

Continuous Cover Forestry: Delivering sustainable and resilient woodlands in Britain



Conference Report

**Continuous Cover Forestry Group
National Conference**
Braithwaite Institute, Cumbria
3-5 June 2014





Foreword

This report is based on presentations and discussions at the Continuous Cover Forestry Group (CCFG) National Conference, held from 3-4 June 2014 at the Braithwaite Institute, near Keswick, Cumbria. The conference was combined with visits to woodlands managed on CCF principles within the Lake District National Park. The conference theme was *'Continuous Cover Forestry: Delivering sustainable and resilient woodlands in Britain'*. The conference attracted 140 participants from across the British Isles and from North America; presenters included leading researchers, policy-makers and practitioners.

The conference drew together several themes of high importance to forestry at the present time, namely ecological resilience, sustainability and the provision of ecosystem services. Threats to our forests from global climate change, and new pests and diseases, are drivers for a widespread review of current forestry practices. It is now recognised that appropriate diversification of genotypes, species and structures are critical tools for enhancing the resilience of woodlands, and so help to safeguard long-term supplies of high quality timber and of other forest ecosystem services.

The goals for the conference were to:

- Present latest developments in CCF management systems, especially focusing on the potential of CCF to promote sustainability and resilience.
- Demonstrate examples of CCF in practice, under a range of management objectives.
- Identify future measures that could result in wider adoption of CCF in Britain, including consideration of aspects relevant to research and policy.

Despite growing interest in CCF, there is a continuing need to share knowledge and understanding, also to debate and challenge conventional thinking. This report draws together a range of views and experiences. It concludes with a list of recommendations which form a programme where management expertise is developed hand-in-hand with applied research and enhanced mechanisms for knowledge sharing to adapt our forests to the environmental and other challenges of the 21st century.

The CCFG committee wishes to thank all the speakers and participants in the conference for their contribution to this major event. We particularly wish to acknowledge the sterling work of Ted Wilson and the members of the local organising committee in drawing together such an excellent programme and making this conference such a memorable occasion.

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Executive Summary

1. The CCFG National Conference which was held in the Lake District on June 3-4 2014 attracted about 140 delegates and was the largest conference dealing with Continuous Cover Forestry held in Britain for over a decade. Delegates came from all parts of Britain as well as from Ireland and North America.
2. There were 10 presentations to the conference including the *Scottish Forestry Trust Lecture* delivered by the keynote speaker Professor Klaus Puettmann of Oregon State University, USA. His theme was the topic '*A Global View of the Future of Alternative Silviculture Practices*'. All presentations can be found on the conference website.
3. The conference was supplemented by field visits to two forests in nearby areas of the Lake District where managers and researchers demonstrated various aspects relevant to the implementation of CCF.
4. It was evident that an increasing number of people in Britain are now adopting CCF as their preferred management regime, both across the public forest estate and in the private sector. This mirrors an increasing interest in the use of alternative silvicultural practices worldwide. The CCF approach is recognised as providing attractive forests that contain a range of tree species and increased structural diversity. Such aspects can be important for biodiversity and recreation, yet are fully compatible with the supply of quality timber. The approach can be especially valuable on sites where management must consider the sustained provision of a range of forest ecosystem services. A good example was seen at Thirlmere Forest where water quality is the priority, but other values such as timber, landscape, habitat and recreation are important considerations.
5. Regular monitoring of forest development is a critical means of assessing the implementation of CCF and this requires new approaches based on periodic surveys of mature timber and also the condition and status of regenerating and intermediate classes of saplings and maturing trees. Such monitoring needs to allow for evaluation of the impacts of browsing animals and other pests. If combined with financial information on product outturn and management costs, the data can provide essential information on the viability of CCF in different forest types and ownerships.
6. There is an ongoing need for careful research on a range of aspects relevant to the wider use of CCF, such as improved growth and yield models that can accommodate a range of species and varied stand structures while providing useful predictions of forest development over time. Other areas include better understanding of the effect of CCF on carbon sequestration and storage, as well as analysis of cultural and organisational factors that may affect the uptake of CCF. A comprehensive list of research priorities for CCF is provided in Appendix 1.
7. Wider uptake of CCF will be made easier through an expanded programme of knowledge exchange which will enhance the silvicultural knowledge and skills of owners, policy makers, and those responsible for transforming forest to CCF. This programme would greatly benefit from the expansion and consolidation of the small existing network of well documented demonstration sites located throughout Great Britain.

Overview of the conference

The two day conference was attended by about 140 delegates; these were mainly from the UK apart from eight from Ireland and a couple from North America. The delegates were split between FC, FE, NGO, and private sector representatives while there were about 20 students present. The subsequent one day CCFG England visit to the western Lakes was attended by around 60 participants. This was the largest conference dealing with Continuous Cover Forestry held in Britain for over decade. There was extensive local press coverage of the event with three TV/radio slots and 20 local newspaper reports (Appendix 3).

The format of the conference consisted of an initial half-day of indoor presentations on the first morning, followed by a half-day visit to sites in either Wythop Wood or Thirlmere Forest. The second day started with delegates spending the morning visiting the field sites that they had not visited the previous afternoon. The closing session of the conference involved an afternoon of presentations by a range of national and international speakers. In addition to the formal presentations at the conference, about ten posters were provided by student delegates One highlight was the *Scottish Forestry Trust Lecture* given by Professor Klaus Puettmann of Oregon State University in the USA who has published extensively on the need to adopt a more flexible approach to silviculture which embraces irregularity and complexity and thus increases the resilience of forest ecosystems.



Synopsis of presentations

In the following paragraphs, we summarise some of the key points made in the individual presentations and that emerged from the field visits. PDFs and webcasts of the individual presentations can be found on the conference website (http://www.ccf.org.uk/conferences/conference2014/conference2014_home.html).

Following introductory remarks by Bill Mason and Rik Pakenham, the Welcome Message from the **Prince of Wales** was read to the delegates. This message highlighted the importance of developing a 'long-term' view for the future of British woodlands and forests, particularly through the use of a CCF type approach. It stressed how this approach could enhance the species and structural diversity of British forests and so increase their resilience against the hazards of pests and diseases and the risks due to climate change. For these reasons, the woodlands of the Duchy of Cornwall had converted to CCF management in recent years. These points were echoed in the Opening Address from **Richard Leafe** (Chief Executive of the Lake District National Park Authority) which stressed the need for CCF to be seen as a means of improving the



delivery of ecosystem services from the various woodlands within the National Park. He noted that it was essential to obtain more public benefits from the way land within the Park was managed and he saw an important role for CCF in enabling foresters to provide such benefits. The increasing importance of CCF as a means of delivering management objectives was also stressed by **Graham Gill** (Forest Management Director, North England District, Forestry Commission England) in the first of two keynote presentations to the conference. He noted that at least 10 per cent of the forest area in his district was now being managed under CCF and that he anticipated that this area would increase if certain problems and knowledge gaps could be overcome. Among these was the need for greater quantification of the effects of the transformation to CCF upon timber properties and on the consequential financial returns from the forest. A second aspect was the problematic nature of later stage thinning in stands undergoing transformation, where there could be a lack of brash to protect soils against site damage caused in mechanical harvesting.

These overviews were then followed by a series of presentations covering various aspects of the benefits provided by CCF. **Gary Kerr** (Principal Silviculturist, Forest Research) discussed CCF in relation to the promotion of stand structures that would be resilient to the potential impacts of climate change or biotic and abiotic hazards. Resilience implied that the stands were capable of adapting to the impact of a stressor such as climate change while maintaining productivity. He proposed that CCF with its emphasis upon the creation of irregular stand structures composed of a range of species was well equipped to improve the resilience of British forests in a changing climate. Knowledge gaps included the need for better understanding of the spatial and temporal dynamics of mixed species stands. Echoing Graham Gill, he also stressed that improved growth and yield models capable of handling complex irregular structures, were essential to be able to quantify the impacts of the transformation to CCF. In a presentation delivered by Philippe Morgan, **Andy Poore** (SelectFor Ltd) provided information on the economic impacts of transformation on a range of stands in lowland Britain. Using the 'Marteloscope' methodology developed by the AFI in France, they were able to show how different thinning regimes could be used to influence the financial returns from CCF stands. **Christine Reid** and **Saul Herbert** (Natural England) outlined how CCF might be implemented in lowland broadleaved woods to improve biodiversity. They set this presentation in the context of a large number of wildlife species that were of conservation concern and which were mainly associated with broadleaved woodland. To provide evidence of the impacts of alternative approaches such as CCF upon woodland wildlife, a series of 70 permanent sample plots had been established in a range of stand types in the Wyre Forest, the largest of Ancient Semi-Natural Woodland in England. Preliminary results had indeed suggested that there were benefits to be gained from greater use of CCF, but these indications required further and longer investigation. The use of CCF as part of a strategy of adapting British forests to climate change was considered by **Mark Broadmeadow** (Forestry Commission England). He stressed the urgency of society taking action to confront climate change, a point recognised by Paul Polman, Unilever CEO in the 2014 Grantham Lecture on Climate Change. Reducing deforestation and forest degradation was a critical component of moving towards a low-carbon economy. CCF, coupled with species and provenance diversification, was an increasingly important tool in adapting forests to the impacts of climate change.

The first afternoon and second morning of the conference saw the delegates visiting eight sites in Wythop and Thirlmere Forests (see Appendix 2) where various facets of the implementation of CCF were discussed. As well as providing an introduction to the history and management objectives of the two forests, topics covered included use of CCF to maintain water quality and ecological aspects, and the interactions between CCF and timber quality (both at Thirlmere). An additional feature at Thirlmere was an introduction to the monitoring protocols developed by the Association Futaie Irreguliere (AFI) demonstrated in a new research plot installed in the forest. At Wythop aspects considered included the management of stands of large Douglas fir, the role of crown thinning in transforming regular stands to CCF, the gradual restoration of PAWS using CCF, and experimental investigation of the regeneration environment in CCF stands. **Bill Mason** (CCFG Chair) presented a summary of the main points discussed at each stop during the second afternoon. Amongst a total of some 38 points, a few themes recurred. The need for effective deer control was seen as critical to delivering successful natural regeneration as part of CCF systems, while successful

transformation involved a need for a change in organisational culture as much as technical improvements. Better understanding of the dynamics of the regeneration environment was very important, not just for achieving successful natural regeneration, but also in preventing colonisation by unwanted species (e.g. on PAWS sites). Correct use of thinning regimes could help to improve the long-term stability of stands being transformed to CCF structures while there was an ongoing need to develop effective methods of implementing CCF on steep terrain, particularly when harvesting large dimension and valuable Douglas fir.



The second afternoon was opened by **Scott Wilson** (independent consultant, Aberdeen) who summarised the findings of his recent review of the extent of CCF management and summarised some of the factors contributing to its wider uptake. His survey had covered some 160 sites throughout Britain containing a wide range of woodland types and tree species – the full report with detailed case studies can be accessed via the CCFG website:

http://www.ccfg.org.uk/resources/downloads/SMcGW_Progress-of-adoption-of-alternative-silviculture-systems.pdf.

Points brought out in his presentation included the fact that there had been a gradual expansion in the area under CCF management in the last 20 years and this trend was common to all ownership types (i.e. private, NGOs, Natural Resources Wales, and Forestry Commission). The uptake was possibly greater in lowland Britain in areas of mixed woodland, including conifer- broadleaved mixtures. Reasons for the adoption of CCF included a desire to reduce restocking costs, a wish to produce quality timber, and a desire to increase the resilience of stands being managed for production forestry. Scott concluded by noting that continued expansion of CCF would require to be supported by more sympathetic grant schemes, improved mechanisms for knowledge exchange, and by a series of well documented and accessible demonstration sites. This overview was followed by **Graham Taylor** (Pryor & Rickett Silviculture) who explored

aspects of using CCF to manage broadleaves on fertile soils in Herefordshire, with a particular focus on oak and sweet chestnut. Based on nearly two decades of experience, he stressed the need for silviculture to be founded on a careful understanding of local site conditions and species requirements. Rigorous control of deer and grey squirrels was essential if quality timber production was to be achieved, while the fertile soils meant that weed competition could be intense so that natural regeneration had to be supplemented by planting. CCF was implemented with a group selection system which had proved successful in reducing regeneration costs while providing benefits to biodiversity and sporting interests, and improving public perception of commercial forestry. **Aine Ni Dubhain** and **Lucie Vitkova** (UC Dublin, Ireland) reported on developments with the use of CCF in Ireland, where the first research trials dated from 1998 following increasing public concern over the impacts of clear felling. Following the formation of ProSilva Ireland in 2000, Coillte had decided in 2005 that all their broadleaved woodlands would be managed by CCF. Aine and Lucie reported results from a recent project that had investigated the extent of CCF management in Ireland as well as considering foresters' attitudes to this approach to management. Some 270 woodland properties were reported to be being managed in this way, covering over ten thousand hectares: the majority of these woodlands were in the public sector. Many of the woodlands were quite small (i.e. < 20 ha) and in most cases the adoption of CCF management was within the last 10 years. Further investigation revealed that economic benefits and broadleaved policies featured strongly among reasons for adoption of CCF. However, aspects such as perceived risks from windthrow and a concern over cash flow and long-term demands of CCF management were cited as reasons for a reluctance to shift away from conventional even-aged management.



The major event of the second afternoon was the *Scottish Forestry Trust Lecture* given by **Professor Klaus Puettmann** (Oregon State University, USA) with the title of '*A Global View of the Future of Alternative Silviculture Practices*'. He saw CCF as one of a number of alternative silvicultural approaches that had emerged over the recent decades (e.g. close-to-nature forestry, natural disturbance based forestry, etc.) all of which shared certain key principles. These were: an emphasis upon partial harvesting of stands; the promotion of small scale variability; the avoiding of intensive site management operations; a preference for the use of natural regeneration; and a desire to develop mixed stands of site adapted species. He suggested that such techniques could theoretically be applied to a large proportion of the world's forests, but it was clear that such application was limited in many places

and in different forest types. This reflected a number of constraints to implementation, involving ecological aspects, economics, logistics, education, and cultural and historical aspects. However, such constraints could be overcome provided that foresters proved capable of adapting the key principles to local conditions, and he felt that the field trips had shown good evidence of such flexibility in British forestry. Professor Puettmann considered that one of the weaknesses of the various alternative silviculture practices was that they were not supported by a unifying conceptual framework in the way that even-aged silviculture was supported by classical economic concepts of efficiency of production. He hoped that recent attempts to propose that forests should be managed as 'complex adaptive systems' could be seen as a means of providing an underpinning conceptual framework for alternative silviculture. An increase in the adaptive capacity of forests would be essential in ensuring a sustainable provision of ecosystem services from forests in an uncertain future where increasing demands would be placed upon forest resources. This would require widening silvicultural perspectives from the stand level to the forest scale as a means of achieving and sustaining multiple values. A great advantage of alternative silviculture practices was their ability to provide flexibility and accommodate uncertainty, the latter being particularly important in an era of projected global change. Traditional thinking about forest operations had regarded providing flexibility (e.g. in increased species or structural diversity) as a cost, but in future climates, the flexibility provided by practices such as CCF could increase the adaptive capacity of forests and therefore could be seen as an asset. Professor Puettmann concluded by saying these were exciting times for all those interested in silviculture since it was increasingly clear that alternative silviculture practices had a major role to play in sustaining forest ecosystems and their services in a variable and uncertain future.

The conference was closed by **Philippe Morgan** (President of Pro Silva) who highlighted the success of the conference in bringing together a range of speakers and participants from such a wide range of backgrounds and such varied experience. He noted the valuable exchange of ideas and practice that took place within the Pro Silva community covering some 28 countries worldwide and the important role of partner organisations such as the AFI in installing a network of plots in irregular forest stands which can provide a quantified evidence base for those considering the adoption of alternative silviculture practices. He stressed the important role that CCF can play in communicating the way that carefully managed forests can help to sustain society and the environment in a changing world. He thanked the conference organisers and the sponsors for their contributions to a successful event and looked to the continuing expansion of CCF within British forestry.

Conclusions & Recommendations

The CCFG committee has drawn the following conclusions from the presentations at the conference and from discussions during and after the event.

1. Forests in Britain are facing a period of uncertainty due to global climate change and the potential impacts of pests and diseases. Many conventional practices that focused on the creation of large-scale plantation forests, composed of a limited number of species, are currently being reconsidered in order to enhance the sustainability and ecological resilience of forest resources in Britain, and in order to deliver a wide range of ecosystem services.
2. Among the most important strategies for enhance resilience are those that promote greater forest diversity, in terms of widening the genetic base, species composition and woodland structure. Diverse woodlands can offer greater adaptive capacity in response to global climate change, and resilience to pests and diseases.
3. Continuous cover forestry (CCF) is one potential strategy for enhancing resilience since it encourages diverse stand structures and is suitable for mixed-species forests. CCF is not a specific silvicultural system, but it does presume to avoid clear-felling and other silvicultural systems that create even-aged forest stands of single species. Site factors, species composition and management objectives dictate the most appropriate silvicultural systems and pattern of stand interventions that will create and maintain a continuous cover forest.
4. Continuous cover forestry has been applied to forests in parts of mainland Europe for well over a century. While there is a long history of individual woodlands and estates in Britain being managed in ways that accord with CCF principles, it is only since the 1990s that a growing number of public and private sector woodlands have adopted CCF approaches. However, although country forestry policies have increasingly promoted CCF as a desirable form of woodland management, there appear to be no accurate figures showing the extent of CCF at a country level.
5. CCF in Britain is increasingly being applied in public and private sector woodlands. Experience from several public and private estates is demonstrating that CCF can be both profitable and environmentally-appropriate, while delivering a wide range of ecosystem services. The regular flow of forest products of different species and size class offers a range of opportunities for land-owners. The quality of residual stands can be enhanced from one cutting cycle to the next through selection of final harvest trees at the optimum stage in their development, and through thinning that produces merchantable products but also leave trees that have potential to increase in volume, quality and value.
6. CCF is highly compatible with the provision of a wide range of ecosystem services from forests. Among the many values that are promoted through CCF are landscape character, carbon capture and storage, hydrological cycles and regulation of water quality, wildlife habitat and biodiversity conservation. In particular, there is growing evidence that CCF is important for woodland biodiversity, due to the wide variety of habitats that are created and sustained. Components of woodlands that are compatible with CCF management systems and support a wide range of flora and fauna include large dimension trees, standing dead trees and downed woody debris.

7. CCF requires a range of skills and monitoring systems that are distinct from the methods commonly used in even-aged woodland management. Improved protocols for assessing growth, yield and productivity, timber quality and woodland values are required to ensure that the CCF approaches are more widely adopted and able to achieve their potential.
8. Good management skills are required to effectively operate CCF systems. Skills in marking trees, designing and developing management prescriptions, managing canopy gaps and controlling the type and quality of natural regeneration, harvesting systems, timber extraction and marketing of products need to be improved to ensure that CCF systems operate effectively and achieve high standards of environmental conservation.
9. Deer and other pest species, such as grey squirrel, are among the most important threats to the sustainability of continuous cover forests, especially through their potential impact on natural regeneration, the recruitment of desirable species and also on the quality of timber.
10. The evidence base needs to be strengthened to duly realise the potential of CCF and to ensure greater diversity and resilience of woodlands in Britain. Research is required at several scales to fully realise the impacts, interactions, opportunities and limitations of CCF. New methods for predicting growth and yield that incorporate mixed-species, irregular structure stands are a priority. These aspects are discussed in more detail in Appendix 1 covering research priorities for CCF.
11. The wider application of continuous cover forestry in the private sector needs to be supported through measures such as the provision of flexible and long-term grants that facilitate appropriate alternative silvicultural and regeneration practices to promote the transformation of even-aged stands to irregular structured woodlands.
12. Training and advice are required to support the wider adoption of CCF approaches. Supporting and expanding the network of research and training sites will provide more opportunities for foresters to gain insight and experience in best practices. Greater support is required for technology development and knowledge transfer programmes dedicated to continuous cover forestry. Such measures can be complemented by the further development of a network of well documented demonstration sites.

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Appendix 1

Research Priorities for Continuous Cover Forestry in Britain

Background

Currently, most forests in Britain are single-species, even-aged plantations managed on the patch clear-felling system, with rotations of between 40-80 years in conifers. The spread of several tree diseases, most notably those affecting ash, larch and pine species, has heightened awareness of the potential risks from introduced pests and pathogens and the potential vulnerability of monoculture systems. Furthermore, in the longer term, global climate change is increasing our uncertainty about future species choice in different locations and on a range of site types. The promotion of more species rich and structurally diverse woodlands is widely considered to be an important measure to adapt our forests to these uncertainties.

Continuous cover forests are inherently diverse and provide foresters with a range of options for adapting woodlands to forest threats, both known and unknown. Woodlands in Britain already being managed on CCF principles have demonstrated that high levels of productivity can be attained, and that a wide range of outputs are possible. In addition, CCF systems are able to accommodate large dimension trees, standing deadwood and woody debris, all of which are beneficial for habitat and biodiversity conservation. However, achieving wider use of CCF will require the transformation of even-aged plantations to irregular structure stands in many parts of the country. A strong evidence-base is therefore required to support new operational procedures and silvicultural practices.

This paper presents a set of priorities for research pertaining to CCF that emerged from presentations and discussions at the 2014 CCFG National Conference. The priorities are structured under a number of headings to help provide an organisational framework within which research can be planned. We hope that the list presented here will contribute to the development of future applied science programmes and project proposals for sustainable forest management in Britain.

The translation of research into practice can only be achieved if there is effective knowledge exchange among researchers, practitioners and policy makers. Therefore, this paper also covers aspects that could form the basis for continuing professional development (CPD) courses in the practice of CCF for foresters, ecologists, natural resources managers and allied professions.

The CCFG would be pleased to discuss these priorities further with interested funding bodies.

Landscape and Forest Scale

- Monitoring and evaluating ecosystem services provided by CCF woodlands: productive potential; ecology and conservation values; cultural and landscape attributes; human health and well-being benefits.
- Potential of CCF woodlands to sequester and store carbon, relative to other management systems. This would include research focused on areas of greatest uncertainty in climate and forest growth models, such as impacts of management on soil carbon.
- Role of CCF woodlands in hydrological cycles: regulating water run-off and discharge to river systems; filtration and quality of drinking water supplies (especially in catchments for reservoirs); impact on water quality, temperatures and aquatic communities in riparian zones.
- Biodiversity and habitat networks: relationships between diverse woodland types and structures;
- Strategies for control of damaging agents, especially deer and grey squirrel in CCF woodlands.

Stand Scale

- Forest stand dynamics: promotion and regulation of natural regeneration; thinning regimes in stands of different species and stand characteristics and potential interaction with wind stability; regulation of tree form and crown architecture;
- Natural regeneration of CCF woodlands: underpinning seed and seedling biology influencing regeneration potential and success; response of species and genotypes to disturbance; impacts of pests and diseases as well as mammal browsing; shade tolerance and environmental requirements for establishment and sustained growth;
- Species mixtures: species interactions over time; implications for nutrient cycling; site requirements and tree health implications of trees growing in species mixtures and in irregular structured stands.
- Growth and yield: development of stand-level models for guiding management interventions and for predicting production and outputs from stands of mixed species and structures; management tools and protocols for assessing productive potential in CCF; reliable financial information to allow managers to predict the effects of adopting CCF;
- Harvesting and extraction systems: efficient and sensitive harvesting methods, especially on steep terrain and/or on moister sites; minimisation of damage to residual stands; road layout and racking;
- Impacts of CCF upon timber quality: strength grading; limiting variability in wood properties; timber properties of 'minor' species.
- Biodiversity and Habitat Conservation: Deadwood and habitat management in irregular stands; conservation of critical species (i.e., red squirrel); woodland birds in irregular stands;

Management systems

- Silvicultural systems: formulating, developing and testing silvicultural systems that are adapted to the natural disturbance regimes present in British forests
- Review of support mechanisms (i.e., grants) to stimulate adaptation of woodlands to enhance resilience, especially with reference to the needs of CCF and the lengthy periods involved in the transformation of even-aged to irregular structure woodlands;
- Use of CCF in Plantations on Ancient Woodland Sites (PAWS): community dynamics, managing regeneration of native broadleaves and other species; conservation of critical species and communities (especially understorey plants, soil fauna, etc.)

Monitoring Systems

- Cost-effective and standard methods for assessing the growth and development of forest stands being managed by/transformed to CCF;
- Accurate statistics: providing an estimate of the extent of CCF in British forests and a comparison of that figure against an estimate of the potential for CCF;
- Integrating stand level monitoring with biodiversity and environmental quality monitoring.

Human Factors

- Skills and training needs for CCF: methods and approaches; incentives and professional recognition; promoting a range of formal and informal training programmes, at both the introductory and more advanced level to support implementation of CCF practice.
- Understanding cultural and organisational aspects influencing silvicultural practices in British forestry, in order to identify barriers to wider application and adoption of CCF systems;
- Communication: provision of a revised and updated set of key reference documents underpinning the use of CCF in Britain; development of technical and professional skills with reference to CCF;
- Attitudes and values of forest managers, owners and the wider public towards CCF woodlands.

Research and Demonstration Forests

- There is a continuing and essential role for well documented demonstration forests and stands, where best practices can be showcased, or where new technologies and ideas can be applied. Information about such forests needs to be made more widely accessible e.g. via a dedicated website. Across the public sector, the Forestry Commission has pioneered a network of CCF demonstration forests. Enlarging this network to cover all regions of the country and also including more examples from private woodlands, where management objectives may vary, would support efforts to boost interest in CCF and spread knowledge and skills among professional practitioners.

Appendix 2

Case Studies: Forests Visited During the Conference

A major feature of the CCFG National Conference was the mix of indoor (plenary) and forest-based sessions. Half of the conference was based outdoors, with eight technical presentations taking place in two woodlands (Days 1 and 2). By visiting two different woodland areas it was possible to appreciate how Continuous Cover Forestry principles can be applied under a range of forest conditions and management objectives, and across the public and private sectors.

Case Study 1: Wythop Forest

Website: <http://www.forestry.gov.uk/forestry/INFD-832GX8>

About: Wythop Forest lies within the Lake District National Park, 7km north-west of Keswick. The area managed under Continuous Cover extends to 156 ha. A form of Continuous Cover Forest (CCF) management has been successfully practiced across two areas at the north and south ends of Wythop since the late 1980s. Focussed on Douglas fir as the main species this has included underplanting (north) and regeneration (south) and has seen the development of very large over storey trees up to 52m top height. In addition the forest includes areas of mature beech and sycamore.

Whilst past management has focussed on conifers, the majority of Wythop, including all the area managed under CCF, is designated as a Plantation on Ancient Woodland Site (PAWS) and in line with national policy no further underplanting of conifers will be carried out within the PAWS area. Whilst regeneration of up to 20% conifers is acceptable, future focus will increasingly be towards favouring the development of quality broadleaf stands.

Objectives:

- The production of high quality timber.
- Deliver PAWS restoration by manipulating forest species mix over time.
- The protection of water quality and health of Bassenthwaite Lake.
- The safety of motorists using the A66.
- Development of a diverse resilient forest structure.

Desired Stand Structure: The aim is to encourage a complex stand structure to develop looking for establishment through regeneration but also using gap planting to introduce native broadleaves. A number of mature Douglas fir will be kept in perpetuity and consideration is being given to retaining up to 20% of the forest as Douglas fir where it regenerates and is easy to extract whilst removing it slowly from within two tree lengths of the A66 and in difficult to extract areas.

Monitoring: Forty five permanent monitoring plots established in the “Regeneration Stage” to assist management prescriptions illustrate that:

- Trees are dominated by Douglas fir and broadleaves.
- Seedlings and saplings are dominated by beech and sycamore.
- Less than 5% of seedlings and 2% of saplings show browsing or fraying.
- Stand structures are only approaching complex types in a few places.

Challenges:

- Non native beech and sycamore regeneration levels.
- Low level of native seed sources.
- Practicalities and economics of harvesting steep slopes.
- Proximity of A66 and two tree length rule.
- Risk of landslide and erosion.



Case Study 2: Thirlmere Forest

Website: <http://corporate.unitedutilities.com/thirlmeremanagement>

About: Thirlmere is situated within the Lake District National Park, 6km south of Keswick. The forest extends over 800 ha and surrounds Thirlmere reservoir. It is composed of a wide range of woodland types, including areas of commercial plantation, ancient semi-natural woodland, juniper woodland and continuous cover forest. It has been a major source of water for the City of Manchester and the Greater Manchester region since 1894.

Objectives:

- Sustain and enhance the quality of drinking water.
- Reduce the risk of erosion.
- Maintain a permanent forest canopy.
- Develop a diverse forest structure which is resilient and able to adapt to climate change.
- Maximise the production of high quality specialist timber.



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Case Study 2 – Vicky Bowman (Woodland Officer), Paul Phillips (Catchment Area Manager) and Colleagues at Northern Catchment Area, United Utilities plc.

Appendix 3

Reporting the CCFG National Conference 2014

TV and Radio Reports

1. **“Lake District becomes classroom for experts.”** *ITV Border Evening News: Lookaround.* Report by Fiona Marley Paterson. URL: <http://www.itv.com/news/border/update/2014-06-09/lake-district-becomes-classroom-for-experts/>. Broadcast: 09 June 2014
2. **“Experts arrive in Cumbria for sustainable forestry conference.”** *BBC Radio Cumbria Live to Air Interview on The Breakfast Show with Mike Zeller.* 0720-0725 slot. Broadcast: 03 June 2014
3. **“Cumbrian ‘close to nature’ forestry conference has captured the attention of the world.”** *BBC Radio Cumbria News Hour with Julie Clayton.* 1715-1720 slot. Broadcast: 20 May 2014

News, Magazine and Online Reports

1. **“A lot of ground covered at forestry conference.”** *Cumberland and Westmorland Herald,* Published: 21 June 2014 (p. 20)
2. **“Forest experts visit area.”** *Times and Star.* Published: 20 June 2014
3. **“ProSilva Ireland attends first international Continuous Cover forestry conference in UK.”** *Report by Cathy Fitzgerald.* URL: <http://prosilvaireland.wordpress.com/> Published: 20 June 2014
4. **“Conference attracts global experts.”** *In-Cumbria* [online]. URL: <http://www.in-cumbria.com/home/conference-attracts-global-experts-1.1142355> Published online: 13 June 2014
5. **“County’s forestry gets global showcase.”** *Cumberland News* (p.) Published: 13 June 2014
6. **“Forestry experts teach worldwide lessons from Cumbria.”** *ITV Border News.* URL: <http://www.itv.com/news/border/2014-06-09/forestry-experts-teach-worldwide-lessons-from-cumbria/> Published online: 09 June 2014
7. **“Cumbria leads way in worldwide woodlands lessons.”** *ITV Border News.* URL: <http://www.itv.com/news/border/story/2014-06-09/future-of-woodlands-discussed-worldwide/> Published online: 09 June 2014
8. **“Woodland flood risk discussed worldwide.”** *ITV Border News.* URL: <http://www.itv.com/news/border/update/2014-06-09/woodlands-flood-risk-discussed-worldwide/> Published online: 09 June 2014

9. **"Prince champions "vital" forest sustainability conference."** *Keswick Reminder* (p. 11).
Published: 06 June 2014.
10. **"Charles tells of inspiring Lakes."** *Cumberland News* (p. 7) Published: 06 June 2014.
11. **"Prince Charles rooting for Cumbria: Prince praises forestry conference in Keswick."**
Report by Emily Parsons, News and Star. Published: 04 June 2014.
12. **"Prince Charles writes to Cumbria forestry professionals."** URL: <http://www.in-cumbria.com/home/prince-charles-writes-to-cumbria-forestry-professionals-1.1140009>
Published online: 03 June 2014
13. **"Woodland role to protect climate."** Report by Maureen Hodges, *Cumberland News*
Published: 23 May 2014 (p. 8)
14. **"Putting Cumbria on the Global Forestry Map."** *Cumberland and Westmorland Herald*,
Published: 24 May 2014 (p. 11) <http://www.cwherald.com/a/archive/putting-cumbria-on-the-global-forestry-map.427106.html>
15. **"CCF Conference."** Conference pre-view article. *Forestry Journal* 20(5): 12 (May 2014 issue)
16. **"Continuous cover forestry: delivering sustainable and resilient woodlands in Britain."**
Report by Ted Wilson. British Ecological Society, Forest Ecology Group. URL: <http://besfeg.wordpress.com/2014/04/30/continuous-cover-forestry-delivering-sustainable-and-resilient-woodlands-in-britain/> Published: 30 April 2014.
17. **"Can trees save us from drowning?"** Report by Maurice Chesworth. *Cumbria 24*. URL: <http://www.cumbria24.com/news/2014/01/28/can-trees-save-us-drowning> Published: 28 Jan 2014.
18. **"Conference on need for mixed forests."** Report by Mike Bridgen. *The Northern Farmer*.
URL: http://www.northernfarmer.co.uk/news/11002193.Conference_on_need_for_mixed_woodlands. Published: 11 February 2014.
19. **"Conference on need for mixed woodlands."** *Darlington and Stockton Times* (Farming Section).
Report by Mike Bridgen. URL: http://www.darlingtonandstocktontimes.co.uk/farming/11002193.Conference_on_need_for_mixed_woodlands/. Published: 11 February 2014.
20. **"Lake District Conference on how trees can reduce flooding."** *Cumbrian Crack*. URL: <http://www.cumbriacrack.com/2014/01/28/lake-district-conference-trees-can-reduce-flooding>. Published: 28 January 2014.
21. **CCF – policy or action?** Article in *Forestry and Timber News* August 2014 by Caroline Harrison, Confor England

About the Continuous Cover Forestry Group

The Continuous Cover Forestry Group (CCFG) is a technical and professional organisation dedicated to developing skills and disseminating knowledge about continuous cover forestry in Britain. The main objective of the group is to promote the transformation of forests of even-aged stands to structurally, visually and biologically diverse woodlands, in which sustainable production of high quality timber is undertaken according to the principles of continuous cover management.

The Group was inaugurated following a meeting at Longleat on 13 March 1991. Since that time CCFG has provided information and training on the silvicultural practices and systems required in CCF management, where a permanent growing stock is maintained and where increment is removed in cyclical interventions. In addition, CCFG contribute to policy formulation and wider debates about sustainable forestry in Britain and Europe.

The Group welcomes new individual and corporate members. CCFG offers the following benefits to its members:

- An annual programme of UK site visits
- Overseas study tours
- Practical workshops
- An informative newsletter, downloaded from the website
- Networking within UK and overseas, and a source of practical experience

CCFG is a member of Pro Silva, the association of forestry organisations committed to advancing "close to nature" silvicultural systems.

Further information about CCFG is available online: www.ccfg.org.uk





Conference Report

**Continuous Cover Forestry Group
National Conference**

Braithwaite Institute, Cumbria
3-5 June 2014

www.ccfg.org.uk

