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Coarse Woody Debris in the Coastal Forests of Southern Vancouver Island

In this extended abstract, we present results from a study of coarse woody debris in forests of coastal British Columbia (see Wells and Trofymow 1997 for the full report). We examined trends of CWD abundance across chronosequence plots established by the Canadian Forest Service, on the drier east side (CWHxm subzone; Meidinger and Pojar 1991) and the wetter west side (CWHvm subzone) of southern Vancouver Island. Overall, total biomass of CWD on the east side was substantially (and significantly) lower than on the west side. Mean total biomass, across the chronosequences, ranged from 17 Mg/ha to 38 Mg/ha (55 m^3/ha to 149 m^3/ha) on the east side and 65 Mg/ha to 191 Mg/ha (307 m^3/ha to 636 m^3/ha) on the west side (Figures 1a and 1b).

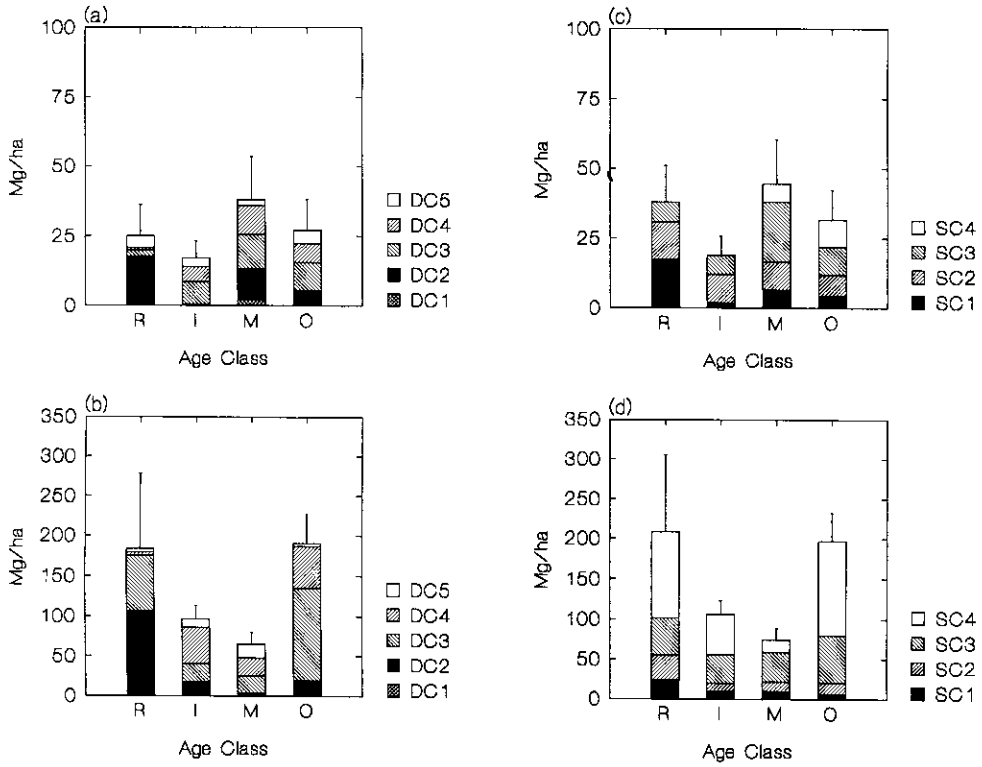

Figure 1. Mean CWD mass (>12 cm dia.) for (a) east-side CWHxm and (b) west-side CWHvm chronosequences with decay class; mean CWD mass for (c) east-side CWHxm and (d) west-side CWHvm chronosequences with size class. Note change in scale between east-side and west-side plots. Error bars are standard errors. n = 4 plots/age class category. R = regeneration plots (3-9 years). I = immature plots (32-43 years). M = mature plots (66-99 years). O = old growth plots (>200 years). DC = decay class. SC = Size Class; SC 1 = 1.1 to 12.0 cm dia.; SC 2 = 12.1 to 29.9 cm dia.; SC 3 = 30.0 - 59.9 cm dia.; and SC 4 = 60 cm+ dia.

Spies and Franklin (1988) predicted that CWD would follow a 'U'-shaped trajectory in coastal forests of the Pacific Northwest. We found that total biomass of CWD followed a 'U'-shaped curve over the chronosequence in three of four sites on the west side, while no overall trend was detected for total biomass in the east side. Further, in both subzones, CWD was skewed to lower decay classes in younger stands, and more normally distributed in older stands (Figures 1a and 1b). On the east side, CWD in young stands tended towards small size classes, and was more uniformly distributed in older stands (Figure 1c; note that small diameter material is included). On the west side, CWD tended towards larger size classes in all age classes (Figure 1d; note that small diameter material is included). Finally, on the east side, Douglas-fir (*Pseudotsuga menziesii*) was the most common species among classified CWD; on the west side, western hemlock (*Tsuga heterophylla*) and western redcedar (*Thuja plicata*) were most common.

The biomass levels we observed on west side plots were consistent with accumulations reported in other *Pseudotsuga - Tsuga* forests of the Pacific Northwest (Caza 1993). Alternatively, on the drier east side plots, the range of 17 Mg/ha to 38 Mg/ha, (55 m^3/ha to 149 m^3/ha), were among the lowest CWD accumulations recorded for this forest type, regardless of age class. Reported biomass in old–growth (200+ years) *Pseudotsuga - Tsuga* forests of Washington and Oregon ranges from 66 Mg/ha to 490 Mg/ha (221 m^3/ha to 1421 m^3/ha) (Caza 1993).

The low amounts of CWD observed in this study on the east-side plots are somewhat surprising, given the high values observed in Douglas-fir forests in Washington and Oregon. It may be that the old-growth plots in this study were established in less productive stands than typical for the east side (because productive sites in the CWHxm on southern Vancouver Island have been subject to more harvesting than less productive sites), yielding lower than typical CWD loadings. Decay rates, which can be high on dry sites (Harmon et al. 1986), combined with lower growth rates of trees could result in lower than typical CWD loadings on unproductive sites.

On both the east side and west side, variance in CWD loadings among plots was substantial. This may have limited our ability to detect some trends, and suggests that factors other than age (e.g. edaphic site characteristics and stochastic disturbance events) are influencing CWD abundance. Finally, we caution that the regenerating, immature, and most mature stands examined in this study may not be following the same developmental trajectory as old stands because they initiated after harvesting while old stands initiated after natural disturbances. Further studies examining the influence of site characteristics and disturbance history on CWD abundance would improve understanding of CWD dynamics in the CWH zone.

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