

Enhancing Overland Flow Infiltration through Sustainable Well-Managed Thinning: Contour-Aligned Felled Log Placement in a *Chamaecyparis obtusa* Plantation

ABSTRACT

Contour felling is a restoration method used to decrease overland flow (OF) and soil erosion in the world. However, the impact of thinning and the placement of felled logs on OF remains inconclusive. Low ground cover and soil permeability promote OF in *Chamaecyparis obtusa* (Siebold et Zucc.) Endl plantations, making thinning a method for reducing runoff. We examined the relationship between OF and ground cover in a *C. obtusa* plantation in Japan. Event-based runoff was monitored in three plots from 2016 to 2021, with 40% thinning conducted in 2019. In plot T1, logs were randomly scattered, and, in T2, logs followed contour lines, while control plots stayed the same. After thinning, both treatment plots showed lower OF than the control plot. The ANCOVA test shows a significant slope reduction in treatment plots compared to the control plot from pre-thinning to post-thinning (T1: 0.67 to 0.26, T2: 0.66 to 0.12, $p < 0.001$, Tukey HSD test). However, in plot T2, OF remained stable for two years post-thinning, affirming the enduring effectiveness of contour-aligned log placement. This study backs the notion that aligning fallen logs with contour lines boosts long-term OF infiltration, supporting sustainable forest and soil management.