Analysis of Changes in Timber Values due to Silviculture Treatments under the Canada-British Columbia Forest Resource Development Agreement - FRDA Report 041

Silvicultural prescriptions employed in the practice of intensive forest management are expected to enhance the productivity and increase sustainable yields from the land base. Measurements of these improvements are often taken in terms of physical productivity gains that result from a treatment or various intensities of a treatment. It is more appropriate to evaluate the benefits derived from investment in silvicultural treatments in terms of the value of the forest than by volume alone.

"...Investments in intensive forest management should not be evaluated in terms of physical criteria such as maximizing the volume of timber through time from a particular site... The question is whether such investments represent the most efficient allocation of society's scarce resources. Consequently, the appropriate criterion for assessing the desirability of investments in intensive forest management is economic." (Percy, 1986)

It was with this approach that Sterling Wood Group, commissioned under FRDA, set about in 1987 to develop tools for measuring changes in wood value resulting from FRDA program activities. The objective of the study was to develop tools that could be used to determine the changes in value of tree stems that may result from changes in tree size, particularly diameter, brought about through various silvicultural techniques.

The analysis was hampered by a surprising lack of empirical data relating stem or log values to physical factors such as log diameter, defect, or incidence of knots. Nevertheless, sufficient information was obtained from a variety of sources to develop a useful tool for assessing the increases in value that may occur from the increase in tree size prompted by silvicultural treatment.

The methods used to determine the increase in log values are fully described in the report. The author notes that they are simple and, reflecting the paucity of data, no pretense at sophisticated modelling was used.

Terms of reference required the development of tools for determining stem values through a range of appropriate heights and diameters for major B.C. species and for coast and interior regions. In addition to value changes with height and diameter, the value of achieving knot-free clear wood increments to the stem were to be determined. The project did not require the gathering of original data. The approach was to be empirical, using published data, industry and government sources, and "best judgement" of the consultants. Current stem values were used, expressed in constant Canadian dollars and with 1986 used as a base year. For the study, all known literature was reviewed, many researchers and practitioners were interviewed, and all known accessible data was gathered.

The core of the report consists of sets of tables and graphs, by species, for interior and coastal forest stands. These provide numerical value increments for diameter and height changes that might result from silvicultural treatments. An additional set of tables addresses value increments for the production of clear wood and "uppers" (i.e., from pruning). These latter tables are provided only for coastal Douglas-fir stands and are based on very limited data because no others exist. Douglas-fir stands are the most likely candidates to receive such treatment in the foreseeable future. The tables and graphs in the report are useful to the practitioner in that once the physical effect of a specific silvicultural treatment has been determined or projected, the value effect of that treatment can also be determined. This in turn allows a financial analysis of cost to benefit, or of rate of return.

In addition to and independent of the provision of numerical data, the consultants were requested to comment on perceived value trends of forest products. This has been done in the report in a subjective manner and the opinions and conclusions are solely those of the consultants.

The study was split into two separate sections, one for the coast and one for the interior. The distinction between these two regions is broadly recognized administratively by all agencies and especially by the B.C. Ministry of Forests. Stumpage appraisal systems differ distinctly between the coast and interior chiefly because the primary market for forest products is reached at the log level on the coast, while it is at the dimension lumber level in the interior. On the coast there is an active log market wherein some seven million cubic meters are bought and sold annually. This market and the history of prices it provides is a basis for establishing the value of timber on the coast. Moreover, the complexity and diversity of the coastal milling infrastructure inhibits determination of timber values using an end-product system as is used in the interior.

There is no general log market in the interior, hence the primary market for forest products is dimension lumber. Pulp chips also contribute to primary revenues, but market prices are not published, and the revenues are commonly treated as a by-product offset against production costs. For the purpose of this study, the value of the merchantable stem delivered to
the mill gate was calculated by deducting conversion costs (net chip revenue) from the average market value of lumber recovered. For representative pricing, a 10-year (1978-1987) historical average of all costs and prices was used in this study in order to minimize the influence of economic cycles.

The report notes that second-growth is being harvested at an accelerating rate. These stands are producing some of the highest real conversion returns in the province despite relatively low selling prices. These conversion returns are partly a function of excellent terrain and logging chance, developed transportation systems, and increasingly efficient logging and milling techniques. The authors believe this demonstrates the excellent financial feasibility of harvest in unmanaged stands with this size of timber, even when harvest occurs well below the presumed physical rotation age. They feel it clearly illustrates the excellent potential for intensive forest management in immature stands similarly located. Component value relationships illustrated in the report will all be upward. They feel that the already demonstrated high real conversion returns and this upward value expectation are compelling arguments for use of a large financial optimism factor by practitioners for forecasts and projections. Data based on unmanaged second-growth stands below rotation age indicates excellent financial results. It follows that managed stands should achieve even better results.

The authors conclude that the effect of diameter on value takes place within a narrow band of log diameters from 15 to 25 cm. It is within this range that yield of lumber increases dramatically. Between 20 and 25 cm, stem values tend to plateau and then rise again on the expectation of recovering premium lumber grades on the coast and wider dimension widths in the interior. The effect of diameter on conversion costs is relatively insignificant once the impact of value recovery has been accounted for.

Copies of the 67 page report, Analysis of changes in timber values due to silviculture treatments under the Canada-British Columbia Forest Resource Development Agreement, by Sterling Wood Group Inc. are available, while supplies last, from:

Canadian Forestry Service
Pacific Forestry Centre
506 West Burholme Road
Victoria, B.C. V8Z 1M5

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