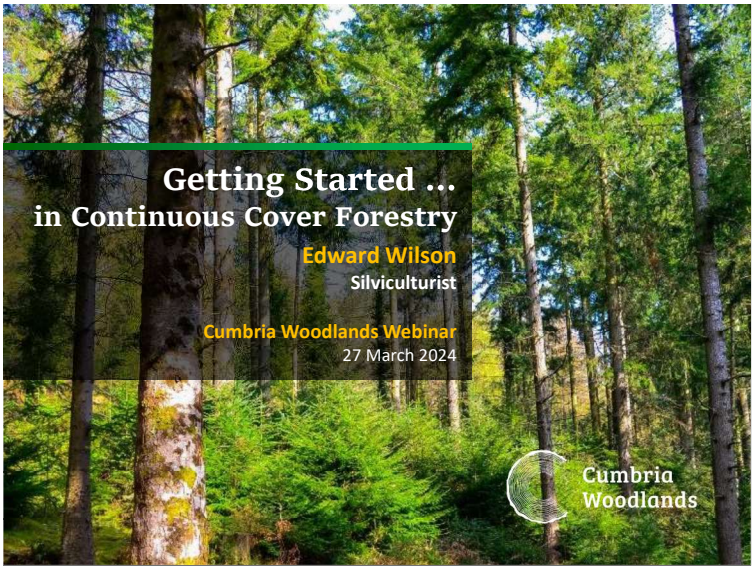


Outline of Presentation

- Policy Drivers for UK Forestry
- What is CCF?
- What are the Guiding Principles of CCF?
- Stand Transformation – the Pathway to CCF
- Steps in Stand Transformation: Crown Thinning
- Take Home Messages

Policy Drivers for UK Forestry

Policy Drivers:

1. Increase ecological resilience
2. Promote multi-functional forest management
3. Maintain timber production and quality

Strategy:

- Increase species and structural diversity at stand and landscape scales (Leslie et al. 2024)

***f*(forest area ↑ + species ↑ + structure ↑)**

Continuous Cover Forestry: an alternative approach

Continuous Cover Forestry (CCF):

- *"..the use of silvicultural systems whereby the forest canopy is maintained at one or more levels without clear felling."* **Mason et al. 1999**
- *"… is a management option in which canopy cover is maintained continuously, the soil is never exposed, and clearfelling is avoided …"* **Ní Dhubháin 2003**
- *"While CCF is not a silvicultural system per se it can be implemented using various silvicultural systems that do not involve clearfelling."* **Yorke 1998**

Guiding principles:

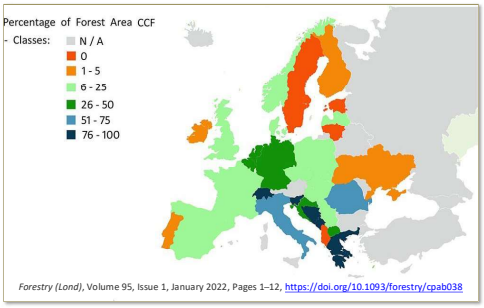
1. Managing the forest ecosystem
2. Using natural processes
3. Working within site limitations
4. Diversifying stand structure

→ **Close(r)-to-Nature forestry**

- Can be applied to any forest type: mixed, broadleaf, conifer.
- Promoters: Pro Silva Europe (1989), CCFG (1991), Pro Silva Ireland (2000).

European context: % forest area managed by CCF

Mason et al. 2022

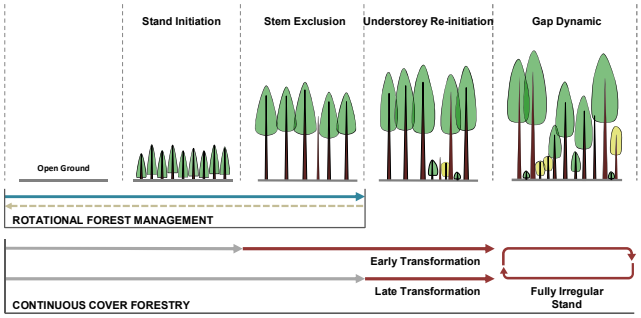


Forestry (Lond), Volume 95, Issue 1, January 2022, Pages 1–12, https://doi.org/10.1093/forestry/cpab038

Barriers to wider implementation of CCF:

- Current **forest structure and condition**
- Dominance of **Rotational Forest Management** (>80% of productive forest area)
- Lack of **experience and training (and confidence)** among forestry personnel

Forest development stages and management systems

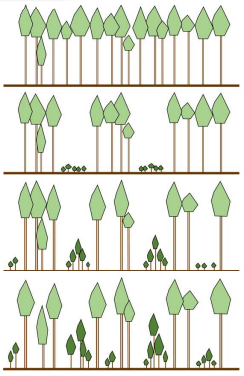


Rotational forest management (RFM) generally works with stands in the stand initiation and stem exclusions phases of forest development.
Continuous cover forestry (CCF) leads through an early or late transformation to irregular stands that are analogous to the gap dynamic phase.

Stand Transformation Schütz 2001

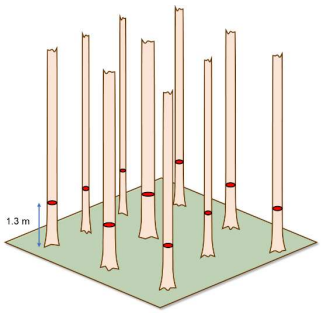
A programme of stand interventions that facilitate the transition from an even-aged to an irregular structure stand.

1. **Differentiation**
   - The focus is to promote each valuable element, ensuring structural development and stability
2. **Promoting Regeneration**
   - The focus is on favouring new decentralised regeneration groups
3. **Structural Development**
   - The focus is to achieve good horizontal and vertical distribution of structural elements
4. **Structure Achievement**
   - The focus is to achieve vertical individualisation of the remaining groups



Basal Area

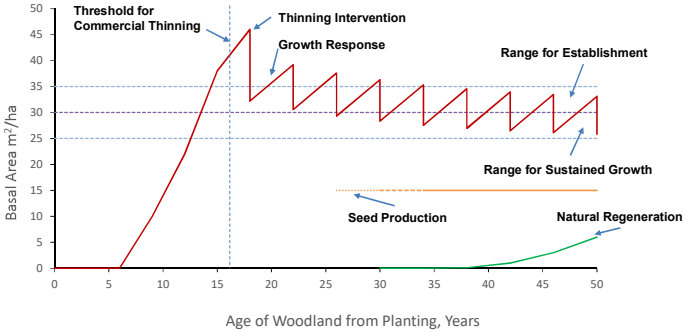
Basal area of a tree = cross-sectional area of a tree at breast height (1.3 m)



Important metric to support CCF management decisions.
Relates to stand density and species attributes for natural regeneration.

Conceptual Model for Stand Transformation

Basal Area dynamics with Sitka spruce

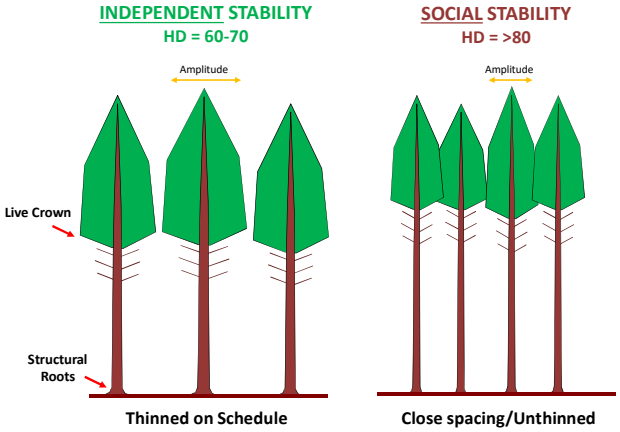


Early-stage stand transformation is basically a process of thinning with purpose.
We maintain continuous production, but preserve the forest ecosystem.

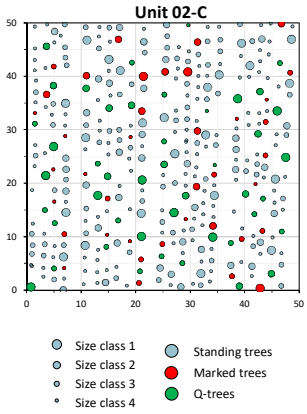
Silvicultural Objectives in Stand Transformation

1. **Sustain timber <u>production</u>**
2. **Promote timber <u>quality</u>**
3. **<u>Transform structure</u>**
   - Understand and **control stand basal area** (BA)
   - Biological/ecological processes for regeneration/growth
   - Vegetation and deer management
4. **Promote anchorage of trees/<u>stand stability</u>**
   - Height:Diameter ratios
   - <60 = poor quality, **60-80 = stable**, >80 = unstable
5. **Retain habitat and biodiversity <u>attributes</u>**

Independent versus Social Stability



CROWN THINNING



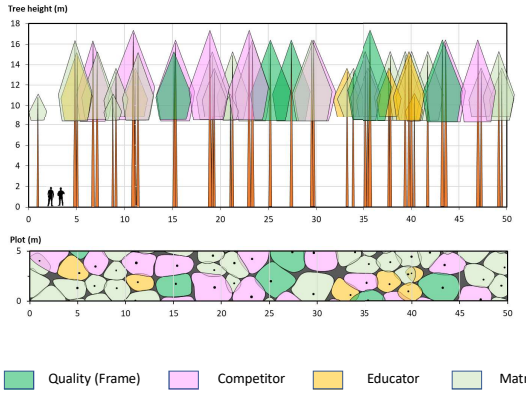
Example plot from Fossy Hill Forest

Target Basal Area reduction (T3): **20%**
Marking Pattern: **Crown**
Cutting cycle: **3-4 yrs**

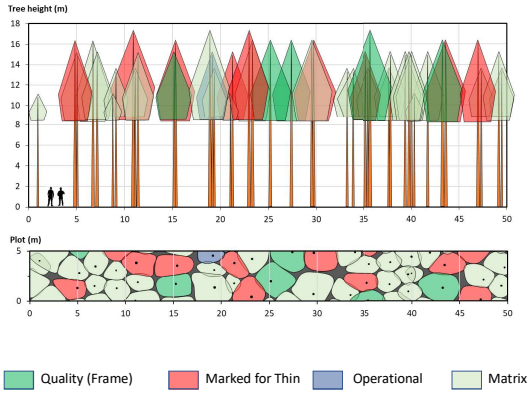
Selection Reasons:

(Positive Selection)	(Negative Selection)
<u>Q-Trees</u> (Retained)	**<u>Thinned</u>**
Stem straightness	**Release**
Light branching	**Negative quality**
Good vigour, stable	Spacing
No damage	Damage
Healthy foliage	Suppressed

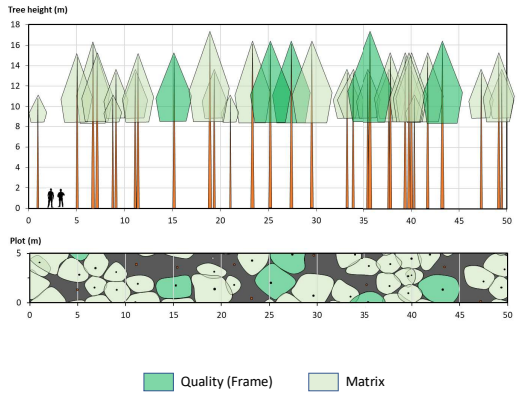
Designating silvicultural roles
Ballycullen Forest | CROWN Thinning |T3 (2018)



Tree Marking Decisions
Ballycullen Forest | CROWN Thinning |T3 (2018)

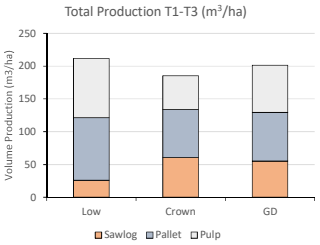


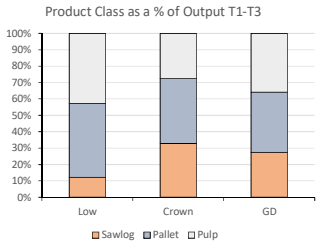
Post-Thinning
Ballycullen Forest | CROWN Thinning |T3 (2018)



Production and Product Classes
Ballycullen Forest | 2010-2022

Mathematical determination using assortment tables

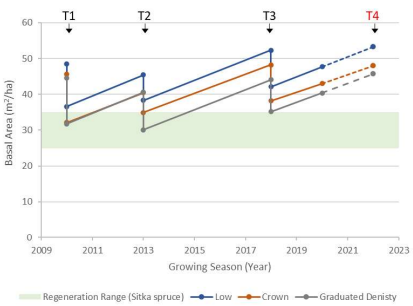




Total output T1-T3:
- Low – 210 m³/ha
- Crown – 185 m³/ha
- GD – 200 m³/ha

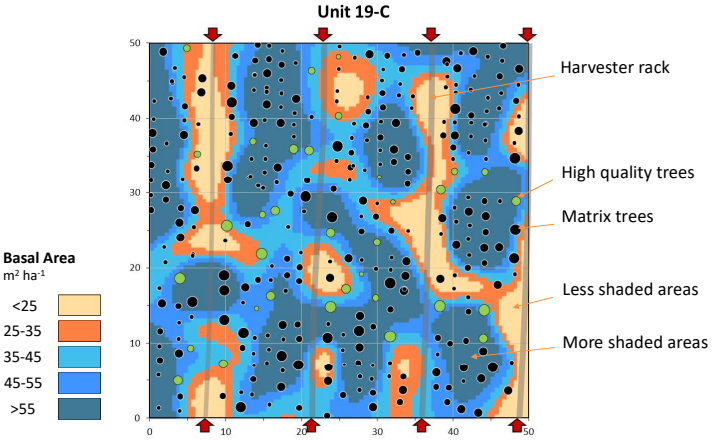
Total output T1-T3:
- Low – **12% sawlog**, 45% pallet
- Crown – **32% sawlog**, 40% pallet
- GD – **28% sawlog**, 35% pallet

Basal Area dynamics, 3 Thinning Interventions
Ballycullen Forests | 2010-2022



Site productivity: YC22 [MMAI, m³/ha/y]
Maximum thinning removal: 20% of stand basal area (BA)
Notes:
- Note the time between T2 and T3 (5 years) enables stand basal areas to rise exceptionally high.
- Important to maintain thinning schedule, keep development on track, reduce risk of high HD ratio

Implications of Tree Marking on Forest Floor
Ballycullen Forest | CROWN Thinning |T3 (2018)



Natural regeneration at Dunranhill Forest following 4th thinning intervention (2021)

Natural regeneration after several stand interventions, Cloragh Woods

Tree marking is a key skill
Courses to follow

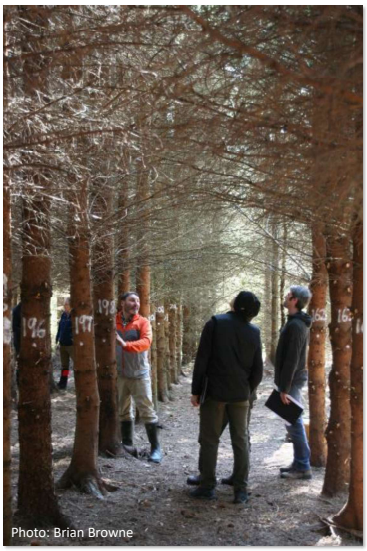


Photo: Brian Browne

So … Getting Started in CCF
(to be developed on the field day)

- **Identify suitable sites**
  - location, soils, thinning history
- **Use inventory data to inform decisions**
  - species, density, size classes, HD ratio, biodiversity, operability
- **Thin the forest on a regular schedule**
  - Crown thinning for production, quality, structure, stability
- **Always promote the quality attributes**
  - high value trees, biodiversity, social functions
- **Learn by doing, adapt to changing conditions, maintain a regular schedule of active management**
- **Allow time** for the stand to respond and for natural regeneration
- **Engage with the wider community of practitioners, training; share experience**
- **Embrace the challenge and the opportunities**

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  - **Anna and Brian Browne**
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  - **Coillte**
- **Funders**
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  - **PHASE 2 (2017-2022): Teagasc:** Agriculture and Food Development Authority [TranSSFor Project]
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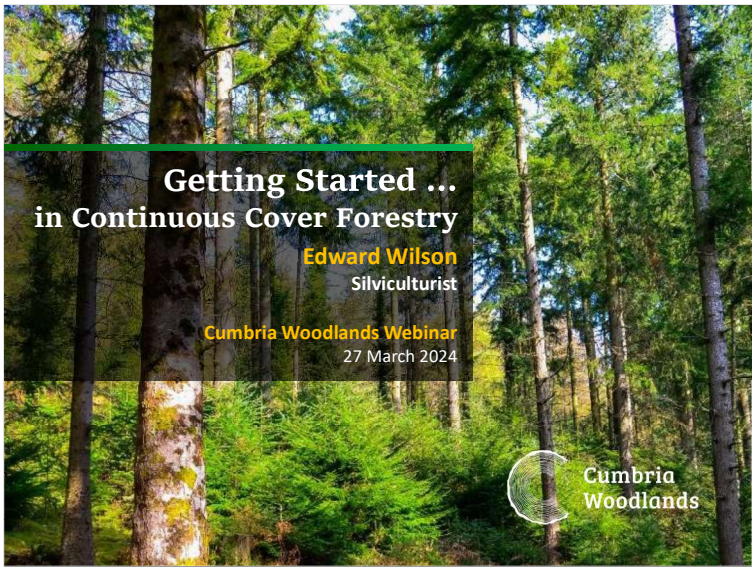

Getting Started … in Continuous Cover Forestry

Edward Wilson
Silviculturist

Cumbria Woodlands Webinar
27 March 2024

Cumbria Woodlands