

**Evaluating Operational cost and Soil disturbance in varying silvicultural prescriptions**

Harikrishnan Soman<sup>1</sup> and Anil Raj Kizha.<sup>2</sup>

[anil.kizha@maine.edu](mailto:anil.kizha@maine.edu)

<sup>1</sup>Graduate Research Assistant

<sup>2</sup>Assistant Professor of Forest Operations

School of Forest Resources,

University of Maine, Orono, Maine 04469, USA

Forest residues have multiple uses among which they are conventionally used for armoring the timber harvesting skid trails to minimizing soil disturbances (in the form of displacement, compaction, and rutting). The aim of this study was to quantify the cost of extracting forest residues from a mechanized timber harvesting operations along with evaluating the disturbance to the soil profile caused by not laying the slash mat. The field-based experiment was done on two ground-based timber harvesting scenarios: (Treatment A) armoring trails with forest biomass versus (Treatment B) no forest biomass on trails. The study was replicated across three silvicultural prescription common to the state of Maine, USA. Measurement variables collected for the study included delay-free cycle times of various timber harvesting machines, weight of loaded machines, rut depth, and soil penetration force. The impacts of ground-based harvesting operation on soil structure was determined related to number of machine passes, load of machines, and moisture content. This information on the cost and productivity for timber harvests operations would be beneficial when developing economic and environmentally sustainable harvesting best management practices.