ENVIRONMENTAL FOOTPRINT COMPARISON TOOL

A tool for understanding environmental decisions related to the pulp and paper industry

GREENHOUSE GASES

EFFECTS OF NON-WOOD FIBER USE ON GREENHOUSE GAS EMISSIONS

Wood Fiber Procurement

In a recent appraisal of greenhouse gas emissions from forestry operations, Sonne carried out a life cycle assessment that estimated direct and indirect emissions associated with growth of Douglas fir in the Pacific Northwest (Sonne 2006). Though the assessment is related more to the management of trees for saw timber rather than wood pulp, it nonetheless provides a benchmark for silvicultural-related greenhouse gas emission properties.

Of the various unit operations, harvesting emerged as having the greatest greenhouse gas contribution. Where practiced, the piling and burning of slash accumulated from prior harvests constitutes the second largest emission source. Fertilization represents the third greatest. Carbon dioxide accounted for the majority of GHG emissions (67%), followed by nitrous oxide (N_2O) (23%), and methane (CH_4) (10%).

Johnson et al (2005) have also projected emissions of CO_2, N_2O and CH_4 for several silvicultural scenarios in the Southeast and Pacific Northwest. Harvest rotations were 25 and 45 years, respectively. In each region, two levels of management intensity were evaluated, characterized in part by an approximate three-fold increase in nitrogen fertilization. Respective nitrogen applications in the Southeast were 189 and 547 kg per hectare, approximately four times greater than in the Pacific Northwest evaluation.

The various scenarios evaluated in these two studies provide a range of greenhouse gas emission estimates that accompany various treatment regimes and management objectives on different landscapes. Though no single value can be claimed to typify the procurement of pulpwood, the evaluations are useful for establishing an order of magnitude for what might be encountered in silvicultural practice. Values developed in the two referenced studies ranged from as little as 0.8 to as great as 2.75 metric tons CO_2e per 100 cubic meters harvested wood. A value of 1.5 metric tons CO_2e per 100 cubic meters harvested wood might be taken as a representative value.

References

Johnson, L., B. Lippke, J.. Marshall, and J. Comnick. 2005. Life-cycle impacts of forest resource activities in the Pacific Northwest and Southeast United States. *Wood and Fiber Science* 37 Corrim Special Issue: 30–46. http://www.corrim.org/reports/2005/swst/30.pdf

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