

Precision Thinning - a comparison of stand-level and pixel-level thinning in Norway spruce and Scots pine stands

Magnus Persson¹, Renats Trubins², Ljusk-Ola Eriksson¹, Johan Bergh¹,
Johan Sonesson³, Emma Holmström²

¹Linnaeus University, Sweden
Email: {magnus.j.persson, ola.eriksson, johan.bergh} @lnu.se

²Swedish University of Agricultural sciences, Sweden
Email: {renats.trubins, emma.holmstrom} @slu.se

³Skogforsk, Sweden
Email: johan.sonesson@skogforsk.se

Abstract

Precision forestry allow decision making on tree level or pixel-level, as compared to stand-level data. However, little is known about its long-term effects on within-stand variation, stand economy and growth. In this study, silviculture was optimized in 20 conifer-dominated forest stands located in the boreo-nemoral region of southern Sweden. Two thinning scenarios were tested; optimization using a stand-based approach; Stand level thinning (SLT) and precision thinning approach; Precision thinning (PT).

Mean annual increment of living stem volume (MAInet) was significantly higher for PT than SLT for the full rotation ($p = .002$) but not regarding Net Present Value (NPV, $p = .10$). The within-stand variation in basal area ($m^2/ha-1$) was significantly lower at the end of the rotation compared to the start of the simulation for both SLT ($p < .001$), and PT ($p < .001$). At the end of the rotation, SLT had significantly higher variation in basal area compared to PT ($p < .001$). The results indicate the there is no clear long-term benefit or drawback in basing silvicultural decision on pixel-level information as compared to stand level data when optimizing stand economy. However, PT was the upper hand since within-stand variation can be accounted for and targeted during harvest planning.