameter inside bark (dib) and minimum diameter at breast height (dbh) by species, and allowable waste limits are used in the analysis to calculate merchantable volume.

Table 13. Utilization levels

| Analysis unit / species                | Utilization      |                           |                      |
|----------------------------------------|------------------|---------------------------|----------------------|
|                                        | Minimum dbh (cm) | Maximum stump height (cm) | Minimum top dib (cm) |
| Lodgepole pine (except smallwood pine) | 12.5             | 30                        | 10                   |
| Smallwood pine                         | 7.5              | 20                        | 7                    |
| All other coniferous species           | 17.5             | 30                        | 10                   |

Data source and comments:

Table 13 reflects current regional standards, license requirements and current performance.

#### 6.1.2 Volume exclusions for mixed species stands

One or more species in mixed-species stands may be unmerchantable or retained on-site as a result of choice of silvicultural system. As examples, the deciduous species in a predominantly coniferous stand may not be harvested, or a number of standing Douglas-fir may be retained within a lodgepole pine stand in order to assist regeneration or achieve other silvicultural objectives. Where this volume is unharvested and not otherwise accounted for, volume reductions for these portions will be made to the estimated stand volume. The species that do not contribute and that will be excluded from the estimation of stand volume are shown in the table below.

Table 14. Volume exclusions for mixed species types

| Analysis units                              | Volume exclusion     | Comments                                                    |
|---------------------------------------------|----------------------|-------------------------------------------------------------|
| 7-10 (PI/F)                                 | 15m <sup>3</sup> /ha | Volume reduction for silviculture systems with fir reserves |
| All deciduous volumes in all analysis units | 100%                 | Non-utilized species                                        |

Data source and comments:

Table 14 reflects current regional utilization standards, license requirements, and current performance.

## 6. Current Forest Management Assumptions

### 6.1.3 Minimum harvestable age derivation

Minimum harvestable ages denote the estimated time required for stands to grow to a harvestable condition. They define the lower limit for harvesting. Harvesting may occur in stands at the minimum requirements (for example, to maintain harvest levels for a short period of time or avoid large disruptions in harvest levels). However, most stands will not be harvested until well past the minimum timber production ages because management objectives for other resource values take precedence (e.g., requirements for the retention of older forest).

Table 15. Minimum harvestable ages - definition criteria

| Analysis units              | Leading species                                             | Priority/rotation age | Minimum volume (m <sup>3</sup> /ha) | Per cent removal/ re-entry period |
|-----------------------------|-------------------------------------------------------------|-----------------------|-------------------------------------|-----------------------------------|
| 1 (selection)               | Douglas- fir / yellow pine                                  | n/a                   | n/a                                 | 25%/30 years                      |
| 2, 23-26                    | Douglas-fir, yellow pine, spruce                            | 101                   | 150                                 | n/a                               |
| 19 – 22                     | Balsam / hemlock                                            | 121                   | 150                                 | n/a                               |
| all others (3 – 18, 27, 28) | Lodgepole pine, Douglas-fir, spruce, balsam, cedar, hemlock | 81                    | 150                                 | n/a                               |

Data source and comments:

Minimum harvestable ages are based on forest district cutting priorities weighted by area for each species and do not necessarily reflect biological culmination ages. The minimum volume required for clearcut harvesting is 150 cubic metres per hectare. The selection harvesting regime involves removal of 25% of the volume every 30 years, allowing the entire stand to be harvested every 120 years. It is also assumed that a first pass has already occurred within all selection analysis units, and volume tables will be adjusted accordingly.

## 6. Current Forest Management Assumptions

### 6.1.4 Harvest scheduling priorities

Generally, older available stands are favored for harvesting when all other objectives have been met. Table 16 reflects average per cent harvested by species in the Merritt TSA, over the last 3 years and has been provided for information only.

Table 16. *Harvest scheduling history*

| Analysis units  | Leading species | Proportion of total harvest (1995-1997)<br>(%) |
|-----------------|-----------------|------------------------------------------------|
| 15 – 18         | Balsam          | 7                                              |
| 1 (selection)   | Douglas-fir     | 1                                              |
| 2 – 6           | Douglas-fir     | 4                                              |
| 7 – 14, 22 – 25 | Lodgepole pine  | 68                                             |
| 19 – 21         | Spruce          | 20                                             |

Data source and comments:

The above table was is based on scaled volumes 1995-1997 with adjustments to fit with analysis units. Analysis results will be reviewed to compare species composition of projected harvests with the composition of the inventory.

## 6.2 Unsalvaged losses

Table 17 shows the estimated average annual unsalvaged volume loss to catastrophic events such as insect epidemics, fires, wind damage or other agents over the long term on the timber harvesting land base. The unsalvaged loss column reflects only the volume that will not be recovered or salvaged.

Table 17. *Unsalvaged losses*

| Cause of loss | Annual unsalvaged loss (m <sup>3</sup> /year) |
|---------------|-----------------------------------------------|
| Insects       | 93 841                                        |
| Wind damage   | 18 565                                        |
| Wildfire      | 31 220                                        |
|               | 143 626                                       |

## 6. Current Forest Management Assumptions

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Data source and comments:

The agents contributing to the unsalvaged losses are those not considered in inventory growth plots or Operational Adjustment Factors (OAFs). Only losses in the timber harvesting land base were considered. Inoperable areas, private land, parks, and other areas not currently part of the productive forest land base were not included in the calculations.

Calculations used for unsalvaged loss estimates:

1) Unsalvaged insect infestations:

Unsalvaged losses due to Mountain Pine Beetle and Spruce Beetle over the past 9 years were estimated to average 93 841 m<sup>3</sup>/year. This estimate, which relates to the timber harvesting land base, was determined based on a review of aerial survey information and proposed harvest plans. Other insect losses were assumed to be accounted for in the current inventory and OAFs.

2) Unsalvaged windthrow (catastrophic events or along cutblocks):

District staff estimated that windthrow in small scattered patches, along cutblock edges, and single tree damage amounts to 18 565 m<sup>3</sup>/year.

3) Unsalvaged wildfire losses:

Wildfire losses were based on a 10-year rolling average from 1989 through 1998. The Lawless Creek Wildfire of 1998 is included in the total wildfire losses, but the extent of damage has been estimated based upon the salvage operations that are still in progress.

### 6.3 Silviculture

#### 6.3.1 Silviculture and regeneration activities in managed stands

The silviculture program reflects the mix of treatments expected to be carried out in the Merritt TSA. This level of activity assumes basic silviculture on all sites, plus incremental silviculture on some sites. Table 18 shows the proportion of each analysis unit to be treated under each silviculture regime and the expected average regeneration delay.

Recent plantations and future stands will be grown on managed stand yield tables (MSYTs) produced using the B.C. Forest Service table interpolation program for stand yields (TIPSY) growth and yield model. 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 will be produced for the different regeneration methods (each method and species combination) and then aggregated into one table.

## 6. Current Forest Management Assumptions

Table 18. Regeneration assumptions by analysis unit

| Analysis unit<br>(leading species)                    | Site<br>class<br>(old) | Age<br>(years) | Regen<br>delay<br>(yrs) | Method /<br>type       | %   | Density (Planted) |                |                      | Operational<br>adjustment<br>factors |      |
|-------------------------------------------------------|------------------------|----------------|-------------------------|------------------------|-----|-------------------|----------------|----------------------|--------------------------------------|------|
|                                                       |                        |                |                         |                        |     | Species           | Spp. %         | Stems /<br>ha        | OAF1                                 | OAF2 |
| 1 Fir (Fd) / Yellow<br>pine (Py) / Dry<br>– selection | All                    | All            | n/a                     | Selection -<br>natural | All | n/a               | n/a            | n/a                  | n/a                                  | n/a  |
| 2 Fir (Fd) Yellow<br>pine (Py) / Dry<br>– small patch | All                    | All            | 2                       | Plant                  | 100 | Fd<br>Py<br>PI    | 50<br>25<br>25 | 1000<br>1000<br>1300 | 15                                   | 5    |
| 3 Fir (Fd) / Wet<br>– young                           | Good /<br>medium       | < 141          | 2                       | Plant                  | 100 | Fd<br>PI<br>Sx    | 5<br>79<br>16  | 1400<br>1400<br>1400 | 15                                   | 5    |
| 4 Fir (Fd) / Wet<br>– old                             | Good /<br>medium       | ≥ 141          | 2                       | Plant                  | 100 | Fd<br>PI<br>Sx    | 5<br>79<br>16  | 1400<br>1400<br>1400 | 15                                   | 5    |
| 5 Fir (Fd) / Wet<br>– young                           | Poor / low             | <141           | 2                       | Plant                  | 100 | Fd<br>PI<br>Sx    | 5<br>79<br>16  | 1400<br>1400<br>1400 | 15                                   | 5    |
| 6 Fir (Fd) / Wet<br>– old                             | Poor / low             | ≥ 141          | 2                       | Plant                  | 100 | Fd<br>PI<br>Sx    | 5<br>79<br>16  | 1400<br>1400<br>1400 | 15                                   | 5    |
| 7 Pine (PI) / Fir (Fd)<br>– young                     | Good /<br>medium       | < 141          | 3                       | Plant                  | 100 | PI<br>Sx<br>Fd    | 90<br>5<br>5   | 1300<br>1300<br>1300 | 15                                   | 5    |
| 8 Pine (PI) / Fir (Fd)<br>– old                       | Good /<br>medium       | ≥ 141          | 3                       | Plant                  | 100 | PI<br>Sx<br>Fd    | 90<br>5<br>5   | 1300<br>1300<br>1300 | 15                                   | 5    |
| 9 Pine (PI) / Fir (Fd)<br>–young                      | Poor / low             | < 141          | 3                       | Plant                  | 100 | PI<br>Sx<br>Fd    | 90<br>5<br>5   | 1300<br>1300<br>1300 | 15                                   | 5    |
| 10 Pine (PI) / Fir (Fd)<br>– old                      | Poor / low             | ≥ 141          | 3                       | Plant                  | 100 | PI<br>Sx<br>Fd    | 90<br>5<br>5   | 1300<br>1300<br>1300 | 15                                   | 5    |
| 11 Pine (PI) / Spruce<br>(S) – young                  | Good /<br>medium       | < 141          | 2                       | Plant                  | 100 | PI<br>Sx          | 75<br>25       | 1400<br>1400         | 15                                   | 5    |
| 12 Pine (PI) / Spruce<br>(S) – old                    | Good /<br>medium       | ≥ 141          | 2                       | Plant                  | 100 | PI<br>Sx          | 75<br>25       | 1400<br>1400         | 15                                   | 5    |
| 13 Pine (PI) / Spruce<br>(S) – young                  | Poor / low             | < 141          | 3                       | Plant                  | 100 | PI<br>Sx          | 75<br>25       | 1400<br>1400         | 15                                   | 5    |
| 14 Pine (PI) / Spruce<br>(S) – old                    | Poor / low             | ≥ 141          | 3                       | Plant                  | 100 | PI<br>Sx          | 75<br>25       | 1400<br>1400         | 15                                   | 5    |

a. Selection analysis units will be grown on Variable Density Yield Prediction (VDYP) growth and yield model, not a MSYT.

*continued*

## 6. Current Forest Management Assumptions

Table 18. Regeneration assumptions by analysis unit (concluded)

| Analysis unit<br>(leading species)                                    | Site<br>class<br>(old) | Age<br>(years) | Regen<br>delay<br>(yrs) | Method /<br>type | %   | Density (Planted) |          |               | Operational<br>adjustment<br>factors |      |
|-----------------------------------------------------------------------|------------------------|----------------|-------------------------|------------------|-----|-------------------|----------|---------------|--------------------------------------|------|
|                                                                       |                        |                |                         |                  |     | Species           | Spp. %   | Stems /<br>ha | OAF1                                 | OAF2 |
| 15 Pine (PI)<br>- young                                               | Good /<br>medium       | < 141          | 2                       | Plant            | 100 | PI<br>Sx          | 90<br>10 | 1300<br>1300  | 15                                   | 5    |
| 16 Pine (PI)<br>- old                                                 | Good /<br>medium       | ≥ 141          | 2                       | Plant            | 100 | PI<br>Sx          | 90<br>10 | 1300<br>1300  | 15                                   | 5    |
| 17 Pine (PI)<br>- young                                               | Poor /<br>Low          | < 141          | 2                       | Plant            | 100 | PI<br>Sx          | 90<br>10 | 1300<br>1300  | 15                                   | 5    |
| 18 Pine (PI)<br>- old                                                 | Poor / low             | ≥ 141          | 2                       | Plant            | 100 | PI<br>10          | 90<br>10 | 1300<br>1300  | 15                                   | 5    |
| 19 Balsam (B) /<br>Hemlock (Hw) –<br>young                            | Good /<br>medium       | < 141          | 3                       | Plant            | 100 | Sx<br>PI          | 80<br>20 | 1300<br>1300  | 15                                   | 5    |
| 20 Balsam (B) /<br>Hemlock (Hw) -<br>old                              | Good /<br>medium       | ≥ 141          | 3                       | Plant            | 100 | Sx<br>PI          | 80<br>20 | 1300<br>1300  | 15                                   | 5    |
| 21 Balsam (B) /<br>Hemlock (Hw) –<br>young                            | Poor / low             | < 141          | 3                       | Plant            | 100 | Sx<br>PI          | 60<br>40 | 1300<br>1300  | 15                                   | 5    |
| 22 Balsam (B) /<br>Hemlock (Hw) –<br>old                              | Poor / low             | ≥ 141          | 3                       | Plant            | 100 | Sx<br>PI          | 60<br>40 | 1300<br>1300  | 15                                   | 5    |
| 23 Spruce (S) /<br>Western White<br>Pine (Pw) / Cedar<br>(Cw) - young | Good /<br>medium       | < 141          | 2                       | Plant            | 100 | Sx<br>PI          | 53<br>47 | 1400<br>1400  | 15                                   | 5    |
| 24 Spruce (S) /<br>Western White<br>Pine (Pw) / Cedar<br>(Cw) - old   | Poor / low             | ≥ 141          | 2                       | Plant            | 100 | Sx<br>PI          | 53<br>47 | 1400<br>1400  | 15                                   | 5    |
| 25 Spruce (S) /<br>Western White<br>Pine (Pw) / Cedar<br>(Cw) - young | Poor / low             | < 141          | 2                       | Plant            | 100 | Sx<br>PI          | 53<br>47 | 1400<br>1400  | 15                                   | 5    |
| 26 Spruce (S) /<br>Western White<br>Pine (Pw) / Cedar<br>(Cw) - old   | Poor / low             | ≥ 141          | 2                       | Plant            | 100 | Sx<br>PI          | 53<br>47 | 1400<br>1400  | 15                                   | 5    |
| 27 Pine (PI) leading<br>(smallwood)<br>young                          | —                      | < 141          | 4                       | Plant            | 100 | PI<br>Sx          | 90<br>10 | 1300<br>1300  | 15                                   | 5    |
| 28 Pine (PI) leading –<br>(smallwood) old                             | —                      | ≥ 141          | 4                       | Plant            | 100 | PI<br>Sx          | 90<br>10 | 1300<br>1300  | 15                                   | 5    |

## 6. Current Forest Management Assumptions

Data source and comments:

Values in Table 18 were determined based on MLSIS reports and current performance as estimated by Merritt Forest District staff. Regeneration delay has been increased in some pine analysis units to account for a proportion of natural regeneration. Age of planting stock is estimated at one year on average, and will be subtracted from the regeneration delay. Operational adjustment factors (OAFs) will be applied to all managed stand yield curves to account for natural spatial patchiness (OAF1), and decay, waste and breakage (OAF2), respectively. OAF 1 is a constant percentage reduction to account for small stocking gaps. OAF 2 accounts for losses that increase with age. The value of OAF 2 increases from zero and passes through 5% when the stand is 100 years old.

Prior to the analysis, information on the proportion of planting stock that is class A (genetically improved) will be compiled to allow assessment of the potential timber supply implications through sensitivity analysis.

### 6.3.2 Immature plantation history

For this analysis, all stands regenerated since 1974 (those that are less than 25 years old) will be assigned to a managed stand yield curve (TIPSY). These stands have a history of density control and stand tending and are considered managed stands.

### 6.3.3 Not satisfactorily restocked (NSR) areas

Land classified in the Merritt TSA as type identity 4 or 9 is included in the current timber harvesting land base. These type identities indicate not satisfactorily restocked (NSR) land base. The purpose of this section is to identify 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. The areas listed in Table 19 represent the most recent available forest district silviculture records. Therefore, the inventory will be adjusted to match the figures provided in this table, if there are discrepancies.

Table 19. Not satisfactorily restocked (NSR) areas

| Area                                           | Backlog NSR area (hectares) | Current NSR area (hectares) |
|------------------------------------------------|-----------------------------|-----------------------------|
| Merritt TSA                                    | 306                         | 8 500                       |
| Lawless Creek wildfire<br>(see comments below) | —                           | 1 835                       |
| Total                                          | 306                         | 10 335                      |

## 6. Current Forest Management Assumptions

Data source and comments:

The data for backlog NSR was derived from the Integrated Silviculture Information System (ISIS) and the Major Licensee Silviculture Information System (MLSIS), excluding woodlots. The backlog NSR area represents those areas with insufficient stocking that were harvested prior to October 1987. The current NSR reflects approximately 2 years of current harvest area which has not yet been planted or naturally regenerated to stocking standards.

The 1998 Lawless Creek wildfire of 1998 destroyed 1835 hectares of previously established plantations some of which were free-growing, or were still under obligations to achieve free-growing. This area has not yet been recorded in the inventory system because the fire was so recent. Because of the large size of the plantation area destroyed, the damaged area will be accounted for in the analysis. The analyst will determine the specific method to be used in the analysis.

### 6.4 Integrated resource management

#### 6.4.1 Objectives which require forest cover requirements

As noted in Section 4.1, “Management zones, groupings and objectives,” forest cover requirements (i.e., maximum allowable disturbance or minimum area retention) may be examined at a number of different levels, including landscape units, wildlife areas, or visually sensitive areas. The contribution of forest outside the timber harvesting land base to forest cover requirements will be considered.

Table 20 lists the forest cover requirements to be applied to each management group or zone.

Table 20. Forest cover requirements

| Management zone        | Maximum % area younger than minimum tree height/age |                             | Minimum tree height/age |             | Minimum % area older than mature cover height/age |                             | Minimum mature cover height/age |             |
|------------------------|-----------------------------------------------------|-----------------------------|-------------------------|-------------|---------------------------------------------------|-----------------------------|---------------------------------|-------------|
|                        | Gross forested area                                 | Timber harvesting land base | Height (metres)         | Age (years) | Gross forested area                               | Timber harvesting land base | Height (metres)                 | Age (years) |
| Community watersheds   | 20                                                  | n/a                         | 6.6                     |             |                                                   |                             |                                 |             |
| Ungulate winter range  | 20                                                  | n/a                         | 3                       |             | 40                                                |                             | 20                              |             |
| Elk movement corridors | 20                                                  | n/a                         | 3                       |             | 40                                                |                             | 20                              |             |
| Standard management    | n/a                                                 | 33                          | 3                       |             |                                                   |                             |                                 |             |
| Visual management      | see Table 21                                        |                             |                         |             |                                                   |                             |                                 |             |
| Landscape units        | see Table 22                                        |                             |                         |             |                                                   |                             |                                 |             |

## 6. Current Forest Management Assumptions

Data source and comments:

It is assumed that selection management satisfies mature cover and green-up requirements for all of the above management zones, so where that silvicultural system is used, no additional forest cover requirements will be applied.

### *Community watersheds*

On average, under current management, a maximum of 20% of the gross (total) forested land base in community watersheds can be less than 6.6 metres in height.

### *Ungulate winter range*

This area is managed to ensure sufficient thermal cover is maintained. As per the approved Merritt TSA Ungulate Winter Range Strategy, no more than 20% of the gross forested area may be less than 3 metres in height and at least 40% of the gross forested area must be at least 20 metres in height.

### *Elk movement corridors*

Based on historic and current performance, elk movement corridors are managed in a similar manner to ungulate winter ranges requiring no more than 20% of the gross forested area may be less than 3 metres in height and at least 40% of the gross forested area must be at least 20 metres in height.

### *Standard integrated resource management*

Standard management involves a 3-pass harvesting sequence, requiring no more than 33% of the timber harvesting land base be less than 3 metres in height at any time.

### *Visually sensitive areas*

Visually sensitive areas within the Merritt TSA are managed for within the visual zones along major travel corridors and around A, B, and C class lakes. Forest cover requirements for these areas will be modeled as described in Table 21.

Table 21. Forest cover requirements for visually sensitive areas

| Visual quality objective | Maximum % younger than green-up height |                 |                     |                     |                 |                     |                     |                 |                     |
|--------------------------|----------------------------------------|-----------------|---------------------|---------------------|-----------------|---------------------|---------------------|-----------------|---------------------|
|                          | Low VAC                                |                 |                     | Intermediate VAC    |                 |                     | High VAC            |                 |                     |
|                          | Green-up height (m)                    | % removal range | % removal mid-point | Green-up height (m) | % removal range | % removal mid-point | Green-up height (m) | % removal range | % removal mid-point |
| Preservation             | 5                                      | 2-4             | 3                   | 4                   | 3-5             | 4                   | 3                   | 4-6             | 5                   |
| Retention                | 5                                      | 4-6             | 5                   | 4                   | 6-9             | 7.5                 | 3                   | 8-12            | 10                  |
| Partial retention        | 5                                      | 8-12            | 10                  | 4                   | 10-20           | 15                  | 3                   | 15-25           | 20                  |
| Modification             | 5                                      | 15-20           | 17.5                | 4                   | 20-25           | 22.5                | 3                   | 25-30           | 27.5                |

## 6. Current Forest Management Assumptions

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Data source and comments:

Constraints for visually sensitive areas have been determined for each visually sensitive polygon based on methods described within the *Procedures for Factoring Visual Resources into Timber Supply Analyses* (MoF 1998, report REC-029) modified further by Merritt Forest District staff in consultation with the Regional Landscape Management Forester

The visually effective green-up (VEG) heights were determined using field data gathered from plots established along major highway corridors in the Merritt TSA.

Each VQO polygon will be modeled separately in the analysis. The forest cover requirement will be the mid-point of the per cent removal range for the VQO polygon.

### *Landscape level biodiversity*

Landscape level biodiversity requirements will be modeled as directed in a letter dated August 25, 1997, jointly signed by the MoF/MELP Deputy Ministers. Further direction regarding modeling old forest at the BEC variant level was provided by the Chief Forester in a letter dated May 25, 1998, and the *Landscape Unit Planning Guide* (1999). These directions can be summarized as follows:

- the base case will model old-seral biodiversity constraints only; the impacts of other seral constraints will be tested through sensitivity analysis;
- old-seral targets can be reduced to 1/3 the *Biodiversity Guidebook* value at year zero, 2/3 of the target at the end of the second rotation (160 years) and full target value at the end of the third rotation (240 years) for areas with low emphasis; sensitivity analysis may be used to test the impact of applying the full target value immediately;
- old-seral targets will be modeled using requirements that reflect an area-weighted mix of 10% high BEO:45% intermediate BEO:45% low BEO for old-growth targets for each natural disturbance type at the BEC variant level within each draft landscape unit;
- sensitivity analysis will be used to test application of draft BEOs unless they are legally established prior to the analysis, in which case they will be used in the base case.

## 6. Current Forest Management Assumptions

Table 22 describes how the landscape level biodiversity targets will be applied to each landscape unit in the base case.

Table 22. *Old-seral requirements by landscape unit and natural disturbance type (NDT)*

| NDT | Biogeoclimatic unit | Old-seral stage % area retention by minimum age |                       |                            |                            |                       |               |
|-----|---------------------|-------------------------------------------------|-----------------------|----------------------------|----------------------------|-----------------------|---------------|
|     |                     | Minimum age (years)                             | Low emphasis (Time 0) | Low emphasis (by year 160) | Low emphasis (by year 240) | Intermediate emphasis | High emphasis |
| 2   | CWHms1              | 250                                             | 3                     | 6                          | 9                          | 9                     | 13            |
| 2   | ESSFmw              | 250                                             | 3                     | 6                          | 9                          | 9                     | 13            |
| 3   | MSxk                | 140                                             | 5                     | 10                         | 14                         | 14                    | 21            |
| 3   | MSdm2               | 140                                             | 5                     | 10                         | 14                         | 14                    | 21            |
| 3   | MSunk <sup>a</sup>  | 140                                             | 5                     | 10                         | 14                         | 14                    | 21            |
| 3   | ESSFdc2             | 140                                             | 5                     | 10                         | 14                         | 14                    | 21            |
| 4   | IDFhx1              | 250                                             | 5                     | 9                          | 13                         | 13                    | 19            |
| 4   | IDFhx2              | 250                                             | 5                     | 9                          | 13                         | 13                    | 19            |
| 4   | IDFdk1              | 250                                             | 5                     | 9                          | 13                         | 13                    | 19            |
| 4   | IDFdk2              | 250                                             | 5                     | 9                          | 13                         | 13                    | 19            |
| 4   | PPxh                | 250                                             | 5                     | 9                          | 13                         | 13                    | 19            |

Note: (a) MSunk denotes that the variant is unknown. The variant will be determined based on a map review

Data source and comments:

The percentages for old-forest seral stage retention are based on recommendations in the *Landscape Unit Planning Guide* and the *Biodiversity Guidebook*, in keeping with Deputy Minister, Chief Forester, and Timber Supply Branch direction (see also, Section 7, “Sensitivity Analyses”). Rotation ages are as described within the *Landscape Unit Planning Guide* (page 30).

### 6.4.2 Wildlife trees (WT) and tree patches (WTP)

Stand level biodiversity in the Merritt TSA is provided for through 3 methods:

- wildlife trees left inside cutblocks (single tree reserves);
- wildlife tree patches inside cutblocks (group reserves);
- wildlife tree patches adjacent to or external to cutblocks.

It was assumed that none of these trees or area would be harvested in the future, and therefore these trees and areas have been modeled as volume reductions (that is, adjustments to the yield estimates). As with landscape-level biodiversity, a number of assumptions are required in estimating the resultant volume retained for wildlife tree patch purposes. These assumptions are summarized in Table 23.

## 6. Current Forest Management Assumptions

Table 23. Assumptions and reductions to reflect volume retention for wildlife tree patches (WTPs)

|                                                                   | Average gross cutblock area (%) | LU objectives established | % of WTP target retained in non-contributing land base | % of WTP's >2ha to be used again and/or be used to meet old growth targets | Net WTP volume reduction (%) |
|-------------------------------------------------------------------|---------------------------------|---------------------------|--------------------------------------------------------|----------------------------------------------------------------------------|------------------------------|
|                                                                   | 10.7                            |                           |                                                        |                                                                            |                              |
| <b>WTP area reduction</b>                                         |                                 | 3% of target              | 50%                                                    | 50%                                                                        |                              |
| <b>Net WTP area</b>                                               |                                 | 7.7                       | 3.85                                                   | 1.93                                                                       |                              |
| <b>Assume net WTP area is proportionately equal to net volume</b> |                                 |                           |                                                        |                                                                            | 1.93                         |

Data source and comments:

Estimates of volumes retained in single tree reserves and wildlife tree patches were derived for the Merritt TSA through information gathered from silviculture prescriptions for the period July 1997 to December 1998. On average, SPs noted a retention of 10.1% of the gross cutblock area in WTPs. It is further assumed that landscape-level objectives established for old forest and WTP targets will be modeled based on Table 20a of the *Biodiversity Guidebook*. It was estimated that the initial target area could then be reduced by 3% (i.e. moving from Table 20b to Table 20a in the *Biodiversity Guidebook*). It was further assumed that 50% of WTPs are in areas outside of the timber harvesting land base, such as inoperable forest, and volume not currently included in the volume estimates (e.g. veterans). It was also assumed (based on tracking) that 50% of the total WTPs outside and/or adjacent to cutblocks would be identified as WTPs again for subsequent harvesting, and where larger than 2 ha, would be used as contribution to the old forest retention targets. If necessary, the percentage cover requirements for old forest will be adjusted to account for the contribution of WTPs larger than 2 ha.

## 7. Sensitivity Analyses

Sensitivity analysis provides a measure of the timber supply impact of uncertainty in management assumptions and data. By developing and testing a number of sensitivity analyses, it is possible to determine which variables most affect analysis results. The first table shows issues that are particular to this TSA. This is followed by a list of sensitivity analyses that are standard in most TSAs.

Table 24. *Sensitivity issues specific to the Merritt TSA*

| Possible issues that may be examined                                                             |
|--------------------------------------------------------------------------------------------------|
| Potential designation of existing study areas and areas of interest as protected areas           |
| Stoyoma Mountain Area                                                                            |
| Biodiversity — apply mature and old-seral forest constraint                                      |
| Biodiversity — apply early-seral forest constraint                                               |
| Biodiversity — old-seral constraint at 100% for low emphasis (no phase-in)                       |
| No biodiversity — no seral-stage constraints or wildlife tree patches                            |
| Biodiversity — apply draft BEOs with phase-in of old-seral for low emphasis LUs                  |
| Biodiversity — apply draft BEOs with old-seral constraint at 100% for low emphasis (no phase-in) |

Table 25. *Standard sensitivity analysis*

| Issue/uncertainty to be tested                           | Sensitivity levels                                       |
|----------------------------------------------------------|----------------------------------------------------------|
| Existing stand yields                                    | +/- 10%                                                  |
| Regenerated stand yields                                 | +/- 10%                                                  |
| Minimum harvestable ages                                 | +/- 10 years                                             |
| Underestimation of site productivity on old-growth sites | Apply old-growth site index adjustments                  |
| Land base changes                                        | +/- 10%                                                  |
| Harvest flow alternatives                                | Alternatives to base case                                |
| Green-up periods                                         | +/- 5 years                                              |
| Standard integrated resource management zone             | Change maximum area below green-up age to 25% (from 33%) |

## Appendix A Numeric Identifiers for Management Zones

Table A-1. Biogeoclimatic variants / natural disturbance types (NDTs)

| NDT | Subzone/variant | Numeric ID | NDT | Subzone/variant | Numeric ID |
|-----|-----------------|------------|-----|-----------------|------------|
| 2   | CWHms1          | 01         | 4   | IDFxh1a         | 12         |
| 2   | ESSFmw          | 02         | 4   | IDFxh2          | 13         |
| 3   | ESSFdc2         | 03         | 4   | IDFxh2a         | 14         |
| 3   | ESSFxc          | 04         | 4   | IDFxh2b         | 15         |
| 3   | MSdm2           | 05         | 4   | PPxh2           | 16         |
| 3   | MSxk            | 06         | 4   | BGxh2           | 17         |
| 3   | MSunk           | 07         | 4   | BGxw1           | 18         |
| 4   | IDFdk1          | 08         | 5   | ATp             | 19         |
| 4   | IDFdk1a         | 09         | 5   | ESSFdc          | 20         |
| 4   | IDFdk1b         | 10         | 5   | ESSFmwp         | 21         |
| 4   | IDFdk2          | 11         | 5   | ESSFxc          | 22         |

Table A-2. Draft landscape units and draft biodiversity emphases

| Landscape unit # and NDT | Draft landscape unit name | Draft Emphasis | Numeric identifier |
|--------------------------|---------------------------|----------------|--------------------|
| 1 – All                  | Lower Nicola              | High           | 01                 |
| 2a—NDT3                  | Guichon                   | Low            | 02                 |
| 2b—NDT4                  | Guichon                   | Intermediate   | 03                 |
| 3a – NDT3                | Nicola Lake               | Low            | 04                 |
| 3b – NDT4                | Nicola Lake               | Intermediate   | 05                 |
| 4a – NDT3                | Upper Nicola              | Low            | 06                 |
| 4b – NDT4                | Upper Nicola              | Intermediate   | 07                 |
| 5a – NDT2                | Spius                     | High           | 08                 |
| 5b – NDT3 and NDT4       | Spius                     | Intermediate   | 09                 |
| 6a—NDT3                  | Coldwater                 | Low            | 10                 |
| 6b—NDT2                  | Coldwater                 | Intermediate   | 11                 |
| 6b—NDT4                  | Coldwater                 | Intermediate   | 12                 |
| 7a – NDT3                | Quilchena                 | Low            | 13                 |
| 7b – NDT4                | Quilchena                 | Intermediate   | 14                 |
| 8a – NDT3                | Otter                     | Low            | 15                 |
| 8b – NDT4                | Otter                     | Intermediate   | 16                 |
| 9a – NDT3                | Allison-Missezula         | Low            | 17                 |
| 9b – NDT4                | Allison-Missezula         | Intermediate   | 18                 |
| 10a – NDT3               | Hayes                     | Low            | 19                 |
| 10b – NDT4               | Hayes                     | Intermediate   | 20                 |
| 11 -- All                | Tulameen                  | Intermediate   | 21                 |
| 12a—NDT3                 | Similkameen               | Low            | 22                 |
| 12b—NDT4                 | Similkameen               | Intermediate   | 23                 |
| 13a—NDT3a                | Smith-Willis              | Low            | 24                 |
| 13b—NDT4                 | Smith-Willis              | Intermediate   | 25                 |
| 14a – NDT3               | McNulty                   | Low            | 26                 |
| 14b – NDT4               | McNulty                   | Intermediate   | 27                 |

## Appendix A    Numeric Identifiers for Management Zones

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Table A-3. *Community watershed*

| CWS Code | Watershed  | Status | Numeric ID |
|----------|------------|--------|------------|
| 310.003  | Anderson   | Active | 01         |
| 310.009  | Bell       | Active | 02         |
| 120.004  | Brook      | Active | 03         |
| 310.024  | Dillard    | Active | 04         |
| 310.021  | Hackett    | Active | 05         |
| 120.017  | Kwinshatin | Active | 06         |
| 310.034  | Lee        | Active | 07         |
| 120.024  | Skuagum    | Active | 08         |
| 310.064  | Thomas     | Active | 09         |
| 310.080  | Trout      | Active | 10         |

Table A-4. *Visual quality objectives (VQOs)*

| VQO | VQO               | Numeric ID |
|-----|-------------------|------------|
| P   | Preservation      | 01         |
| R   | Retention         | 02         |
| PR  | Partial retention | 03         |
| M   | Modification      | 04         |