

Forestry

Continuous cover forestry in Co Wicklow



Sitka spruce is being transformed from a single-storey to a multi-layered diverse forest to maintain tree cover in Co Wicklow. Donal Magner reports

Silviculture – the science of forest management – as practised in Ireland has clear objectives and a straightforward timeline. A forest is established, maintained, thinned, clearfelled and replanted to begin the cycle all over again.

But what are the options available to forest owners who wish to maintain tree cover in perpetuity. I recently walked through an excellent stand of Sitka spruce in the townland of Ballycullen near Ashford, Co Wicklow, that in normal circumstances would be close to clearfelling as it was planted in 1994.

This is part of a research project that will eventually transform this woodland into continuous cover forestry (CCF). “The objective of CCF is to harvest trees and preserve the forest at one and the same time,” explains my guide, Ted Wilson. “Permanent woodland conditions are maintained, protecting the soil and biodiversity as the forest is renewed by natural regeneration.”

The transformation process at Ballycullen began in 2010 when the forest was ready for first thinning. At that stage, CCF research funding was approved by the Department of Agriculture, Food and the Marine, which lasted until 2014.

From 2017, the second phase of the research was taken up by Teagasc and UCD under the guidance of Wilson, who is a Walsh scholar in silviculture. The project forms the basis of his PhD in forestry at UCD and is supervised by Dr Ian Short, Teagasc and Prof Áine Ní Dhubháin, UCD.

Thinning regimes

The first signs that this 8ha forest is being treated differently than a typical Sitka



Natural regeneration of oak in Ballycullen. \ Donal Magner



Ted Wilson, surveys the forest property in Ballycullen, Co Wicklow, which is being transformed into CCF. \ Donal Magner

site are the irregular patches allowing plenty of light to reach the forest floor. A forester unaware of the thinning regime might think that the forest has been overthinned, but Wilson explains that three different thinning regimes are being compared:

- ☛ Low thinning.
- ☛ Crown thinning.
- ☛ Graduated density thinning.

Low thinning, the removal of the smaller inferior trees to favour the final crop, is the conventional selection method in Ireland, but in CCF there is no final crop.

Crown and graduated density thinning treatments are two potential pathways for transformation of the plantation to CCF.

A critical feature of these two approaches is the selection of trees that have potential to produce high-quality timber when they reach the target size for harvest.

Trees of lesser quality or competing with the high-quality trees are marked and removed at each thinning, allowing the best trees the space they need



Sitka spruce natural regeneration emerging in the CCF site. \ Ted Wilson

to develop and maximise their timber.

One advantage of crown and graduated density thinning is that slightly larger trees are removed during the early stages compared with low thinning. This provides the owner with a higher early income than in a low thinning. But the main benefit of thinning at this stage lies in the transformation to an uneven layered forest and creating the right environment for natural regeneration, the qualities that define CCF.

Quality trees

Ted Wilson discusses the selection method in greater detail when we walk through the crown thinning plot.

“In CCF, we talk about making positive and negative selections of trees,” he says (see panel, below). “From the first thinning stage we identify the potential quality trees. We look for trees that have straight stems, light branches, healthy and vigorous crowns and good root development for tree stability. This is what we call the positive selection process. At this point, the size of the tree is less important than their future quality potential.”

The objective is to mix tree sizes, retaining good-quality trees including smaller but healthy trees. “This is important as these trees will provide a continuous supply of added-value timber as we continue through the transformation process,” he explains.

“Although they are all the same age, keeping trees of different sizes begins to create a more irregular structure in the forest. The trick is to keep the tree size and spacing balance going until the forest begins to regenerate.” As a silviculturist, his ultimate goal is to achieve the optimal dynamic between high value timber production and natural regeneration.

Natural regeneration

The regeneration of the Ballycullen stand is one of the more fascinating aspects of the project.

According to the eminent forester, the late Peter Savill, Sitka spruce starts to regenerate between 30 and 40 years while the best age for regeneration is greater than 50 years. Yet, in Ballycullen after 25 growing seasons, regeneration is already underway.

Furthermore, the regeneration is prolific. In some plots, it is estimated that up to 100,000/ha seedlings – still barely visible – are beginning to emerge. But doesn’t that suggest that this stand is likely to be a Sitka spruce stand in perpetuity? “What is encouraging is the emergence of other species including Douglas fir and even oak,” Wilson replies. “We are also seeing mountain ash, holly, birch and sycamore arrive, all without any human help.”

That Sitka may be the dominant species is likely but it will, over time, morph to a mixed-age forest with opportunities for other species to add to the diversity. He believes the results from Ballycullen will inform the management of predominantly Sitka spruce forest stands on sites suitable for CCF.

The current project will conclude in 2022, following the fourth “stand intervention” – the phrase used instead of thinning.

UCD and Teagasc plan to extend the life of the project, which is vital as the true worth of CCF is in generating important information well into the future.

Forest owners interested in continuous cover might check out the Forest Service Woodland Improvement CCF scheme. It provides funding for conversion of existing forests to CCF over a 12-year transitional period with three grant payments of €750/ha for each intervention.

The educators and the competitors

While the quality trees – marked ‘Q’ – are emerging in Ballycullen, the surrounding trees which Ted Wilson categorises as “educators and competitors” also play a key role in CCF. ☛ **Educator trees:** these are retained as they play a positive role in the enhancement of tree quality in the neighbouring ‘Q’ trees such as im-

proved branch form as well as minimising epicormic shoot growth.

☛ **Competitor trees:** these trees are gradually removed early in what is termed ‘negative selection’. “These are inferior quality trees with less potential for added-value timber production,” says Wilson.

“You take out the competitor which

drives the transformation process and provides more space for the quality trees and allows bigger crowns to develop.

“The crown is the engine because more carbohydrates are being produced and this translates into more timber production on the best trees.”

The interplay between quality, edu-

cator and competitor trees “creates a structural irregularity that allows height variations across the forest,” he maintains.

“Already, some trees are up to 5m taller than their neighbours which is adding to diversity and helping with stability.”