The WOODSIM™ Log-Supply Simulation Program -- Example of Reports

The following is an example of reports that can be produced from WOODSIM™.

Context

- This example is based on a fictional operation in British Columbia (BC), where Mountain Pine Beetle (MPB)-attacked stands are being harvested. The dominant species is Lodgepole Pine, with some Spruce present. Two different bucking strategies are simulated: first, bucking for Sawmill1: logs are categorized as either Bigwood or Smallwood, based on the diameter at 1.5ft from the butt. Second, bucking for Sawmill2, oversized logs, those greater than 17 inches at the butt, are extracted first. Then, the remaining logs are again categorized as Bigwood or Smallwood. For a complete description of each Log Sort see the Log Sorts section below. WOODSIM™ also keeps track of trees that do not make sawlog merchantable specs (Rejects), and even those non-merchantable stems that will produce a sawlog.

- The results in the FibreFlow reports are presented by DBH Group and "Crack Class". The Crack Class defines the extent of the MPB damage, in categories defined by BC's Forest Service, the four categories range from "no attack" (Crc_NoCrc), to "severe attack" (Crc_OffGrade2). It is important to note that every class definition in WOODSIM™ is user-defined, this includes the classification of stems, logs, blocks, crack classes, etc.

- This particular example starts with the .DAT file which describes the cruising of the given stand. The presence of MPB attack is driven on a tree-by-tree basis by the Insect Code. Also, WOODSIM™ models the decay on a tree-by-tree basis, simulating the decay pockets, not as a blanket average. This allows for detailed calculation of long-butting losses, and permits the user to explore different long-butting practices.

- WOODSIM™ keeps track of the fibre transformation from the stump to the mill's yard. It tallies the volumes in different manners, recognizing that through the supply chain there exist different measures that should be tracked. For example, it is important to track the merchantable volume, that which falls within the merchantable standards, this is particularly

important in area-based tenures, where the company will pay based on the merchantable volume. It also keeps track of the used volume, or hauled volume, necessary to calculate freight charges, and royalties when harvesting in volume-based tenures. The FibreFlow reports show the relevant Gross (including decay) and Net (excluding decay) volumes through the supply chain.

- The LogStatistics report shows the key statistics for each log sort delivered to either Sawmill1 or Sawmill2. It is important to remember that the log sorts are defined by the user.

Volumes

- WOODSIM™ starts by calculating the Gross Merch Volume (GMV). This is the volume, including decay, measured following the merchantability standards: 30 cm stump, 10 cm top, and min DBH of 17.5 cm except 12.5 cm for LP.

- The program also knows the percentages of decay, waste and breakage (DWB) that make the difference between the GMV and Net Merch Volume (NMV). The NMV is what is reported in the cruise compilations. However, this NMV usually underestimates the amount of fibre exracted. The reason is that the amount of decay taken in usable logs is significantly lower than that which is left behind in either whole-stem decay rejects, or longbutted segments. Therefore, using the average DWB to calculate the difference between GMV and NMV will overestimate the decay extracted and underestimate the sound fibre.

- Therefore, WOODSIM™ makes detailed calculations on the volume that is expected to be left behind as whole-stems due to excessive decay. This volume is called Firmwood Reject Volume, and the Gross Firmwood Reject Volume (GFV) includes decay whereas the Net Firmwood Reject Volume (NFV) represents the sound fibre left behind in these decayed stems.

- After removing the firmwood reject volumes, WOODSIM™ simulates the long-butting based on user specifications: In this case, assume that stems with a butt diameter less than 10.0 inches allow a maximum of 20% decay as a fraction of diameter. For stems greater than 10.0 in at the butt, for Spruce and Pine, the maximum decay allowed is 50% of the area, with a minimum rind of 2 in. For Balsam, the maximum decay allowed is 33% of the area, with a minimum rind of 2 in. The volume removed is called Longbutted Volume, and the Gross

Longbutted Volume (GLB) includes decay whereas the Net Longbutted Volume (NLB) represents the sound fibre left behind in the longbutted segments.

- WOODSIM™ then proceeds to buck the stems after the longbutted segments have been removed. The volume is tallied into Log Sorts where the Gross Hauled Volume (GHV) represents the volume in each log sort including decay, and the Net Hauled Volume (NHV) excludes decay.

- When tallying the Gross volumes, the following equation will hold:

  GMV - GFV - GLB = GHV

  where GHV includes only those log sorts that were produced from merchantable stems (excludes Rejects)

- When tallying the Net volumes, the following equation will hold:

  NMV - NFV - NLB = NHV

  where NHV includes only those log sorts that were produced from merchantable stems (excludes Rejects)

- There might be a small discrepancy in the calculation due to recalculations of decay volues through the process.

- For diagrams illustrating the above, **please click here**.

Please click here to view the Excel reports (saved as an html file).

Please note that the Excel reports were generated by **HalcoMiner™** from an MS Access database file generated by WOODSIM™.