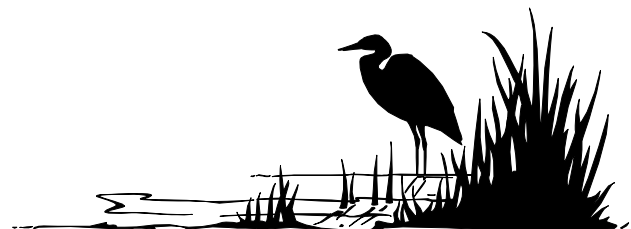# Interim Forest Management
Planning Manual

Supplemental Guidelines - Timber Supply Analysis
Documentation Requirements

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Land and Forest Service
Alberta Environmental Protection

Timber Supply and Other Resource Analysis Documentation Requirements

Timber Supply

One key requirement of management plan approval is the confirmation and validation of the timber supply analysis procedures and proposed harvest levels. The required data files and documentation that must accompany the management plan submission are presented below.

The documentation should be broken down into six broad categories:
- Growth and Yield
- Land Base Determination
- Timber Supply Analysis Procedures
- Summary of Results
- Selection and Discussion of Preferred Forest Management Strategy
- Enhancements to Analysis

A. Growth and Yield

1. Volume Sampling

A written description of the data collection methodology (field procedures, quality control, stand selection and plot allocation) as well as a description of the analysis procedures and assumptions must be presented. A sample copy of the field tally sheets for the cruise plots must be included. All data compilation will be reviewed and validated by the LFS. The following data sets are to be submitted in digital format (ASCII, dBASE IV or SAS Data Format).
- Raw Uncompiled Plot Data
- Individual Tree Compilations
- Plot Compilations

A hard copy of pertinent program code (i.e. actual code segments listing the coefficients and functions) for plot data compilation must be provided.

2. Yield Curve and Volume Table Development

A description of the modeling procedures tested and evaluated during yield curve development must be presented along with the rationale for selecting the proposed yield curves. Any yield curves that are developed using non-traditional methods (i.e. using multiple averaging, weighting, capping, arbitrarily setting limits and removal of plots) must be documented and justified. Additional documentation should include:
- the plot assignments to the appropriate yield class
- guidelines for the stratification of the land base into yield classes
- individual tree and plot compilation methods employed

- ♦ sample intensity by final yield strata
- ♦ yield curve stratification and development assumptions by utilization standard
- ♦ yield curve development models employed
- ♦ taper functions applied (or equations used) to estimate individual tree volume
- ♦ cull deductions applied by utilization standard
- ♦ assumptions and modifications applied to adjust yield curves
- ♦ regeneration lags used in the analysis

In addition, the actual data set used to fit the curves must be provided and should include all the pertinent linkages so that the LFS can reproduce and verify the curves in terms of site class, density class, origin, stand type, age or any other relevant criteria.

A hard copy of the pertinent program code (i.e. code segments listing the coefficients and functions) used to fit the curves must be provided.

The final proposed yield curves are to be submitted in both hard copy format and digital form. A set of graphs illustrating the associated plot volumes against the yield curves must be provided.

3. Cull Deductions

A summary of proposed cull deductions for different utilization standards must be presented. The methodology in obtaining these estimates must also be presented.

B. Land Base Determination

1. Inventory

A history of the base inventory with a review of any updates carried out subsequent to the date of aerial photography used in completing the inventory must be provided.

2. Inventory Stratification

Stratification of the land base by land use category allows for further modelling opportunities on other resource values. Process, criteria and assumptions used in obtaining the "net" land base are to be provided. All landbase net down procedures will be reviewed and validated by the LFS.

Land use classifications that require stratification are:
- ♦ Productive versus non-productive forest land
- ♦ Private land versus Crown land
- ♦ Crown land committed to incompatible and single uses
- ♦ Existing and proposed parks, wilderness areas, other protected areas, prime protection and conservation areas
- ♦ Areas of restricted operability
- ♦ Accessibility and slope constraints

- ♦ Riparian and other restrictive buffers
- ♦ Subjective deletions (site specific productivity adjustments)
- ♦ Administrative units / zones / compartments, etc.

Documentation of the stratification procedures and category definitions should include a hard copy of pertinent program code.

3. Final Net Land Base Attribute File

The land base file used in the timber supply analysis must be submitted in digital format (e.g. dBASE IV, ASCI, etc.). The land base file must be complete (i.e. should include all records). Query protocols used to extract and aggregate the stand level data into the actual input file(s) used in the specified timber supply models are to be provided.

The land base attributes provided should include:
- ♦ FMU, township, range, meridian, stand number and sub-stand numbers
- ♦ complete A.V.I. (or Phase 3) stand description for both overstory and understory
- ♦ updated modifier fields
- ♦ site class
- ♦ stand origin
- ♦ fields describing the yield class assignment
- ♦ compartment designation and age class
- ♦ gross stand area
- ♦ net stand area.

4. Spatial Data

If a spatial analysis was carried out, both spatial and attribute data representing the final selected management strategy must be provided for review purposes.

C. Timber Supply Analysis Procedures

1. Models Used

A copy of the model(s) used in the timber supply analysis is required for review purposes. Non-standard or proprietary models must be either provided to the LFS or a 'hands-on' demonstration must be arranged to verify harvest levels and management strategies. A digital file (ASCII, dBASE IV) of the final timber supply model input and output files used in generating the proposed conifer and deciduous harvest levels must be provided.

2. Timber Supply Analysis Assumptions

A technical description of the assumptions, constraints and parameters used in the timber supply analysis is

required. Constraints are the operational requirements and limitations that may affect the availability and flow of resources. Constraints that should be documented and explained, in the context of the forest management plan objectives, include:

- Adjacency requirements (i.e. entry age, establishment period)
- Green-up requirements (i.e. visual, crown closure)
- Harvest compartment and cut sequencing requirements
- Access and development limitations
- Block size limitations (maximum and minimum)
- Merchantability/economic limitations
- Reforestation requirements
- Constraints associated with other landscape management issues (i.e. structure retention for wildlife, connectivity, fragmentation, non clear cutting harvest simulation, etc.)

Impacts of operational constraints are assessed to ensure realistic projections of forest growth and associated harvest.

D. Summary of Results

A summary of timber supply runs performed must be presented. The standard required timber supply runs that *should* be provided include:

1. One pass evenflow over two rotations
2. Two pass evenflow over two rotations
3. Two pass evenflow for first rotation, step up/down to LRSYA
4. Detailed calculation of LRSYA by FMU and yield strata

These alternate runs are provided only for comparative information and must be feasible solutions. Number 4 run is a required run for comparison with previous government FMU analysis but may not be necessary for second generation and later FMA DFMP's. Previous approved DFMP analysis should be summarized and included for comparative purposes.

The pertinent information presented for each run should be included for each FMU or SYU, as appropriate, and any aggregated units:

- the initial and final age class distributions
- growing stock summaries over time
- primary and secondary harvest levels over time

E. Selection and Discussion of Preferred Forest Management Strategy

1. Development of the Preferred Forest Management Strategy

Land and Forest Service must understand all alternatives tested leading to the selection of the preferred forest management strategy. Documentation of the rationale for each step of the analysis is required and includes:

1. Species included in coniferous and deciduous AAC determinations
2. Harvest system(s)
3. Regenerated yield assumptions
4. Allowances or analysis for natural disturbances
5. The chronology and rationale for alternate runs
6. Long term rate of flow of timber and non timber resources
7. Evaluation of how the recommended harvest level achieves the preferred forest management strategy and associated objectives proposed in the management plan (e.g. water yield, wildlife habitat, etc.)

2. Harvest Sequencing

The harvest sequence output of the preferred forest management strategy should be followed, and deviations addressed, at the operational level. The sustainability of the timber and non-timber resource values projected in the model is dependent on this. The final harvest sequence requires supporting documentation and includes:

♦ The procedure used to determine the harvest sequence
♦ The final FMA and embedded timber operator harvest sequence as per the final recommended analysis
♦ The proposed compartment organization that ties to previously defined landscape units

F. Future Enhancements to Analysis

In some instances there may be necessary to provide analysis enhancements interim to the next scheduled management plan revision. In these cases, it is important to identify areas of the analysis requiring further attention.

♦ Scope
♦ Time frame (should include examples)

These enhancements need to be documented in the management plan.