

Transformation of Sitka spruce stands to continuous cover forestry: comparison of three thinning regimes

Edward Wilson^{1,2}, Ian Short¹, Áine Ní Dhubháin² and Paddy Purser³

¹ Teagasc Forestry Development Department, Ashtown Food Research Centre, Dublin

² UCD Forestry, School of Agriculture and Food Science, University College Dublin, Belfield, Dublin

³ Purser Tarleton Russell Ltd, Forest Sector Management, Consultancy & Research, Woodenbridge, Co. Wicklow

Background

Fifty-two percent of the stocked forest area in Ireland is Sitka spruce. Forest management in Ireland is dominated by the clearfell system; a system that normally entails an even-aged forest structure. There has been increasing interest in recent years in Continuous Cover Forestry (CCF); an approach to the sustainable management of forests whereby forest stands are maintained in a permanently irregular structure by single tree selection and harvesting. Coillte Teo has adopted a low impact silviculture policy (including CCF) in its broadleaf estate and increasingly private forest owners are also transforming their forest stands using CCF principles.

There is little guidance related to transformation of conifer plantations to CCF. The COFORD-funded Low Impact Silvicultural Systems in Ireland project (LISS), led by UCD and completed in 2014, began the process of filling knowledge gaps.

The TranSSFor Project

A new 5-year Teagasc-funded project began in 2017, in collaboration with UCD. Called the TranSSFor project, research will focus on the initial stages of transformation of two Sitka spruce stands in Ireland.

Three thinning treatments were used. A conventional “low” thinning will be used as the control for the study. Two additional treatments, “crown” and “graduated density” thinning, will also be applied. These treatments favour a more diverse arrangement of trees and focus on removing the competitors to future high quality individual trees. Currently, the stands are on a 3-year thinning cycle and due to be thinned in 2018 and 2019. This project will continue the transformation process by carrying out these thinnings and investigating their impact on stand transformation.



Current stand condition after two thinnings (left); future, desired structure (right).

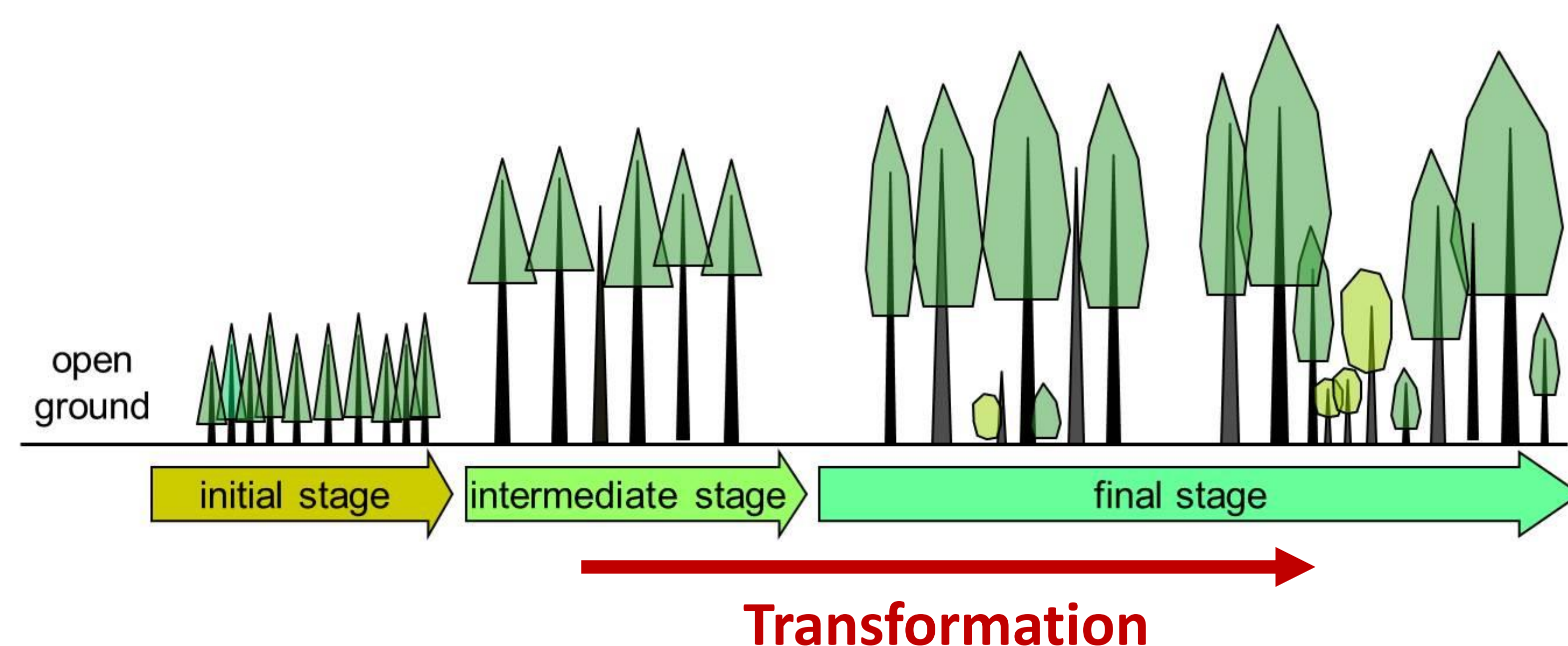
Current Research Plans

The three thinning treatments are replicated in three blocks and at two sites in Ireland. Data collection began in January 2018 with mapping the individual trees and recording site conditions. Full tree and stand measurement continues with assessments of tree social classes, productivity, health and vigour, stem quality and timber strength characteristics. Environmental conditions, including understorey light levels, are also being carefully monitored.

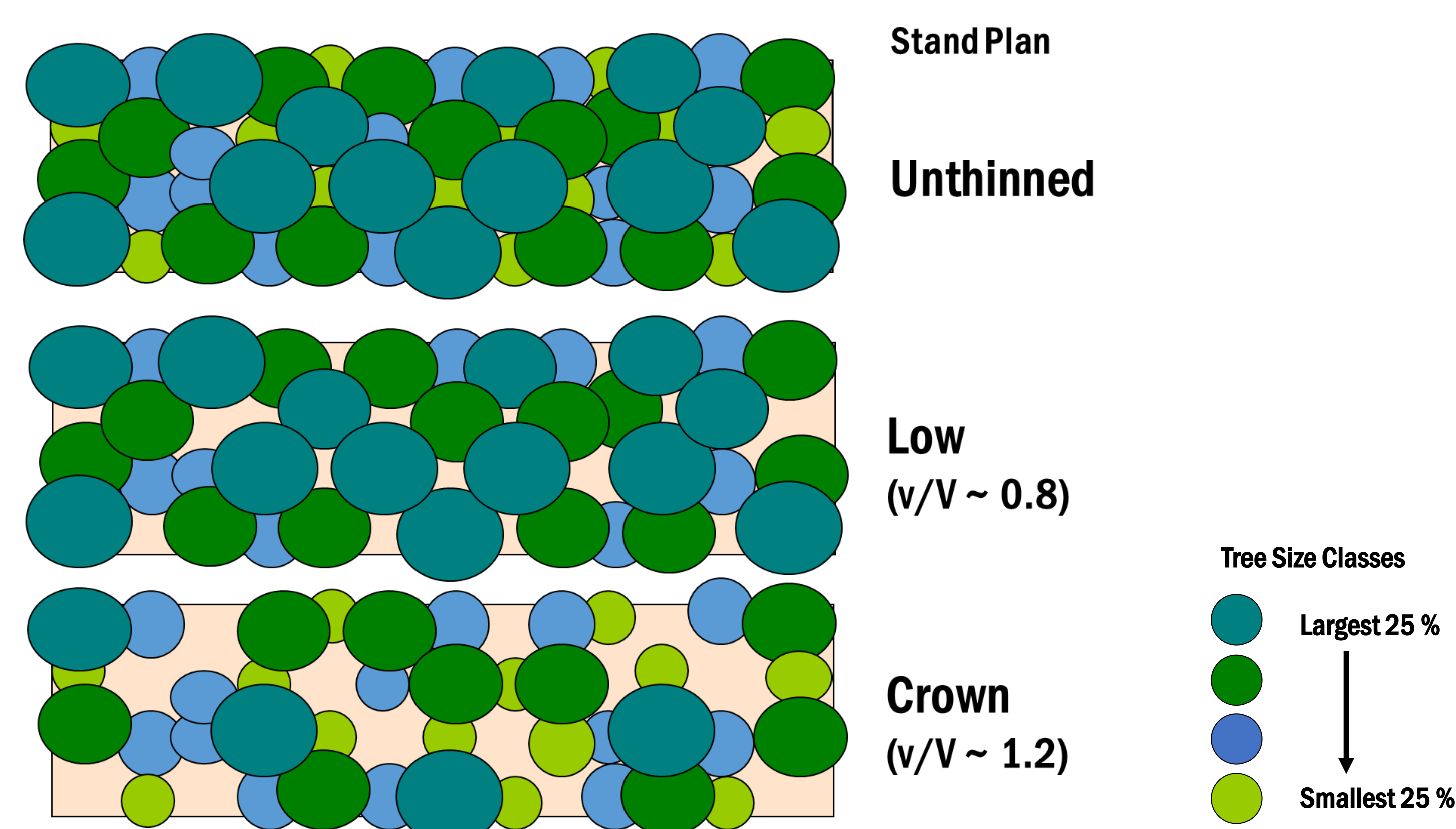
Further Reading

- Wilson, E. R., I. Short, Á. Ní Dhubháin and P. Purser. 2018. The TranSSFor Project: the transformation of Sitka spruce stands to continuous cover forestry. *CCFG Newsletter* 38 (Spring 2018): 91-97
- Wilson, E. R., I. Short, Á. Ní Dhubháin and P. Purser. 2018. Transforming Sitka spruce plantations to continuous cover forestry. *Forestry & Energy Review* 8(1): 38-40

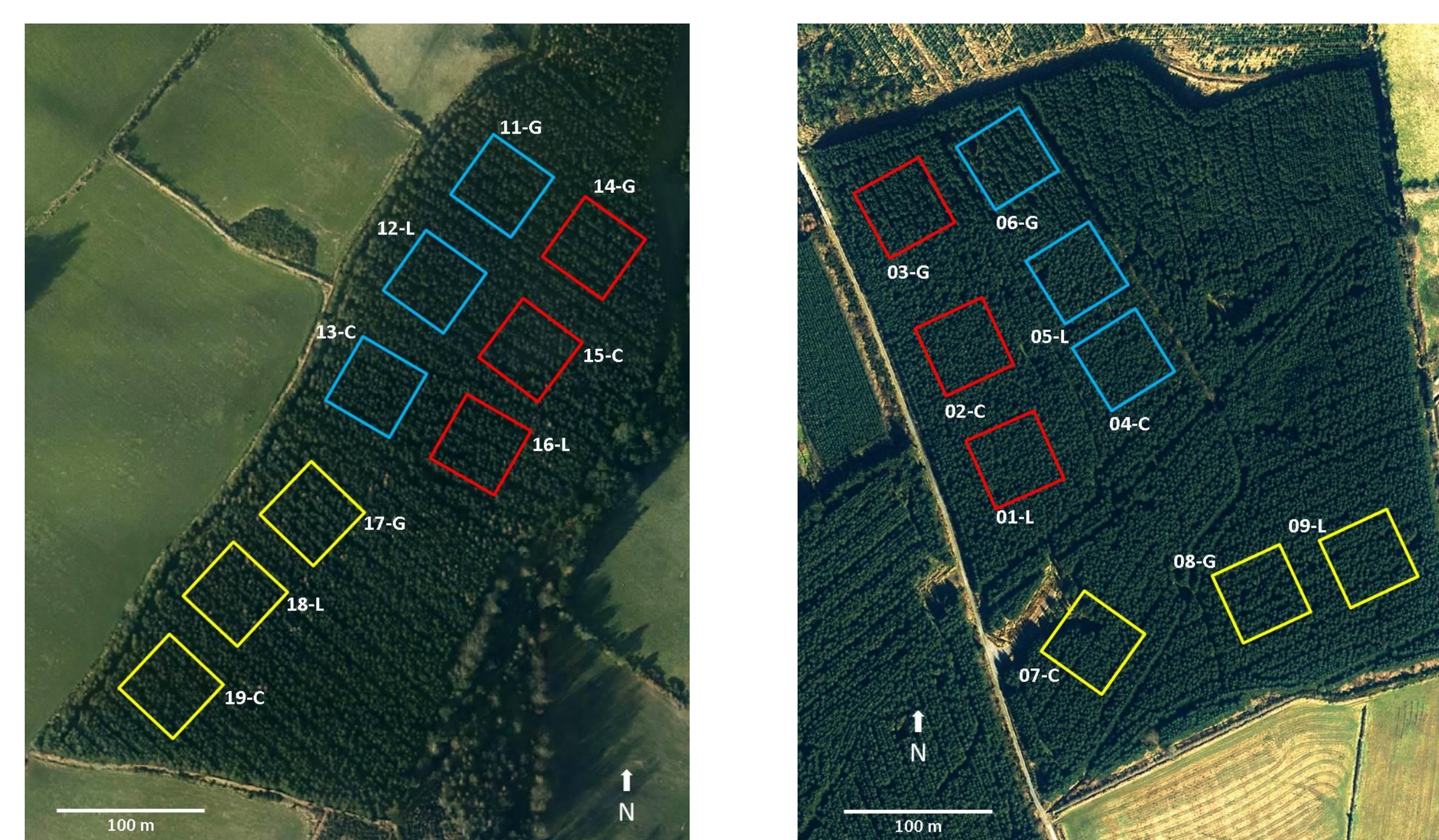
More Information: www.teagasc.ie/crops/forestry/research/transformation-of-sitka-spruce-to-ccf



Successional stages in an even-aged planted forest. Transformation of a planted stand requires a series of planned interventions that aim to maintain and promote timber quality, while also restructuring the stand to facilitate natural regeneration. Credit: diagram adapted from original by Jens Hauke.



Different spatial arrangements of trees under alternative thinning regimes. Low thinning is the operational standard in even-aged Sitka spruce forests. Crown thinning focuses on removing competitors to the best individual trees and leads to a more open stand structure, facilitating cones of natural regeneration. v/V is the ratio of the average diameter of the trees removed compared with the average diameter of trees in the stand prior to thinning.



Locations and layout of the thinning study: Ballycullen, Co. Wicklow (left); Fossy Hill, Co. Laois (right).