Expected Delivered Log Costs for Areas Treated Under the
Canada-British Columbia Forest Resource Development
Agreement — FRDA Report 079

An estimate of the expected log delivery costs is an important variable in the economic assessment of FRDA-funded projects. FRDA Report 079 summarizes a study, undertaken by the Sterling Wood Group in 1986, which investigated the relationships between delivered log costs and a variety of site-specific factors.

The objective of the study was to develop and test a practical technique for estimating current delivered log costs in British Columbia that would be compatible with the formats of other components of evaluation such as increase in log values and biological response resulting from FRDA activities. This would provide forest managers with a decision-making tool to aid in selecting candidate areas for future FRDA funding.

Literature Review

The review of relevant literature and current studies showed cost information for forest harvesting operations ranged from the specific analyses of particular logging processes or equipment systems to the broad-based appraisal methods of establishing expected delivered log costs designed by the Valuation Branch of the Ministry of Forests (MOF).

The MOF stumpage appraisal system is the only system currently used for estimating logging costs as they vary with site-specific conditions and is based on the harvesting of old-growth timber. It was considered inappropriate for use with the second-growth timber of FRDA treatment sites. Other logging cost determination models were found to be either too restrictive for the province-wide scope of this study or insufficiently developed for application.

Methodology Development

Without a model suitable for the analysis, data for each production phase were obtained from a variety of sources. These included the relevant literature, use of existing manuals (where applicable), local knowledge of second-growth logging costs, in-house files, and discussions with individuals and agencies.

The costs of logs is sensitive to many factors which can be readily classified into three categories:

- physical properties of the trees (dimensions, defectiveness, limbliness, density and species);
- location of the stand (terrain, slope, proximity to existing roads, camps, log dumps and mills); and
- operation and administrative requirements (development required, ecological protection measures, seasonal requirements and scaling of logs).

Of the cost factors isolated, some, such as scaling and administrative expenses, varied little and could be aggregated or averaged by region. Other key elements used in the development of the model varied widely and were factored separately. These elements included tree-to-truck and transportation costs.

Tree-to-truck costs vary by region, major species in the stand (Vancouver region only), volume per hectares at harvesting age, and tree size (dbh for Vancouver region and tree volume for Interior regions). A computer model, using regression formulas, was developed using all combinations of these four elements.

Two sets of transportation cost information were required for the Vancouver region where logs are moved by both truck and water. These estimates were obtained, without modification, from the MOF Coast Appraisal Manual. To use the model, the practitioner needs to know the one-way truck-haul distance and the point of origin of barges or booms to derive the pertinent cost information.

For application to Interior FRDA projects only truck transportation was considered. This information has been separated into highway and off-highway configurations. Here the practitioner must know which configuration applies, the one-way haul distance and full trip cycle time (including loading and activities), to derive the estimated transportation cost.

In most instances, the estimate of delivered log cost will be the sum of the tree-to-truck and transportation costs. Sometimes, however, an additional factor must be included. The cost of a lake boom tow or bridge construction, for example, can be provided by the practitioner and be added as a cost expressed in dollars per cubic meter.

Finally, to provide a truer estimation of delivered log costs, several assumptions were incorporated into the model design so adjustments could be made to depict conditions outside the norm.

- Delivered log costs are expressed in 1988 dollars as the unit costs of logging have remained steady over the past 3 to 5 years.
Factors reflecting technological improvements in machinery or methods are not included and, therefore, cost estimates are considered conservative.

Trucking, dumping, sorting, booming plus towing and barging costs are derived from the MOF Coast and Interior Stumpage Appraisal Manuals.

Development costs, which would be involved in the re-opening of previously logged areas, and overhead are derived from current cost estimates with adjustments made to reflect second-growth logging conditions.

Existing road systems, which allow access to areas now bearing stands established or treated under FRDA, would be available when the new crop matures. The amount of the adjustment made to development costs for re-opening roads will vary with region and site conditions.

The length of road required to develop an area is 0.5 km/ha of developed forest. This can be modified to allow a greater or lesser road requirement, depending on the average slope of the terrain.

Costs are derived for slopes up to 50% in the Interior and 60% in the Vancouver region. Ninety-eight percent of FRDA's stand tending projects and 88% of its planting projects are carried out below these slope limits.

Some factors are set arbitrarily, such as average crew transportation costs.

Sampling

A sample of 207 backlog planting and 232 stand tending projects under FRDA was obtained from the MOF history records database. This sample represented 16% of all FRDA projects and was used to determine regional average values for some factors and to check results obtained from the model.

Additionally, 439 questionnaires were distributed to 42 district offices. This information was used to create a site-specific database of each treatment area. A range of stand volumes, average tree sizes, and terrain characteristics was also derived.

Results

The general log cost computer model was used to generate a series of regional tree-to-truck cost tables and graphs. Transportation cost tables are provided to complete the estimation of delivered log cost. These tables require a minimum of extra calculation and extrapolation on the part of the practitioner.

The general model was also adapted to provide cost estimates for each sample site identified by the study. As the determination of delivered log costs requires a mature harvestable stand be present and as all the sample sites contain newly planted or immature stands, it was necessary to provide a range of results that might be expected at harvest time.

A variance test was conducted to compare a series of randomly picked sample results with costs derived from the general tables. This test showed that for the province as a whole the general tables showed no variance with the samples. In the Vancouver region, general results were 1.8% higher than those for the samples while for Interior regions, the general tables were 0.8% lower.

Copies of the 85-page report, Expected Delivered Log Costs for Areas Treated Under the Canada-British Columbia Forest Resource Development Agreement by Starling Wood Group are available while supplies last from:

Forestry Canada
Pacific Forestry Centre
506 West Burnside Road
Victoria, B.C. V8Z 1M5

Please quote FRDA Report 079 when ordering.