

Learning by doing: A novel approach to training in Continuous Cover Forestry

The establishment of a new training site for Continuous Cover Forestry at Darnaway Forest in Scotland presents an opportunity for hands-on learning mirroring silviculture training initiatives already widespread across Europe.

The future of forestry in the UK is looking greener and more diverse as the emphasis pivots towards multi-functionality and resilience of woodland resources. With this shift comes a growing requirement for new skills and training in silviculture.

Recently, a partnership of UK and European foresters has established a training facility at Darnaway Forest, Morayshire, Scotland, with a specific focus on Continuous Cover Forestry (CCF). This site joins an international collaboration, the Integrate Network, which employs a common training methodology and plot design. The first of its type in the UK, the key feature is a forest plot known as a marteloscope.

CCF is an increasingly popular approach to sustainable forest management that maintains a permanent forest canopy by selectively harvesting individual or small groups of trees. The aim is to foster biodiversity and enhance ecosystem resilience, while sustaining a continuous supply of high-quality timber.

However, there is a well-recognised skills gap that limits the application of CCF in the UK compared with many European countries. Tree marking, a critical skill for CCF management, is a new skill for many foresters, and needs to be honed by formal learning and practical experience.

Integration and Collaboration

The Integrate Network was initiated in 2016 by the German Federal Ministry for Food and Agriculture and the Czech Ministry of Agriculture. Since 2022, the network has become a Multi-Donor Trust Fund with 12 member countries.

The core activity has been the creation of the marteloscope network;

to date, over 260 sites in 27 countries. Each marteloscope is managed by a local team that deliver their own training events. Members of the network include forest owner groups, government agencies, companies and educational institutions.

Originating from the French term “martelage” (meaning “hammering,” the traditional method of marking trees), a marteloscope is a specially prepared forest plot ranging in size between 0.25 and 1 ha. Every tree is numbered, measured, and its timber and biodiversity values are estimated and recorded in software.

Participants use this information to simulate tree marking exercises on tablet computers or mobile phones, instantly analysing the impact of their tree selections on both potential financial returns and biodiversity impacts. This interactive approach fosters valuable discussions and peer-to-peer learning in the forest.

The Scottish project, called Integrate Darnaway, has established two martelosopes in Darnaway Forest. These plots, Darnaway 1 (0.25 ha) and Darnaway 2 (0.5 ha), represent different forest development stages and species compositions. The two plots are numbered 257 and 258 and add the UK to the Integrate Network map.

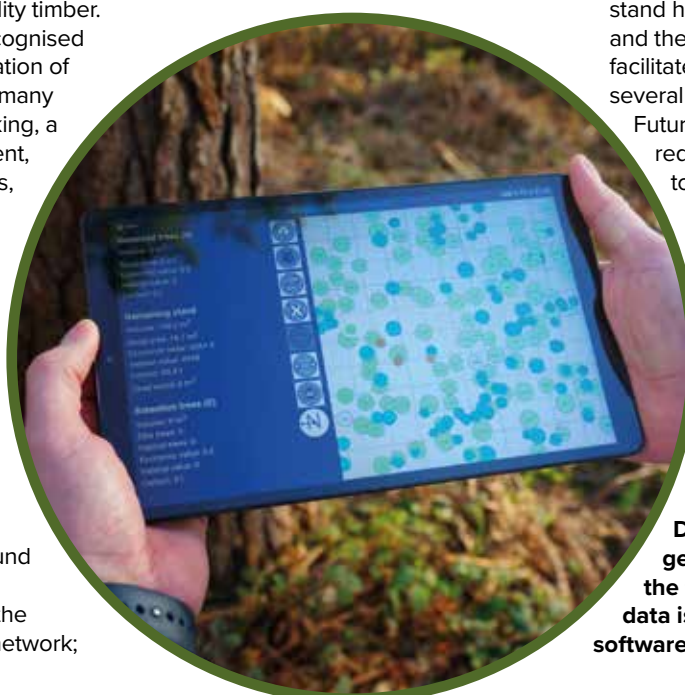
Each marteloscope offers its own opportunities and challenges for training. Darnaway 1 is located in a Douglas fir plantation in the early stages of transformation to CCF. This is typical of many forest stands in the region. A key silvicultural issue is stand stability, so early selection of good quality and stable trees links strongly with enhanced forest resilience in our rapidly changing climate.

Darnaway 2 addresses a wider range of economic and environmental issues, being located in a mature Scots pine plantation that is developing a more complex forest structure. This stand has been thinned several times, and the basal area is low enough to facilitate the natural regeneration of several conifer and broadleaf species.

Future management of this stand will require careful selection of trees to retain and remove, to balance long-term timber production with biodiversity conservation.

Darnaway Forest has been involved in training foresters for many decades and the new martelosopes allow that long tradition to continue with some of the latest teaching and learning methodologies.

Decisions and results are generated in real time using the tablet computers. Marteloscope data is processed using the I+ software. Photo: E. R. Wilson





The Integrate Darnaway inventory team. Photo: Joachim Boehm

Team Approach

An important element of the Darnaway project has been the contribution of student foresters from the UHI Scottish School of Forestry (SSF). This is one of the first times that a student group has helped establish a marteloscope.

Following a training session at SSF, students worked in small teams to complete the layout and mapping, tree measurements and a survey of microhabitat features. Each tree was assessed in terms of potential product assortment (green/red sawlogs, pallet, chip/pulp, residue) and up to 34 specific tree microhabitats, using a field guide prepared by ecologists working with the Integrate Network.

Sharon Rodhouse, an inventory expert, contributed to the training and supervision of the fieldwork.

Following fieldwork, data was checked and processed by the Integrate Network secretariat. Economic analysis has been made possible with product values from local sawmills. The final dataset was uploaded to the Integrate Network server and is available now for use in training exercises. From summer 2025, training events will be rolled out for a wide range of user groups.

Funding for the Darnaway martelosopes was generously provided by Vastern Timber Ltd., who supported the inventory training, site set-up and data analysis; and Scottish Forestry Trust, who are providing a grant for the purchase of tablet computers and course delivery.

Course Delivery

An important feature of the marteloscope approach is the use of tablet computers.

Site data is downloaded from the Integrate Network server onto tablets equipped with bespoke “I+” software. This technology allows users to conduct interactive and virtual tree marking exercises, explore different management options and meet a range of forest management objectives. The trainer can amend prescriptions within the software to meet the needs of individual groups, from novice to advanced tree markers.

From an educational perspective, martelosopes provide a unique problem-based learning (PBL) experience. The tablet technology helps to streamline lesson planning and course delivery.

The martelosopes are located 300 m apart and surrounded by forest stands at different stages of transformation to CCF. Together, Darnaway 1 and 2 provide a platform for training and technical discussions, using the outputs generated by the “I+” software.

Different training configurations are possible using martelosopes and the surrounding forest. A major co-benefit of the project is an emphasis on evidence-based practice. New ideas and scenarios can be tested, stimulating discussions around silviculture, forest management and conservation.

A training hub for CCF

The Darnaway martelosopes have completed the first phase of development and are ready for use as “outdoor classrooms”. The next step is to run several practice workshops and refine the use of the martelosopes in formal CCF training courses and workshops. Training will then roll-out to student foresters, professional

foresters, ecologists and other groups or organisations interested in CCF.

Ultimately, we plan to use these martelosopes for “train the trainer” events and extend the Integrate Network to other regions in the UK and a wider range of woodland types.

By providing a dedicated space for forest-based training, the Integrate Darnaway project will inspire greater confidence among early-career and established professional foresters, and woodland ecologists who wish to adopt CCF principles. Managing for both economic productivity and rich biodiversity ensures a more sustainable and resilient future for our woodlands.

Further Information

- **Integrate Network**
www.integratenetwork.org
- **Darnaway Forest**
www.morayestates.co.uk/woodland
- **Silviculture Research International**
www.silviculture.org.uk/marteloscope

Authors

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