Projections for downed woody debris in Tasmanian wet eucalypt forest under a range of disturbance regimes

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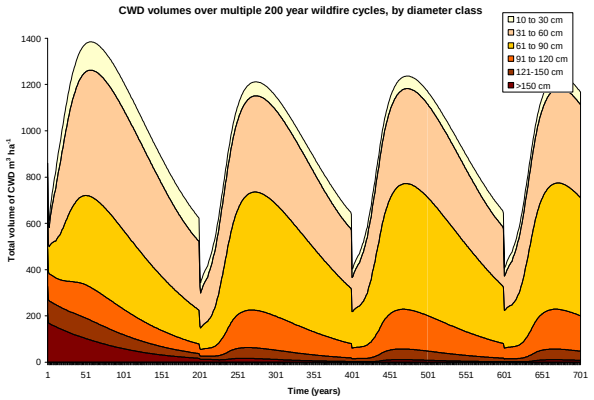
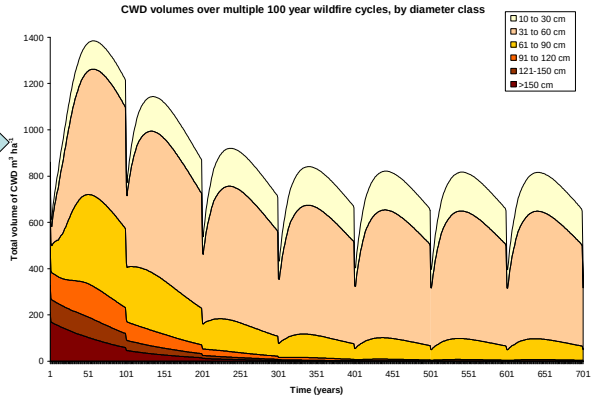
This paper presents some outputs from a model of downed woody debris (DWD) dynamics developed for Tasmania's commercially important lowland wet *Eucalyptus obliqua* forests, which are naturally fire-derived and typically managed through clearfelling. The model assumes that wildfires – and clearfelling – are stand-replacing disturbance events that reset forest succession. It predicts DWD volumes at yearly intervals over successive cycles of disturbance and recovery. The starting point for all models is the typical Tasmanian situation - a mature forest hosting large quantities of DWD. Modelled scenarios differ in their inputs chiefly in the nature and time-interval of the disturbance event (though other differences can also be modelled). The model can present output in tabular or graphical form, by volume or mass, and by diameter-class or decay-class (or a combination of the two). This poster illustrates some graphical outputs for DWD volume by diameter-class.



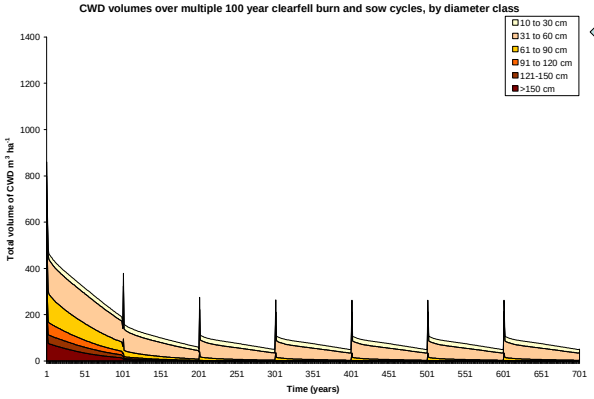
1. Stand-replacing wildfire, with a fire return interval of 200 years.

In this scenario, the peaks in DWD volume occur about 60 years after the wildfire, reflecting a balance between the time taken for large, fire-killed trees to fall over and the rate at which they subsequently decay. This model comes closest to being able to reproduce the volumes of DWD typically recorded in Tasmania's lowland wet *Eucalyptus obliqua* forests. However, it seems that even 200 years is not long enough to grow the large trees required to maintain DWD volumes in the largest diameter-class (>150 cm) at levels typically recorded in the forests. Today's DWD levels more likely reflect a history of non-stand-replacing wildfires rather than longer fire return intervals.



2. Stand-replacing wildfire, with a fire return interval of 100 years.

A fire return interval of 100 years was chosen to enable comparison with anticipated rotation lengths for forests managed under clearfell, burn and sow. Compared to the 200 year scenario, DWD volumes peak at lower levels but the troughs are no lower. The biggest difference is in the diameter-class distribution. After the 'legacy' DWD derived from the previous fire regime has decayed or burnt away, most DWD is less than 60 cm in diameter.

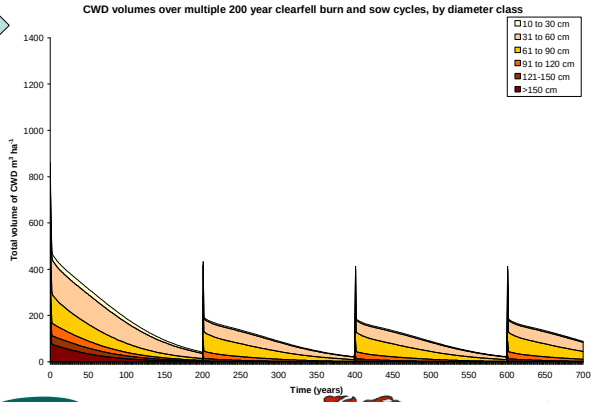


3. Clearfell, burn and sow, with a harvest return interval of 100 years.

A harvest return interval of 100 years is anticipated for the least intensively managed forest subjected to clearfell, burn and sow (CBS) silviculture. Clear differences with the wildfire scenarios are apparent. The peaks in DWD volumes are very much lower, because much of the wood is harvested. Harvest residue accounts for the occurrence of peaks immediately after harvest, while the regeneration burn accounts for the sharp drop in DWD volumes over the following year. Thereafter there are no significant inputs to DWD until the following harvest, allowing volumes to gradually decline as DWD decays. Future CBS rotations are unable to maintain currently recorded volumes because the 'legacy' DWD from the previously unharvested forest is almost fully decayed away or burnt by the beginning of the second rotation. From here on, almost all DWD is comprised of material <60 cm in diameter. This would be expected to significantly reduce the variety of species could make use of the DWD as habitat.

4. Clearfell, burn and sow, with a harvest return interval of 200 years.

Longer harvest return intervals are sometimes suggested as a way to mitigate some of the ecological impacts of intensive forestry. This scenario is able to produce higher peaks in DWD than the 100 year CBS scenario, and much of the DWD is in larger diameter-classes. On the face of it, this suggests that such a regime could enable the survival of a greater variety of DWD-dependent species. However, the predicted volumes remain much lower than either wildfire scenario, and the lack of continued input to the DWD pool after harvest means that after 200 years of decay, the troughs almost reach zero. This is a condition that is impossible to replicate in any wildfire scenario, and would probably limit the variety of DWD-dependent species able to make use of such forest in the long term.



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