Tilhill's Annual Magazine

Tilhill

the *leader* 2020

Tilhill

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QUALITY THROUGHOUT

WELCOME TO THE LEADER 2020

Gavin Adkins
Managing Director, Tilhill

Welcome to **The Leader** 2020 brought to you in what has become the most extraordinary of years both in terms of running a business and, of course, our personal lives. I hope you will enjoy reading our thoughts and insights contained within a variety of articles.

I took over the helm of Tilhill in October 2019 with no inkling of the challenges that were soon to be upon us. As you read through this magazine, I hope you will get a flavour of what lockdown has been like for a forestry company in the middle of, what was then, one of our busiest planting seasons, and how we had to swiftly adapt to new working arrangements coupled with a dramatically fluctuating demand for timber together with different government protocols for different countries, all of which we operate across.

However, the climate change issues that took the headlines only a few months ago have not gone away. The appetite to plant trees to mitigate carbon emissions remains hungry. Woodland creation is a Tilhill speciality. We have been doing it for years across a wide spectrum of project types as you will see in the case studies included here. To enhance our offering further we have launched an exciting new business, CarbonStore. A forum to unite landowners, looking to sell woodland generated carbon units, with companies keen to offset their carbon emissions. See our special feature on carbon for full details.

I would like to take this opportunity to thank our clients, customers, contractors, suppliers and all our staff for their support and commitment over the last few months in particular, enabling us to keep on delivering.

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MY NEW ROLE AS MANAGING DIRECTOR

October 7th 2019 is a day that I will always remember well. This was the day that I replaced George McRobbie as Managing Director of Tilhill Forestry Ltd. George, after more than 40 years in the industry, had decided that it was time to gift himself a little more time to enjoy his fishing, and who could blame him?

My first task after taking the helm was to visit the operations, to meet the staff and get a real sense of the varied nature of our service offering. I spent much of the first six months travelling to our various sites and offices to see our managers work at first hand on the ground. My travels have taken me from new woodland creation projects in southern England to peatland restoration projects in northern Scotland, from harvesting activities in Cornwall to motorway landscaping contracts in Kent, to Ash clearance sites in Wales. The variety of service offered is impressively wide but the desire for quality remains absolute.

I have also been pleased to contribute to the management development programme for our managers, joining some of our graduates at their opening session of the 'Unlocking Potential' programme and judging the 'Dragon's Den' pitches of an earlier cohort completing their journey. These represent future leader potential within our company and the future is bright. I was pleased to see the benefits of this investment in our people gaining recognition at the Confor Awards Dinner in February, with Tilhill colleagues shortlisted in two of the three award categories and Andrew MacQueen, one of our forest managers in South West Scotland, winning the Future Forestry Leader Award.

I appear to have found myself taking on this industry-leading role at an exciting yet, at the same time, one of the most challenging times that the business has ever seen. The desire to plant trees and create new woodlands was everywhere, with politicians falling over themselves to outdo each other with new planting targets. We even had household names and high street shops offering to plant trees to mitigate climate change if people continued to spend money with them.

Carbon and ecosystem services are the emerging metrics that we are becoming used to, in conjunction with the more traditional financial returns used to value forests. I was privileged to be in the audience as Sir David Attenborough received a lifetime award from the Landscape Institute. In his acceptance speech he spoke of the journey that conservation organisations had been on, from attempting to save rare species, to a realisation that in order to save species we needed to protect and increase their ecosystems, including our own woodlands at home.

The social and political will for woodland creation is undoubtedly on a high. However, will the approvals process be tweaked to meet these encouraging aspirations, I wonder? The experience so far is positive, with woodland creation targets being met in Scotland and an increasing number of new projects initiated in England. The jury is still out in Wales having planted only 80 hectares in 2019/20, the lowest number for a decade.

Phytosanitary felling in European markets, following significant windblow events and subsequent Bark Beetle infestation, saturated the UK market with imported sawn timber reducing the competitiveness and demand for UK sawn timber. It was a timely reminder that the UK is the second largest net importer of timber products globally.

Adding to this challenge, in April, the lockdown due to Covid-19 saw UK sawmill demand collapse almost overnight resulting in mills shutting their doors and the staff furloughed. However, a degree of demand remained from biomass power customers and some mills for sawn timber for pallets. A harvesting team, much reduced by furlough, performed fantastically in maintaining supplies to these essential operations.

During this time, the country was encouraged to work from home if possible and to maintain social distancing. We all but closed our offices with a vast number of our staff working from home. We all became familiar with new ways of working, utilising video conferencing and ensuring our usual face-to-face support networks were maintained 'virtually'. Most forest management activities in the woods are an exercise in social distancing as standard. Consequently, our ground preparation and planting work carried on apace, all the time ensuring that we adhered to government guidelines. Indeed, with a number of other companies standing contractors down, we were able to add to our available resource.

Gavin Adkins
Managing Director

> "At Tilhill we have outstanding, professional, resilient, and resourceful staff."

The addition of Maelor Forest Nurseries as a sister company within the group last year also proved to be beneficial. Maelor had lifted their stock of trees for despatch and placed them in cold store before lock down occurred. As a result, unlike other nurseries, Maelor continued to despatch trees throughout the period facilitating our ongoing planting ambitions.

What have I learned then from my first few months in charge?

As the leading company in our industry we have a pivotal role in shaping the UK's green spaces at an exciting time of political and social support for environmental enhancement.

It will not always be easy. Flexibility and adaptability to change will be an important attribute.

But most importantly of all, I have learned that at Tilhill we have outstanding, professional, resilient, and resourceful staff, dedicated to providing a high quality service to our clients and customers no matter what adversity is set before them.

I am both proud and privileged to be able to lead them and I thank George McRobbie for building such an enviable team to hand on to me, his successor.

SAFETY & ASSURANCE OVERVIEW

Many things still feel familiar upon my return to Tilhill after three years in the Minerals Industry. Most of the faces are familiar and many of the issues being worked on by Tilhill, and the wider industry, are the same as when I left. This shouldn't come as a surprise though. The risk profile of any industry will remain largely the same through the years as the work required doesn't fundamentally change. The technology moves on apace and the accepted work practices adapt to new technology/machinery. However, fundamentally, the forest industry is still tackling the challenges of steep, rough ground, falling trees, weather and climate and the individuality of each worksite.

We must acknowledge the work to improve Health and Safety in the industry over the years. Mechanisation has brought much improved safety, as has improved engineering and Personal Protective Equipment (PPE). During the same period general societal acceptance of risk at work has also shifted, meaning we no longer accept things we did in the past. So, I question what will we look back on in 20 years and think to ourselves "I can't believe we used to work like that"?

Site Welfare

The introduction of Welfare provision on sites will be one such topic. For so long, both the industry and the regulator turned a blind eye, accepting that provision of welfare on forest sites was not 'Reasonably Practicable'. This has all changed. The past two years has seen this requirement be introduced. The industry is still at the trialling stage and there have been, and probably will be, a few more bumps along the road, but this will form part of our normal working scene going forward.

Chris Pike
Head of Safety & Assurance

Typical welfare unit on site

> "We must acknowledge the work to improve health & safety in the industry over the years."

More than just a toilet facility, welfare can provide a place to hold site documentation, a place for site meetings and somewhere for workers to get away from the weather, dry out and get changed. Welfare will also play a significant role in making our industry more attractive and accessible for a more diverse workforce. Not everyone is willing to hide behind a bush to relieve themselves! For me, these are the real benefits of welfare; the cultural impact and helping to professionalise the industry.

Advancing Safety and Assurance

Reflecting on my experience in Minerals there are some examples that we in Forestry can follow to achieve the improvements we are seeking in our Safety and Health record. These will form the basis of our continued striving at Tilhill to Insist on Safety. As I look to how we will advance Safety and Assurance in the coming years we will follow three themes:

- **Competence.** We need to ensure that all parties in the work chain are competent in their roles. This includes Operators, Supervisors, Managers and Directors. Each of these roles have different competency requirements. We will review and enhance our competence framework for our own staff. Competence runs across all aspects of the work we perform. This includes technical competence in the role, as well as competence in Health, Safety, Environment and Quality aspects of the work, including how planning will affect those undertaking the work.
- **Use of technology.** We will continue to lead on the use of technology, from our fleet of drones and competent drone pilots to real time in the field planning and reporting tools. The technology must add value to our work and be integrated into our work system in order for us to draw the most from it.
- **Collaboration.** We will continue to play our role within the Forest Industry Safety Accord and the Forest Industry Environment Group. We will continue to collaborate and support our contractors in improving working practices and controls.

So, by looking forwards we also need to look backwards and around us to truly understand the long-term Safety and Assurance challenges that we still need to meet and take inspiration from how others have tackled similar issues.

ISO 45001 Success

> "Our goal is for all persons working on or visiting our sites to be safe and free from harm to their health."

We were delighted to learn we had successfully transitioned from BS OHSAS 18001 to ISO 45001 in June.

ISO 45001 is a milestone as the world's first International Standard dealing with health and safety at work. It offers a clear framework in line with other Standards for Quality and Environmental management. While ISO 45001 was developed drawing on OHSAS 18001, it is very much a new and distinct standard representing a significant shift in the way health and safety management is perceived and designed to mitigate any factors that can cause employees and businesses irreparable harm.

Especially geared toward leadership of senior management, ISO 45001 has the ultimate goal of helping businesses provide a healthy and safe working environment for their employees and everyone else who visits the workplace. This goal can be achieved by controlling factors that could potentially lead to injury, illness and – in extreme situations – even death. As a result, the Standard is concerned with mitigating any factors that are harmful or that pose a danger to workers' physical and/or mental well-being.

Achieving certification to ISO 45001 is a significant step in our drive to further improve Occupational Safety and Health management in the Company. The additional emphasis in Senior Management commitment in the new standard sits well with the fundamentals of our Health and Safety culture.

Our goal is for all persons working on or visiting our sites to be safe and free from harm to their health. This result is a marker of our progress to achieving this, but we continue to strive for safer and healthier working practices and to '**INSIST** ON **SAFETY**' at all times.

Forestry and Plastics

Nicola Abbatt
MRICS, MIOSH, CEnv, MIEMA

The recent and much publicised focus on the use and disposal of plastics has made us increasingly aware of the use of plastics in forestry operations. Contemporary practices in forestry and woodland management involve elements of plastic use and therefore challenges around waste management.

Tilhill is proactively looking for ways to prevent, reuse or recycle plastic from our operations and are trialling potentially viable alternatives to plastic use. Our aim is to reduce the plastic in our environment, whilst balancing other environmental impacts. Recovering used plastic shelters and tree bags can have biosecurity risks in an environment with increasing pests and diseases. It can also be a logistical challenge. We must ensure that the benefit of our current practice of recycling is not outweighed by the negative environmental impact of lengthy transportation.

Tree Shelters

A small percentage of the total trees we plant each year are planted with plastic tree shelters. These may be required because prevention by fencing to protect from deer or rabbits is not a viable option. Where we have long term management of a forest or woodland, we will remove all tubes when they have fulfilled their usefulness in terms of establishment and tree protection.

While the original polypropylene tube (a by-product of the petroleum industry) has many benefits, we have actively been looking for viable alternatives in order to support our clients who wish to go plastic-free and move to a product manufactured from a sustainable resource, with a reduced environmental impact at the end of their life.

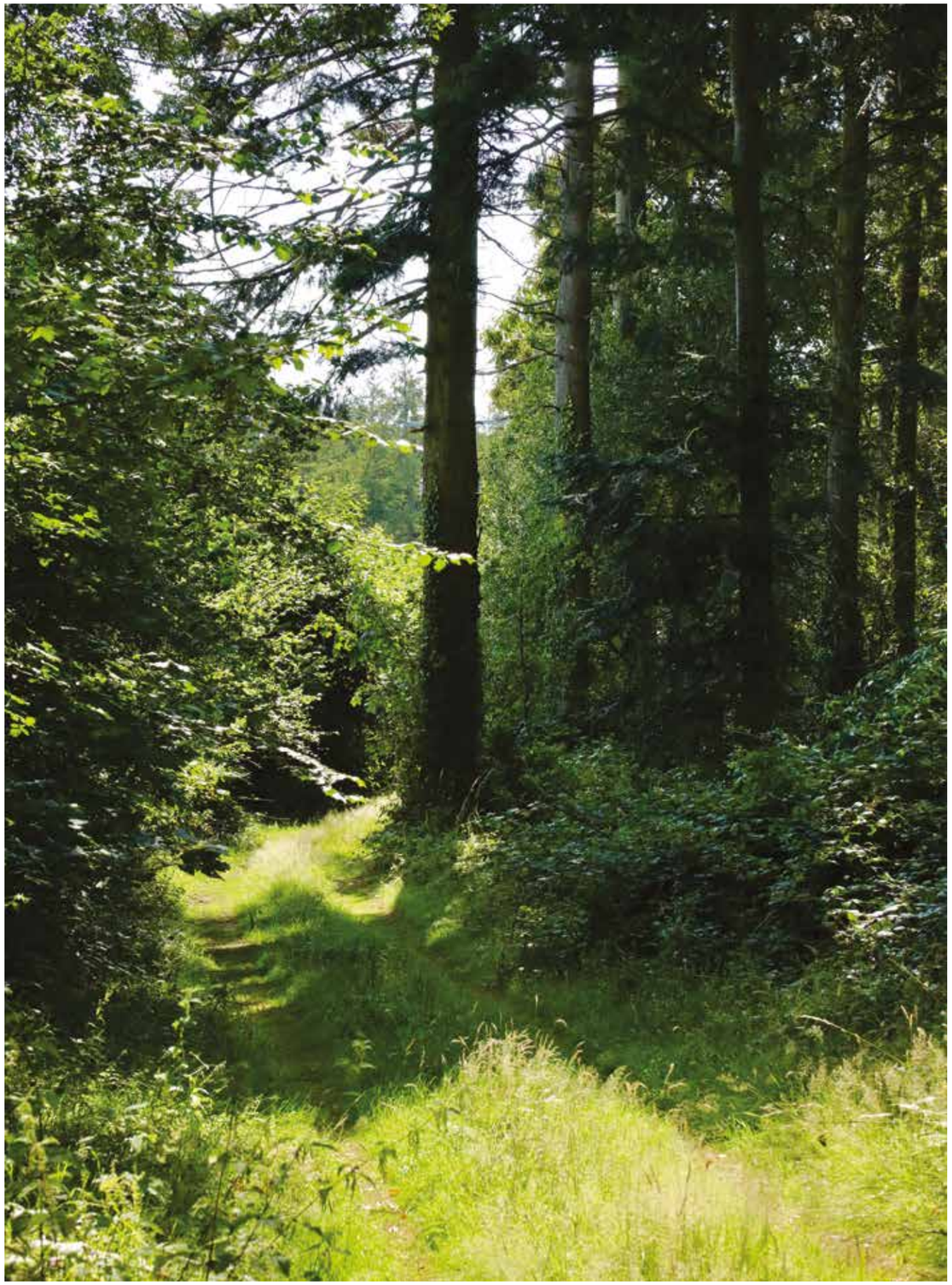
To this effect, we have been undertaking trials of the alternatives on offer including cardboard shelters and compostable spirals, with varying and mixed results so far. These trials are still ongoing.

Tree Bags

Currently saplings for planting are delivered in plastic bags designed to retain moisture and protect the plants. In order to try and eliminate this plastic element of our business we are working in partnership with Maelor Forest Nurseries Ltd to look for alternative materials when delivering young trees and shrubs. We are therefore starting to trial the use of cardboard for deliveries.

As our trials continue, our plan for the future around our use of plastic is to ensure we remain a proactive, exemplary, and sustainable business which leads in its field.

We must work towards reducing the plastic!



TIMBER UPDATE

TIMBER UPDATE

The writing of this piece has provided a time for reflection on the period we have just come through and it has been useful to have a cup of tea and pause whilst thinking on what has been one of the most challenging periods of my life in forestry.

Why challenging? Well, generally, life continues its normal path. The previous months requirements for the business are similar to this month and the next and the next. In winter, demand drops and so on and so on. But COVID-19 came along and completely changed the needs of our customers and therefore how we run our business.

We found ourselves in a position where some customers ceased their requirements overnight while others required more. As sawmills initially slowed, or even stopped, the requirement from some of the biofuel plants we supply (and that are very often listed as critical to our infrastructure) was for more virgin fibre as their supplies of recycled material ceased. Now, sawmills have all restarted but the off take of co-products and small roundwood to the panel board and biomass sector remains patchy.

In essence, the normal steady state that the sector runs at has been completely changed and thrown up in the air. The requirement to manage and plan this process has magnified dramatically. What was previously a weekly planning requirement has become a daily one. The demand on communication with colleagues and the wider sector was similarly increased. I, and many of my colleagues, have become all too familiar with Microsoft Teams software and being more closely associated with the inside of our own homes.

But in amongst all these changes and challenges there have been enormous upsides. Whilst we have experienced moments of stress in our personal lives, both the business and the wider sector, our contractors, colleagues, customers, and suppliers have all shown tremendous resilience, patience, and flexibility in the way they have operated.

We have had, at very short notice, to repurpose our supply chains to provide what the customers have needed exactly when they needed it by and, crucially, we have kept these vital customers supplied. One very good example is a major user of biofuel who are part of the key worker industry. This plant relied largely on the flow of recycled wood the supply of which dried up almost overnight. Colleagues were able to source a virgin fibre supply stream that allowed this plant to continue to operate, whilst at the same time providing several sawmills with an outlet for their wood chips.

Harry Stevens
Timber Buying Director

> “Demand has undoubtedly returned to pre-Covid times and is probably stronger than before”

I envisage a period between now and late Autumn where demand will continue at a strong level.

Personally, I have learned some valuable lessons about the way the team I am part of operate and have gained a greater insight into our collective strengths. Indeed, as a team building exercise I probably could not have thought of a better one, not that I would advocate doing it too often mind you!

So enough of the collective pat on the back, now for the hard bit. What next?

There is strong demand for sawn timber as everyone it seems (myself and most of my neighbours included) have looked at their gardens and decided that if they are not going on holiday then they are going to replace that fence or redo that border.

Our sales colleagues in the sawmills can sell fencing stock several times over and construction timber demand has picked up to normal demand levels. There are some clouds on the horizon though. Demand for small roundwood has been low, although now increasing, and whilst there are high stocks at roadside currently, we anticipate this coming back into balance between now and the new year.

One surprise has been that the market for standing timber does not appear to have weakened at all, as some had anticipated at the start of this period, although the weakness in small roundwood demand has pulled the interest in for poorer quality parcels back slightly. However, all parcels are attracting multiple bidders and good prices.

Indeed, demand has undoubtedly returned to pre-Covid times and is probably stronger than before.

It is likely that this will now be the case until at least the first quarter of next year. It is a good market if you are a grower.

LOCKDOWN

Forestry in Lockdown?

Early in 2020 my wife and I decided to take a holiday in India with the aim of photographing tigers amongst other things. As we got closer to our 1st March departure we suddenly had some reservations thanks to the rapid expansion and impact of coronavirus in China. Should we or should we not go to India? We decided that we would and prepared for the worst both in terms of Coronavirus and, of course, 'Delhi Belly'!

Upon our arrival in Delhi we were both blown away by what to us looked like total chaos and the sheer volume of traffic that they 'fit' on their roads. Indian drivers must have a very good social spatial awareness as we did not actually see very many bumps, irrespective of whether the traffic was trucks, mopeds, cars, Tuk Tuks, rickshaws or camels pulling carts. I did ask our guide: 'How on earth do you learn to drive in Delhi? She replied, 'drive in Delhi'.

The First Signs

The night after we arrived the televisions in India showed that they had their first six confirmed Coronavirus cases. This was mildly disconcerting but we were already prepared and I had already had my 'toolbox talk' from my veterinary wife as to how to clean hands effectively.

Some days later the paperwork caught up with us and we had to complete forms concerning when and where we arrived in India and our intended destination. At that time all the hotel staff started to wear face masks.

The Vanishing Virus

We returned to Delhi and the following day were due to fly back to the UK. We were quite apprehensive over what would happen at the airport – we sailed through with no anxious moments. We were then surprised and anxious that Coronavirus did not seem to exist for Heathrow's Terminal 5 – no precautions at all!

The Reunion

Back to work on the 16th of March and facing a myriad of emails. Most of my time was spent catching up on how the Coronavirus was starting to change the way in which we worked and how it was becoming a serious influence on our day-to-day lives.

On the Tuesday we took the decision to reduce the number of staff in our offices to be compliant with 'social distancing'. A new term at this point but oh so familiar now! I decided to send to work from home as many staff that could effectively do so. Wednesday was spent reorganising face-to-face meetings, delaying some and moving others to virtual meetings. Thursday was spent interviewing potential new recruits via Skype to fill a Landscaping business role. Friday was a virtual meeting with our marketing team about this magazine!

Could We, Or Couldn't We?

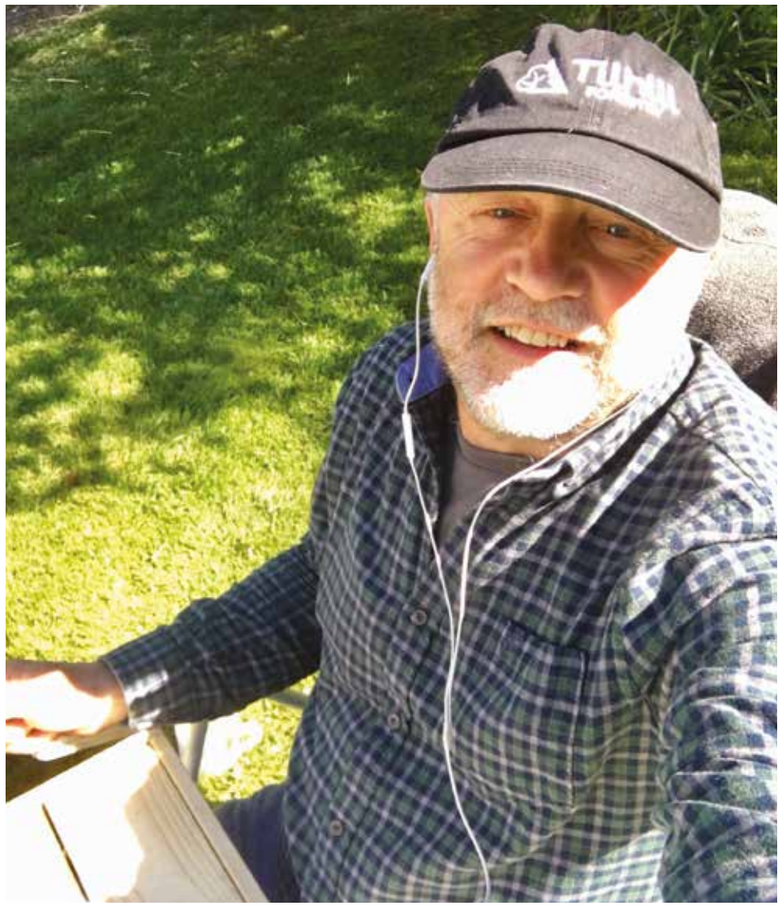
We are at our busiest in Spring with restocking and new planting. Our target this year was to plant just under 20 million trees. This is a considerable logistical challenge for our teams, suppliers, and contractors at the best of times and, of course, we had ordered the trees. It was therefore paramount to keep our contractors working so the trees could be planted at their optimum and our client programmes be completed.

As lockdown tightened, we lost some contractors through furlough. There certainly was confusion as to who could and couldn't work. We looked and read the government guidance very carefully and, whilst some of our colleagues were essential workers, most of the forest management was not. Having read the guidance again it was clear that planting trees could not be carried out at home and we could satisfy the social distancing criteria. So, we could continue. This was some relief as businesses were shutting down around us. We set up a 'Guidance Team' to work on keeping us 'straight' in terms of government guidance. They derived the appropriate 'rites of passage' documents in case staff, suppliers and contractors were stopped. We also had protocols in place for closing sites should our clients choose to do so.

In Other People's Hands

In situations like this, cash flow becomes harder to maintain, so our finance team and managers kept in regular contact to ensure the debits and credits were closely managed. We lobbied the regulators, especially Scottish Forestry to pay grants swiftly and we were pleased that their response was very positive, paying grants without inspections to assist the cash flow. Most of the regulators were working at home without clearance to go onto sites, which helped with grant payments but in some cases have slowed woodland creation permissioning. The BSW Group, like many others, asked staff to take a salary reduction for a period to assist in maintaining a cash headroom. There was a huge acceptance of this measure which I think shows the dedication of our staff to both getting through these unprecedented circumstances and the success of Tilhill.

> IT was the key. We suddenly embraced Microsoft Teams and Zoom.



Indian way of life.

Safety First, Always

Site visits have been essential to ensure we are operating safely, to specification, and that the environment is protected. It is very important to ensure that welfare facilities are kept clean and refreshed more regularly. I took the opportunity in a 'quiet guidance period' to get out and see what was happening. It was great to see the activity first-hand and to chat to operators, planters and our teams, all at a safe distance, of course. It was heartening to see their good spirits and humour – I guess the sunshine helped in that respect. On one site, I was concerned to see only one vehicle but five planters – were we not conforming to social distancing? I was relieved to discover that the planters were all living in the same house – thank goodness, a 'family unit'.

Furlough – The New Word

Mid-April/early May is a quiet period for us in certain areas of forest management, so we had to take the decision to furlough some managers. 'Needs must' to help ensure that we had a strong business to go back to. We currently have two IT projects running – one to upgrade our business system and the second to modernise our mapping platform. These projects are continuing to be developed and we are now at testing stage in our business system which would normally have been tested in a darkened room! However, we have had to create a virtual 'darkened room' using 'Microsoft Teams' to facilitate end-to-end testing. We also were able to unfurlough a few staff to work on these projects. Sometimes, one must take advantages of a particular set of circumstances, which we were able to do here.

Communication, Communication, Communication

Throughout all this we have been in regular contact with our clients, staff, contractors, and suppliers. It has been somewhat challenging to blend the communication appropriately with changes in guidance and circumstances. Only you can judge whether we have been effective and I hope that, by the time you are reading this, we will be out of lockdown and that we have continued to successfully manage your forests and deliver landscape schemes for you.

Forever changed?

I visited a different world in India and returned to a different world back in the UK. I think, in some respects, our world has now changed forever but certain aspects will come back round to the old normality again.

We never did find tigers so perhaps another visit to India is on the cards at some point when the world is perhaps not quite so tipped on its axis. Maybe though, we should have been searching for chameleons instead as their ability to adapt to an ever-changing environment would be most useful at the moment!

Tim Liddon
Forestry Director

FORTY YEARS WITH TILHILL

Tim Liddon, our Forestry Director, this year celebrates an impressive 40-year career dedicated to not only forestry but Tilhill too.

In recognition of this anniversary, Tim reflects on one of his earliest projects and gives an insight into the considerations that were taken into account when managing a forest through its lifespan. It was a time when commercial forestry was looking to move on from its 1970s poor image but well before the application of the many benefits of genetic research into Sitka spruce.

Tim picks up the story:

'In the spring of 1981, I was informed by my boss of the time that we had managed to buy a 124-hectare planting site in the Durham Dales near Barnard Castle. I had just been transferred to Tilhill's Yorkshire district and was spending my time on Tyneside carrying out landscaping works. I was working on the Felling bypass at the time and part of the work involved planting cultivar rhododendrons that were just coming into bloom in front of Gateshead stadium. Mother's Day was shortly thereafter, and I remember clearly how disappointed I was that several of the rhododendrons had strangely disappeared!

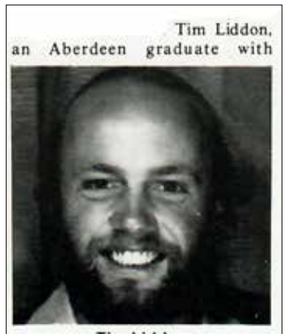
The site that had been purchased was Grassholme pastures. It rose from 300 to 400 metres and faced predominantly North. Immediately to the north of the property was Grassholme reservoir into which ran the streams from the hill ground. The soils went from brown earths on the lower slopes to shallow peaty podzols and peaty soils on the hilltops. It was bounded by stone dykes and farmers, many of whom did not approve of this change of land use to trees.

The property had been bought by the Rolls Royce pension fund who, shortly afterwards, became the owners of Tilhill for a short period in the mid-1980s.

So, I quickly moved from the urban post-industrial landscape to the open hills of the Durham Dales in my Mark 1 Ford Fiesta 850cc – I was allowed to put mud and snow tyres on which helped – a bit. We had engaged contractors to create a forest road on the upper land to give access. The lower land could be easily accessed from the county road. The ploughing contractor, Hastings, from South Scotland came down with their plough tractors and trailed ploughs to cultivate the land ready for planting. The two operators, Jock and Curly, were very experienced and competent, but I still had to watch carefully to ensure the two metre spacing was adhered to and that they did not get too close to the water courses and the stone dykes.

In those days, the drainage was created by a big plough. This humpy plough needed two crawler tractors to pull it across the ground and when travelling on a side slope it tended to creep down the hill leading to steeper drains. This was a period prior to UK Forest Standard and the water guidelines but the use of excavators, which could set drains at a more consistent slope, was only just starting.

The majority of the crop was Sitka spruce and, in those days, not improved stock but imported from Queen Charlotte Island (QCI) British Columbia (or I should say Haida Quai). The young trees came from Tilhill's nursery in Farnham, Surrey and were 1u1 stock – this means the seed was sown sparsely on the seed beds where the trees grew for two years. The roots were undercut periodically to stimulate growth. They were young vigorous plants, having been grown in southern England, where the nursery was well suited with good irrigation. I always recall that the lorry bringing the plants was refrigerated to ensure that the trees arrived in top condition. The lorry had a slogan on the back: *'Plants by the million!'*.


Tim Liddon, an Aberdeen graduate with previous landscaping experience, joined Central Landscape branch.

Tim Liddon

Extract from Newsletter 4 Aug 1980


The humpy plough starting the drainage works.

Tim (left) receiving an award presented by Lord Barbour (centre) and Peter Johnson, MD, Booker Countryside

This was prior to the use of coextruded plastic bags. They arrived in potato crates and were heeled into the ditches, tightly squeezed to ensure that they did not dry out. My boss arrived just after we had unloaded and he tugged on the bundles of trees and said that they 'were not in tight enough and I was to do it again' – mentoring on the job! The planting squad came from Middlesbrough, and I knew them well from my landscaping experience on Tyneside and Teesside. Ron was the foreman and they worked hard and well, planting the hillside.

The crop was fertilised with ground rock phosphate, as was the practice in the early 80's. The site was beaten up to replace failed trees and weeded. I then moved my location as another project had been given to me and I lost sight of the progress of this forest as a result, until recently that is. It came back to my attention, all these years later when one of my (now) Forest Managers told me he was writing a long-term forest plan and looking at the first coupe for felling for a forest property in County Durham that Tilhill had originally planted up.

How did that happen, I thought? It was only yesterday that it was planted!'

Once felling has taken place, so the cycle will begin again. Restocking, managing, felling. This time it will be nurtured by a different keen and enthusiastic forest manager. They come armed with comprehensive qualifications and the additional benefits brought by a 'hand me down' of knowledge from the many years' experience of this forest's creator. As well, of course, as being able to apply the findings from all the research that has taken place during this 40-year timeframe. This forest has a most impressive future.

Tim Liddon
Forestry Director


Ploughing wet ground.

ASH

THE ASH STORY CONTINUES

Much has been written on the impact of Ash dieback disease *(Hymenoscyphus fraxineus)* since it was first found in the UK in 2012 in the northeast corner of East Anglia.

In the 8 years since then there has been significant research, conjecture, assumption and, alas, death of many magnificent and economically important stands of ash trees.

The spread of the disease has been quicker than initially estimated. Much of this is down to the wet, warm and windy early autumns we regularly experience.

We now have a better understanding of how the disease acts. Once a tree is infected, the leaves that fall to the ground each autumn hold the key to its spread. The compound leaf structure has a central stalk or 'rachis', to give it the correct biological name. The fungus grows on the rachises in the form of tiny yellow/white fruiting bodies. Over the course of the winter and spring these then mature and expel spores into the air, the summer after the leaves fell.

The first ash they come into contact with will become infected. The spores settle onto leaves or bark and are then taken into the trees xylem before the disease works its way back into the main stem through dying and embrittled twigs and branches.

Stands or groups of pure ash of around 25 years old have been found to exhibit almost stand collapse with virtually all trees being infected and suffering irreversible crown death. This must be due to the lack of dense vegetation below the pure interlocking ash canopy only some 8 to 10 metres above. We have seen devastating infection on several new woodland sites planted between 1998 and 2006. Here ash was a strong component due to its vigorous early growth, straight form, timber qualities and resistance to squirrel damage. Today, the race is on to harvest these stands before the stems dry out so much that when chipped, they disintegrate and turn to dust rather than good dry wood chips.

In many cases, the stand condition is so poor that complete removal is required and a replacement crop replanted in its place. In other stands we regularly thin out the diseased trees to provide more air flow and sunlight to the crowns of more tolerant trees. Thus far we have to keep returning, monitoring and thinning ever more it seems.

In direct contrast to the plantation stand collapse, open grown hedgerow trees show a wider range of impact to the disease. More open crowns, direct sunlight, greater air movement and lack of competition may all contribute to a tree's ability to periodically recover from partial die back. Despite this, the trees never recover fully and the damage caused continues to weaken trees which can lead to a limb being shed or enabling a more damaging infection to gain entry, such as honey fungus.

Research has now turned to look for any naturally occurring tolerance to the disease that may exist in the wider population of genetically isolated ash across the UK and northern Europe. Forest Research planted 155,000 young transplants from seed collected early into the spread of the disease. Now, five years later, they have 575 trees that remain free of symptoms. Cuttings and grafts are underway to begin establishing a seed orchard for future large scale production. This will only work if the tolerance is genetically inherited and this is where the most recent research is focused.

The UK Forest Research team are joining a group of universities, agricultural facilities, and European researchers under the name of the Nornex Consortium. Their recent funding of £2.4m will help the work into establishing the genome sequencing of ash and find the key to resistance to dieback.

Several other steps have been taken to help professional managers deal with the issues arising from this disease. The safety aspect being one of the most essential. When felling with a chainsaw, ash trees have always been difficult to predict how they will fall – the timber can be stressed and will split under the pressure of being felled. As the tree dies from the disease the timber reacts with even more unpredictability. The Forestry Industry Safety Accord (FISA) has been very proactive in issuing advice and best practice on how mechanical harvesting should be employed as first choice to remove chainsaw operators

Julian Ohlsen
District Manager

> "The spread of the disease has been quicker than initially estimated."

A typical example of Ash Dieback Disease

being placed at the base of an unpredictable tree. Likewise, climbing dangerous and dying trees for sectional dismantling must be avoided and the use of a mobile platform is essential in tree surgery situations.

The protection of our woodland cover becomes ever more important when such an ecological disaster looms and the Forestry Commission has not bowed to pressure to relax felling licence regulations. Trees can continue to be felled if dead, but if simply diseased, they still require forward planning and licences applied for, the exception being smaller individual trees or garden trees which remain exempt.

To encourage proactive management of the decline in commercial ash stands, grants have been made available to encourage their replacement with a wide range of trees such as lime, hornbeam, sycamore and aspen.

The outlook suggests that ash will remain in our countryside for some time yet, just like the English elm, where you can still find isolated trees in mixed woodland growing away from the attentions of the beetle. From this situation, together with the active research and tree breeding efforts, we will remain able to enjoy some element of *Fraxinus excelsior* (ash) in our woodlands.

CONIFER vs BROADLEAF

Conifer vs Broadleaf, an ecological retrospective

Conifer Forests

John Gallacher
Tilhill Ecologist

Now seems as good a time as any for a bit of self-reflection or, in this case, an ecological retrospective. One is perhaps allowed this indulgence after 37 years as a jobbing ecologist, 21 of which have been spent within the forest industry.

Where has the industry been in this span of time? Where are we now and where are we going? This, of course, is a personal journey through the conifer forest. The views to and from the woods are entirely my own.

Where have we been?

Productive forests have and continue to divide public opinion. No more so than in the mid-1980s during the depths of the Flow Country debate where arguments over forestry versus conservation raged and which resonates still to this day. At the time, I worked for the Nature Conservancy Council (NCC) with the debate so polarised that productive forestry was seen as the enemy of nature conservation. The two were considered completely incompatible. Taking something so green and sustainable and turning it into a nature conservation threat coloured my formative career.

Planting on peatland wasn't the only concern, with lowland heath, species-rich grassland, native woodland and limestone pavement also at risk as the forest industry sought to secure a strategic resource. At the other end of the land use spectrum, the NCC were busy surveying and selecting a suite of Sites of Special Scientific Interest across the UK to afford statutory protection under the Wildlife and Countryside Act 1981. Two approaches at the extreme poles of land use, with mistrust and misunderstanding framing any debate between the two.

> "Woodland creation is firmly on the climate change agenda given its capacity to sequester and store carbon."

But things slowly and inexorably change. If someone had told me that before the end of the 20th Century I'd be working for a commercial forestry company I would have laughed, told them the idea was risible and their grasp on reality was tenuous. But by 1999 this is where I found myself – an ecologist with Tilhill. At the time, many said it was gamekeeper turned poacher or, if less kind, that I was selling out. Time alone would tell.

However, I was not the first ecologist at Tilhill. I replaced the late Baxter Cooper on his retirement. He was a man of high ecological standards and integrity with the burden of his legacy heavy on my shoulders to this day. I had met Baxter sometime in the mid-1990s while working for the successor agency to NCC, Scottish Natural Heritage (SNH). The dialogue here was not one of mistrust or misunderstanding but one of mutual respect. It showed me the possibility that in the 'forestry versus nature conservation debate' 'there was perhaps more uniting than dividing us. A number of shifts had also allowed this possibility to develop in my mind – the Broadleaves Policy of 1985 ended the conversion or 'enrichment' planting by conifers of native woodlands while Nigel Lawson's budget of 1988 (for good or bad) put a stop to large-scale afforestation in the Flow Country. I was perhaps changing too with the realisation that more could be achieved by pragmatism than purism.

Where are we now?

Much like the Beatles, some things are of their time – where circumstances align in a series of random events. We find ourselves in a time of climate and biodiversity crises. The two, of course, are intertwined and inseparable but we so happen to be in an industry that might just have one of the answers but not *the* answer.

Woodland creation is firmly on the climate change agenda given its capacity to sequester and store carbon. Scottish Government, in particular, sees the benefits of woodland creation and, throughout the UK, there was much talk at the last election of the benefits of tree planting across the political spectrum.

Targets in Scotland are set to increase the woodland resource by 10,000 ha per annum rising to 15,000 ha per annum by 2025. These targets must be delivered in a way that guards against inadvertently revisiting the Flow Country days by ensuring we mitigate our operations to limit biodiversity loss. Good self-regulation, guidance and high standards will hopefully prevent us from repeating the mistakes of the past. It is with good reason that we survey and assess all new woodland creation projects, the results of which inform the iterative design process. Much time is committed to protecting sensitive habitats and bird areas in consultation with a range of organisations. New tools also allow us to assign values to what we are creating. We have just completed a Natural Capital Assessment for a woodland creation project where the value of the timber at today's prices is worth £2M while the value of carbon sequestration is £47M – carbon values account for over 20 times the value of timber harvested

Conifer Forests

from the site. Add in the other natural capital assets, such as improved public access and improved catchment resilience, and the non-timbers values increase even further. The trick for the industry is to effectively communicate these values to a sceptical public.

This scepticism to woodland creation divides public opinion as much now as it did then. Resistance to change is a key factor here as well as the shifting baseline syndrome which means one's view of the countryside are set in childhood which, for many, means that the hills should remain open and unsullied by woodland. However, as the great ecologist Aldo Leopold noted: *"One of the penalties of an ecological education is that one lives alone in a world of wounds. Much of the damage inflicted on land is quite invisible to laymen"*. The wounds here are the long-term grazing impacts as well as drainage and burning resulting in what George Monbiot calls a *"slow-burn ecological disaster"*. The industry can also supply one of the answers here too.

Experience of the larger woodland creation projects over the past decade or more show that, on average, a 1000 ha estate may deliver 500 ha to 600 ha of mixed woodland once unplantable land, deep peat, and sensitive habitats are excluded. This means considerable scope for rewilding the unplanted land and addressing the 'wounds' alluded to by Leopold. Allowing land to self-determine is a key tenet of rewilding whereby plants and shrubs flower and set seed for the first time in a generation - released from the impact of sheep grazing. This process will underpin an ecological recovery providing food and structure to a range of species. In some areas, we are pursuing peatland restoration by a programme of blocking historic agricultural drains - ecological and hydrological restoration aiding further the carbon benefits of the woodland itself.

And what of the existing timber resource? Not the ecological desert as some would have you believe. Much time over the past 20 years or so has been spent ensuring our management minimises adverse impacts on the species that live there – Golden Eagle, White-tailed Eagle, Goshawk, Sparrowhawk, Red Kite, Merlin, Hen Harrier, Red Squirrel, Badger to name but a small few.

Many of these species, particularly the raptors, remain under constant threat from illegal persecution. The forests, and the people who manage them, provide a safe haven for these species with much time and money spent avoiding or buffering their nests. Not just because we have to, but because we want to.

Much of our effort in this area of species protection is predicated on constructive dialogue with the statutory nature conservation organisations, the RSPB and Local Raptor Study Groups amongst others. A sign of changed times from my starting point 30 odd years ago.

Where are we going?

As is the circularity of life, I find myself returning to where this retrospective started - the Flow Country. We are currently in the middle of a debate about pushing commercial woodland boundaries back from the edge of key areas for wading birds. This is an on-going debate whose resolution will require compromise on all sides. In all of this, I take the word 'compromise' as a positive outcome for without it few, if any, new woodland creation projects would proceed. However, it cannot be a one-sided compromise – all sides need to flex. We also need to work with the truism that whatever we do, in whatever field, it will have an impact. Our choice is to select the least impactful option.

My hope for the future of the industry is that the wider public has a better understanding and buy-in of its value at a time when our options for addressing the climate emergency are diminishing day by day. We once turned something green and sustainable into the enemy of nature conservation. We should remain alert we do not return to those days, especially at a time of high risk when we are busy delivering woodland expansion on a scale we have not seen in a generation.

If I have learned anything it is that there is no stasis, situations change, people change: we can learn from our shared history but not be imprisoned by it and quite clearly *"the past is a foreign land; they do things differently there"*.

Merlin

> "We need to work with the truism that whatever we do, in whatever field, it will have an impact."

Herb Paris

Broadleaved Woodlands

Rob Coltman
Forest Manager

I agree with John Gallacher's observation that now is a timely moment for reflection. I will respond to his past, present, and future assessment of conifer woodland ecology with thoughts from my own area of experience – lowland broadleaved forests.

My work has predominantly kept me in the woods of Surrey, Sussex, and Kent – the most densely forested part of England. The chestnut and hornbeam copses of this part of the UK are a long way from the Sitka forests of the north and west. However, there are similarities between the two and the histories and futures of lowland and upland forests are inextricably linked by people and the wildlife that exists there.

Where have we been?

Lowland broadleaf woodlands in the UK are typically composed of native trees, with some 'honorary' species sneaking in along the way (depending on your definition of 'native'). A significant proportion of broadleaved forests are classed as Ancient Semi-Natural Woodlands (ASNW): forests that have been in existence for over 400 years. These forests share a connection with the diversity of the old wildwood that once spread across Britain after the last Ice Age and can harbour ecological remnants of those times. Usually, plant assemblages are used to define a woodland as ASNW – with ancient woodland indicator species such as Bluebells, Herb Paris or Wild Service tree providing a window to the past. Historic biodiversity can be observed across the biological spectrum with ASNW housing unique fungal, bryophyte or invertebrate communities. A diversity of species which provides the conditions for larger species to thrive – mammals, birds, and reptiles.

Around eight thousand years ago, large animals roamed the wooded landscape: Aurochs (ancestors of our modern cow), Bison, Wolf, Lynx and Brown Bear. Steadily, over the centuries, these species were hunted to extinction. But something interesting also happened: people began to manage the woods. UK forests have now been managed by humans for well over two thousand years through practices of coppicing and pollarding to sustainably produce food, timber, and feed for domesticated animals. The longstanding silvicultural system of coppicing is still alive and profitable in the Sweet Chestnut woods of Southern England, thousands of years on.

At the other end of the spectrum, the upland conifer forests of the UK are typically much younger. Many conifer woods were often initially designed and planted by people within the last century with the aim of producing timber in a time of post-war scarcity. Native woodlands had been pillaged of wood for the war effort, meaning the UK rapidly needed a timber supply to rebuild. Non-native species were chosen from the New World, alongside the native Scots pine to rapidly produce timber. When conifer woods were first established, wildlife was not at the forefront of the fiscal and policy frameworks of the time. However, often the wildlife came to the conifer woods of its own accord, adapting to the novel forests and providing homes to species sometimes struggling to get by in the increasingly dwindling broadleaved forests of the lowlands.

Where are we now?

Presently, broadleaved woodland makes up half of the UK forest cover. These woodlands are widely and rightly praised for their role in providing havens for wildlife and invaluable carbon storage and sequestration services. Passion for trees is high in the UK and that fervour has encouraged a lot of broadleaved planting over the years – enhanced by the Broadleaf Policy and small-level financial planting support from the Government. ASNW, and newer broadleaf woodland, are no longer home to ancient Auroch or Bison, but they do still house a rich array of iconic species such as Hazel Dormouse, Bechstein's and Barbastelle bats, and Nightingales all call lowland broadleaved woodlands home.

There are, however, a number of iconic UK species that will gladly live in both conifer and broadleaved forests. Badger, Pine marten, Fox and Stoat will live in upland conifer woodlands. Natterer's bat will live in conifer plantations, as will Nightjars, especially in areas of restock. Deer seem to get everywhere (for better or worse) and the Red Squirrel does exceptionally well in some areas of conifer forest – far from the grey squirrel territory further south in the UK.

Typical example of active woodland management: chestnut coppicing

CONIFER vs BROADLEAF

Broadleaved Woodlands

> "We must tend new conifer and broadleaved forests to be the best they can possibly be."

Lynx used to roam our wooded landscapes until hunted to extinction

Where are we going?

Human management of lowland forests has in many ways mimicked the landscape created by extinct land mammals. Large animals can disturb woody vegetation, forming breaks in the woods and providing a patchwork environment. This creates diverse conditions for a range of species to thrive. Well considered coppicing and thinning of broadleaved woods can mimic this effect, providing ecologically beneficial disturbance whilst producing timber income. This can also be the case in conifer forests with their cycle of clearfell and restock.

The problem, in an ecological sense, with many lowland broadleaved woods is that they have fallen out of active management. They are often smaller than their conifer counterparts, slower growing, or are in difficult-to-harvest locations. However, these challenges are being met by a dynamic forest industry. Innovative harvesting practices are allowing access to burgeoning biomass markets. Brash, that was previously burned onsite, is increasingly harvested as an additional product, reducing forest fire risk and the impact on ancient soil ecology. Firewood markets continue to support foresters with continuing demand for locally sourced wood. Demand for larger diameter broadleaf timber remains high, with oak as popular as it ever has been as well as various other native species.

The aforementioned passion for trees in the UK could currently be at an all-time high. This has been identified and leapt upon by political forces with all sorts of promises of tree planting numbers. I fully support this and feel lucky to be part of the industry at this time to facilitate this positive landscape improvement. The key will be not simply to plant, but to grow. We must tend new conifer and broadleaved forests wherever they are established so they become the best they can possibly be. With proper and considered management, our new and existing woodland resource will be an invaluable asset to wildlife and people alike – as in the past and moving forwards into the future.

The view across Loch Drunkie in the Scottish Highlands, a good example of both broadleaf and conifer forests.

GENETICS

Research Rewards

Tim Liddon
Forestry Director

It is interesting to reflect every now and again and think 'how could we do this better?' This article looks at crop quality and how we are able, and need, to improve what was achieved in the 1970s – not there was anything bad about the 70's – I was in full time education and enjoyed it, apart from English, which was, of course, due to the teacher who I am sure would counter that position!

The site that triggered this article is located in Lanarkshire. It was planted in the early 70s at a time when there was very significant new planting activity. This led to shortages of stock and thus some of the sourcing of the Sitka spruce seed collected was perhaps not as good as it could have been. Much of the planting stock at that time came from direct imports from British Columbia (Queen Charlotte Island). It was rumoured that when seed was in short supply, seed collection quality reduced. The site, however, was good with mineral soils and relatively low exposure. Rainfall could be described as adequate for Sitka spruce.

In the 1960s, Forestry Commission Forest Research commenced a tree breeding programme with Sitka spruce. The desire was to understand its qualities as it had been established by the Forestry Commission as being, perhaps, the 'best' commercial species for the UK's environment.

The 1960s and 1970s were eras when significant afforestation was being carried out. The objective being to ensure that, in the event of another World War, there would be sufficient stocks of timber following the shortages in World War I and World War II. The tree breeding carried out by Forest Research aimed to improve quality, which at that time was described as increase vigour, straightness, and slightly later, density. The breeding cycle to improve Sitka spruce is long and thus the improved material only started to come onto the market in the late 1990s.

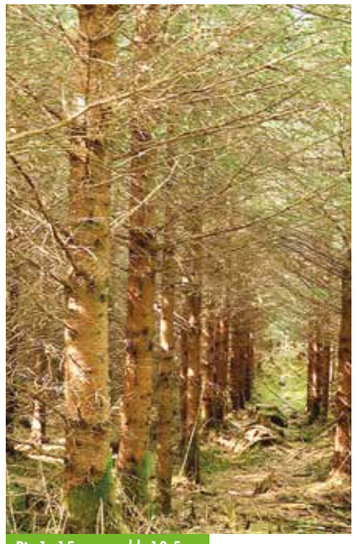
The rotation of Sitka spruce runs roughly 30 to 40 years and thus the improved material came on stream at the right time for the end of the first rotation and restructuring of much of the 70s planting. The property's first felling coop was in 2003 and thereafter fell into what was, roughly, an annual felling programme. This allowed the property to develop a wider age class structure, creating better age diversity. As well as age diversity, the restructuring had to meet the UK Forest Standard and, indeed, The UK Woodland Assurance Scheme which certified that the timber was grown as a sustainable product.

Looking back through the archives we can see that the management plan estimated the crops at yield class 16. This sits comfortably with the average YC across south Scotland. In the first rotation, felling started round about 30 years and records show yields of 250m^3/ha were the norm. Breakout of product at 40% sawlogs and 60% small round wood was not unusual. By the end of the rotation at about 45 years old, the volumes increased to circa 500-600m^3/ha and the product breakout reversed to 60% logs and 40% small round wood.

In 2020, all the original QCI (Queen Charlotte Island) or, should I now say more politically correctly, Haida Quai, has now all been felled and replaced with a mixture of some seed orchard material, but mainly half sibling and full sibling. In seed orchards it is recommended that there are 40 different clones, with cross pollination between a high percentage of these clones to give a panmixis. If there are only a few clones for cross-pollination, then the seed collected will not perform to its expected gain statistics. With half sibling material we know the mother but there will be various fathers. With full sibling we know both the father and the mother, leading to more consistent crops of higher quality. We now have a greater range of quality traits – vigour, straightness, density (which seems to be less important), branching habit and now stiffness.

ID No	Diameter	Density	Straightness	Branching habit	Acoustic velocity (stiffness)	Half or full sibling
MOO56	22	-2	18			Half
psiPF81	10	3	25	12	0	Full
psiPF96	26	-15	25	7	-1	Full

Table 1



Pic 1: 15 years old. 10.5m

Pic 2: 10 years old. 7.5m

In my most recent visit to this property we looked at a variety of these half and full sibling crops which make up the majority of crops. Table 1 shows the percentage gain/loss statistics compared to QCI.

The earliest crop was planted in 2004, with a half sibling MOO56. When we compare the growth rate against some preliminary improved Sitka yield curves then we can see that this crop is probably yield class 26 or 28. This 15 year old crop which is 10.5m (pic 1), shows good form, and is ready for thinning.

I also looked at a 10-year-old crop (pic 2), planted in 2009. This was one of the early full siblings MOO81. The top height of this crop was 7.5 metres which put it at yield class 30. Again, the straightness of the crop and the light branching was very apparent. The next crop we studied was a 5-year-old crop with MOO96. This is one of the newer full siblings that we have in production and it has grown 3.6 metres in four years, which put the crop, again, at yield class 30.

It has not been a straightforward journey, for in the early years of restocking the site was invaded with Willow herb from adjacent young planting. Willow herb is vigorous and, as the flowers dieback and the wind disperses the seed, it looks as though you are in a snow shower. The forest manager on this site struggled with the Willow herb initially until he came up with a solution whereby an early cutting of the Willow herb allowed the grass to take over. This makes it more controllable and does not compete with the trees so much. Now, in the 2020s, the restock crops are covered in grass and have good establishment.

In the early restructuring, the half siblings, because they are grown via vegetative propagation, (cuttings) had issues with slow establishment. We discovered that the vascular connexion between root and shoot was poor which led to this problem. Maelor Forest Nurseries has worked hard to improve this connection and we are now seeing good root shoot balance, vigour, and early establishment.

The superior genetics of these full siblings are clear to see and so is their enhanced value. So, whereas in the first rotation at YC 16 produced 250m^3/ha, the current preliminary yield class curves now indicate the YC 30 crop will be producing 250m^3/ha in its mid to late teens and, by 30 years old, the predication is between 650 – 700m^3/ha. Second rotation forest sites generally have better soils due to the recycling of needle matter and mycorrhiza associations. This as opposed to livestock farming on the initial afforestation sites where there is little recycling and the productivity goes off the site as lamb or beef. However, the improvement in yield is mainly due to the significant tree breeding carried out to selectively improve the crop we grow.

The hard work and forward thinking over the years are now, very evidently, paying dividends.

Willow herb

INVESTMENT UPDATE

Why Forestry Investment?

Bruce Richardson
Head of Investment
& Property

> "For the commercial investor, forestry has provided excellent returns over a long period."

One of the joys of working with a wide variety of clients looking to acquire a woodland is the opportunity to help satisfy the extremely wide range of interests and ambitions they have for their woodland. It is noticeable how even the most commercially minded investor quickly develops a passion for their forest and becomes knowledgeable and keen to be involved in its planning.

For the commercial investor, forestry has provided excellent returns over a long period. According to the MSCI IPD UK Annual Forestry Index, forestry provided an annualised total return of 9.2% pa over 25 years to 2017, comfortably beating the returns from equities and bonds over the same period. Forestry offers socially responsible investing in addition to the potential to provide good investment returns, and we have recently seen a surge in interest from individuals and fund managers. They are keen to explore the benefits that forestry can bring to their own ESG (Environmental, Social and Governance) and CSR (Corporate Social Responsibility) objectives and are seeking sustainable, carbon-friendly investments of which forestry is, of course, an ideal candidate.

Natural Capital has been much in the news recently and, as we move towards an environment where land-based grants are focussed on the "provision of public goods", many owners are attracted to the ecosystem services provided by forestry. These include carbon sequestration, flood mitigation, water quality improvements, habitat, and landscape impacts. Has this been a driver in the recent upsurge in forest prices? Certainly we now see some owners experimenting with asset valuations of their forests based on natural capital principles, with the public forest estate in England being valued on this basis at nearly ten times the value simply of its land and trees in the forest.

However, not everybody wants large commercial forests and we see smaller woodlands, owned with a wider range of amenity and sporting interests, also performing well. These tend to have a variety of species and age classes, giving the involved owner a broader palette to work with. With a large proportion of our UK woodland being under-managed, there is potential to improve and add value to these woodlands through thoughtful interventions. Properly managed, there is no reason why they cannot also attract the tax benefits of the more obviously commercial forests.

With the recent political focus on woodland creation owing to the carbon benefits it brings, there has been tremendous interest from our clients in finding opportunities for planting up new woods. The problem, as always, is finding the land. Landowners are firmly attached to their land and supply falls far short of demand. There has also been some debate on the type of woodlands needed, but the reality is that (on a rolling 5 year average) we have only planted around 30% of the current UK target of 30,000ha per annum and we have an urgent need to create more of every type of woodland.

Last year saw the second largest trading market in 20 years of producing our UK Forest Market Report, with the highest unit price/stocked hectare seen in that period. This continues an upward trend seen since 2002. This year, 2020, has opened very strongly and has remained positive despite the restrictions imposed by Covid-19. In particular, we have seen astonishing prices paid for young forest sites. This, to me, demonstrates the high value placed on both finding top quality sites coupled with using the best planting stock and management, and also long-term investor confidence in the market.

It is not clear what a post-Covid-19 economy will look like, but with its strong contracyclical credentials, continued demand for timber, and forestry's ability to provide public goods and support local rural economies, we remain most confident for the future.

Planting Trees A Plenty in 2020

Tilhill has been planting trees for over 70 years but climate change, net zero ambitions from Governments, and desires to create a cleaner, greener environment mean the focus on planting trees has never been stronger than it is today.

Our case studies provide an insight into the many different ways and reasons landowners are turning to woodland creation to suit both their financial and environmental requirements.

HS2 FUNDED PROJECT

Kasten Harris
Forest Manager

As part of the HS2 contract, £5 million has currently been contributed towards projects involving new native woodland planting and PAWS restoration.

We are lucky enough to manage several properties in Hertfordshire and Buckinghamshire which lie within the area designated for the funds, which actually stretches from Bishops Stortford in the north to Godalming in the south! One of these properties includes a significant area of PAWS coming up to final rotation age, so this seemed a perfect opportunity to get additional grant funding towards planned operations.

A total of 38 hectares on the property was designated as a Plantation on Ancient Woodland Site (PAWS), divided between several separate woodland blocks. All the woodland is managed commercially and sustainably, so we undertake regular thinning throughout most of the woodland where it is economical to do so, meanwhile protecting sensitive areas and encouraging native biodiversity.

The original long-term plan for the PAWS was to convert it back to native species after conifer clearfelling, scheduled between 2010 and 2020. Since the original plan was written, grant legislation has changed, removing any grant aid for restocking following clearfells, making this an expensive option with very slow returns from the new crop.

Plans were revised to recommend that it retain an element of commercial conifer. Despite this, the timber revenue would still barely cover the cost of restocking and protection required. Compartments are in several relatively small blocks with heavy browsing pressure from Muntjac, an invasive species of deer, which are very difficult to keep under control.

HS2 grant aid offered a generous restocking grant in PAWS areas, which was seen as an ideal opportunity to maximise revenues from harvesting operations and make use of grants for deer fence installation.

After initial applications were submitted, we organised a meeting with the Forestry Commission (FC) Woodland Officer for the area. It came to light that grants were only being offered by the HS2 project over a period of 2 years. Felling of all 38 ha of PAWS in this timescale would not be wise, due to the negative impact on the landscape which is in close proximity to built-up areas.

A revised application was submitted, including a total of 13.6 ha of conifer clearfell and restock in PAWS areas.

The main species would be oak, for a long-term investment in quality timber, with cherry and hornbeam to provide shorter rotation returns and some potential for diverse markets. A proportion of other mixed broadleaves, including rowan and birch would be included to increase diversity and be harvested for biomass in future thinnings.

The matter was discussed in detail with the woodland owner, including all the pro's and cons at each stage and an indicative budget was created. Compared to the alternative of restocking primarily with conifers, using the grants would lead to an increase in revenue in the first 2 years due to grant income. Though the impact on medium to long term revenue from thinnings may see a decrease, some schools of thought maintain that high quality broadleaves can be just as good an investment as any conifer crop and the scheme will offer increased benefits to local biodiversity and landscape value.

The HS2 grant will contribute towards restocking of over 30,000 native trees planted and nearly 3km of deer fencing; felling is planned for 2020 with final restocking to be completed by 31st December 2021. We're very much looking forward to seeing the finished product!

CASE STUDY

Arndean Estate

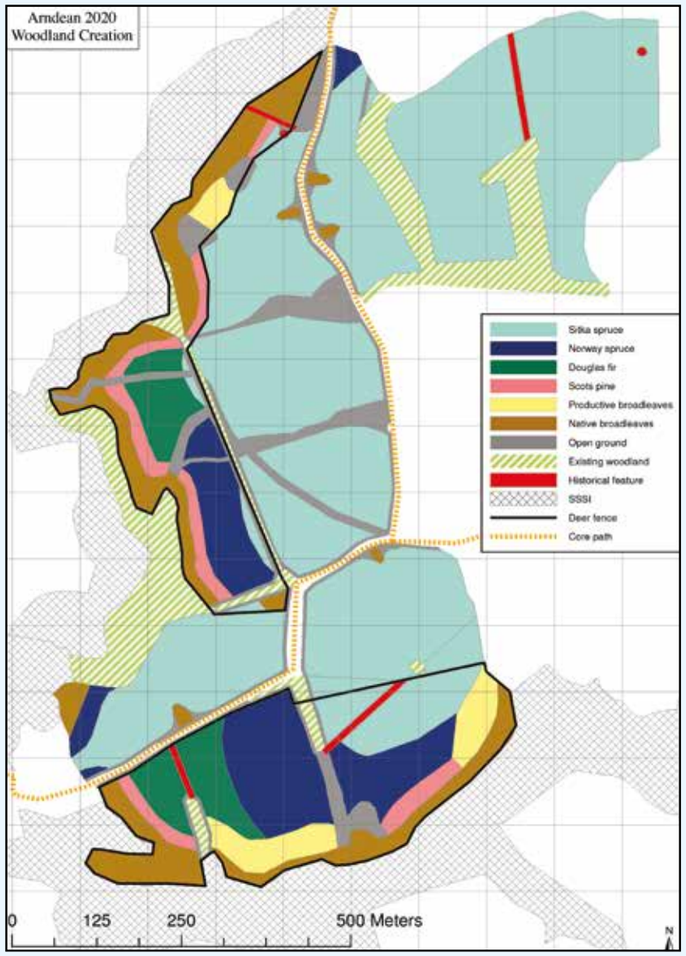
The Arndean Estate woodland creation scheme started in February 2019 as a proposal for 67.5 hectares of commercial forest on land previously used for sheep grazing and sileage. The owner asked Tilhill to steer the scheme through the permission and grant application process and to implement all works with as much Sitka spruce planting as possible.

Surveys carried out by Tilhill showed **no** sensitive vegetation and no potential for ground nesting birds due to previous grazing and cropping of sileage. An archaeological walkover survey found only minor cultural heritage features – mostly field boundary banks. A brief landscape assessment showed that the proposed scheme would not have a significant effect on the appearance of the site when viewed from outside looking in, but it was clear that tree-planting would reduce views outwards from well-used footpaths through the site.

Pre-plan public consultation resulted in mostly negative responses. The closest residents were strongly opposed to woodland creation close to their homes. The Community Council was very concerned about planting of trees close to popular core paths running through the middle of the site. Conservation organisations thought that more native trees should be included. Scottish Natural Heritage did not want any Sitka spruce planted within 50 metres of Sites of Special Scientific Interest. The local authority was concerned about future timber haulage past a school. Others were concerned about water supplies and flooding. All these issues were recorded in an issues log.

The owner realised that compromise was a good way of reducing opposition to the scheme. He agreed to remove two fields from the proposal to please the nearest residents and increased the proportions of Norway spruce, Douglas fir, Scots pine and productive broadleaves in place of some of his preferred Sitka spruce.

The final approved plan included 32.4 ha of Sitka spruce, 5.9 ha of Norway spruce, 2.7 ha of Douglas fir, 1.8 ha of Scots pine, 1.8 ha of productive broadleaves (pedunculate oak, silver birch and wild cherry), 6.0 ha of native broadleaves and 5.6 ha of open ground (total 56.2 ha). Most of the Sitka spruce was located on unfenced ground and the majority of the broadleaves and other conifers were located within two deer-fenced enclosures. Apart from the Sitka and Norway spruce, all other tree species were protected with vole guards. 500 broadleaves outside the deer fenced enclosures, being a fast growing species, were protected with tree shelters with the intention of removing and recycling them at the earliest opportunity.



Sitka Spruce

The owner decided to organise all the fencing and asked Tilhill to deal with ground preparation, weed control, tree supply and tree planting. His fencing contractor is an approved Tilhill sub-contractor which was helpful for co-ordination of works on site. Ground preparation was mostly via continuous mounding with tractor-mounted 'Enviro-mounders' with some less accessible areas mounded with a tracked excavator. Due to a convenient window of extremely dry, calm weather between completion of tractor-mounding and the start of planting, the tractor-mounded areas were quad-bike line-sprayed with Glyphosate. Planting started on unfenced ground with the fencers and excavator still on site. Deer fences and excavator mounding were completed just in time to plant these areas.

All works coincided with a period of very dry weather which was advantageous for ground preparation and weed control. This dry weather pattern was a concern for survival of the planted trees, but subsequent rain has reduced the likelihood of losses. Observation during subsequent site surveys suggests that silver birch and hawthorn may have suffered heavy losses; Douglas fir, Scots pine and Norway spruce might have suffered moderate losses; Sitka spruce and other broadleaved species appear to be growing well with few losses.

Wild Cherry

Despite these setbacks the Estate has been transformed for a better future.

Timeline

First contact with owner	February 2019
Provisional cash flow sent to owner	
Owners confirms wish to proceed	April 2019
First detailed site survey	May 2019
Start of consultation process	
Meetings with residents	June 2019
EIA Screening Opinion Request Form sent to Scottish Forestry	July 2019
Online grant application submitted	January 2020
Office and site meeting with Scottish Forestry to finalise details	
Grant contract issued	April 2020
Grant contract signed and returned	
Start of ground preparation	
Start of deer fencing	
Chemical weed control	
First tree delivery	May 2020
Start of tree planting	
Completion of ground preparation	
Completion of deer fencing	
Completion of tree planting	June 2020

CASE STUDY

Dalhousie Estates

Dalhousie Estates comprise three individual estate areas. In 2017, Tilhill was appointed to take forward a woodland creation project within this 18,000 hectare (ha) Invermark estate, located within the southern edge of the Cairngorm National Park – a dramatically scenic area of the Angus glens.

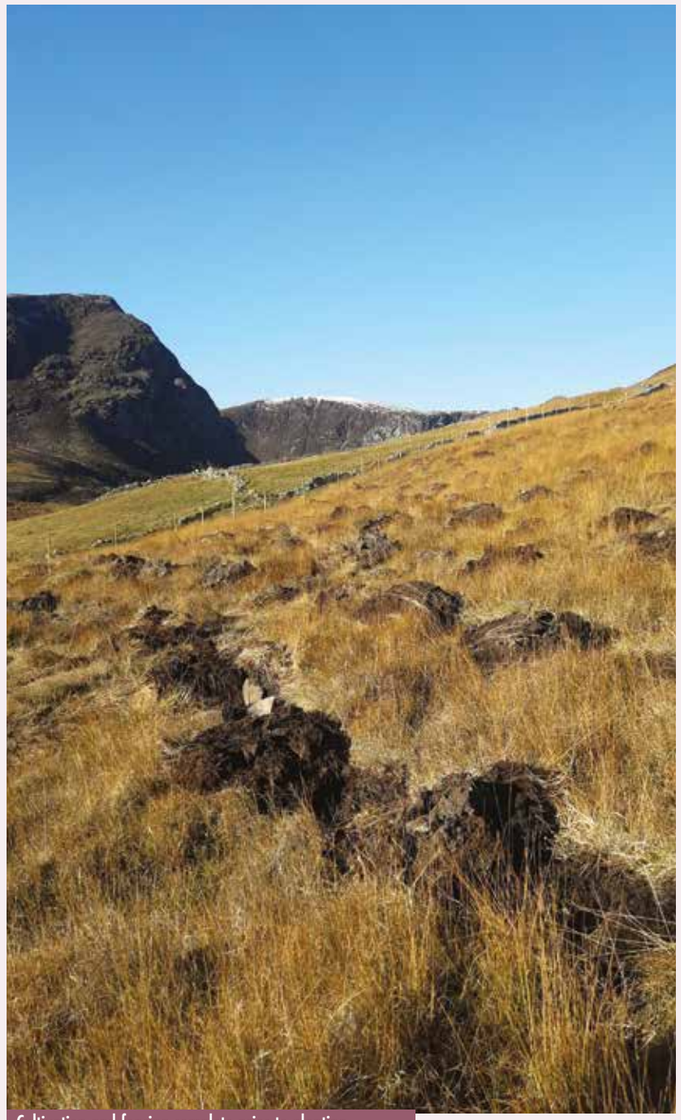
The estate was keen to explore opportunities for woodland creation taking inspiration from the Scottish Government's drive for afforestation, climate change and carbon capture, as well as from having witnessed the experience of south-west Norway's progress towards rewilding their landscape, following reversals of deforestation over the last 100 years.

As a starting point, the estate worked with the land agent to undertake a strategic review to help understand the overarching mixture of land uses, including: a livestock farm, grouse moorland, open moorland 'deer forest', sub-arctic tundra, bog habitats, and a mixture of existing forestry and native woodland.

The review of the 18,000 ha landholding found that approximately 5,900 ha would be capable of supporting forestry. This conclusion provided a basis for further analysis to identify and resolve potentially conflicting land use within the area, including:

- Active tenanted farmland
- Active grouse moorland
- Red deer wintering areas
- The estates existing hydro schemes, and
- Conservation constraints, such as breeding raptors.

Of the 5,900 ha of suitable forestry land, the analysis identified 1,500 ha of potential for forestry, of which 265 ha was existing woodland. As a first phase of works, 125 ha of land was identified for taking forward as a Woodland Creation project.



Cultivation and fencing complete prior to planting

Due to the remote location and distance from the timber markets the Estate opted to progress with a predominantly native woodland development. The area is within the Caledonian Native Pinewood zone which originally covered much of upland Scotland but has been fragmented by centuries of deforestation and overgrazing. Over the last 20 years concerted efforts have reversed this fragmentation.

Tilhill secured Forestry Grant Scheme funding for:

- 42.6 ha of Native Pinewood
- 17 ha of Native Broadleaf woodland, and
- 3.3 ha of Mixed conifer woodland.

An additional 43 ha of land was captured within the 15 km of grouse-marked deer fencing, which included existing regenerating native birch woodlands and important non-woodland wetland and bog habitats.

The project was able to benefit from additional income through carbon grants which helped to bridge the funding gap between the cost of the project and the available Forestry Grant Scheme.

A team of professional contractors undertook fencing and ground preparation works under the supervision of Tilhill Forest Managers over the autumn/winter 2017/18. The elevation of the terrain and the winter weather, coupled with no phone signal on site, culminated in a challenging project to deliver six separate woodland blocks distributed along the lower glens across the Invermark Estate.

Planting works undertaken from January through to March were curtailed by snowfall and prolonged freezing conditions (the 'Beast from the East'). The weather quickly changed from mid-winter to mid-summer conditions in a matter of days and despite a prolonged drought in May/June, at the end of the first growing season, survival and initial growth rates were excellent.

CARBONSTORE

Our Unique Service

Helping you create a cleaner, greener, low carbon economy

With the development of the Woodland Carbon Code (WCC) and the upshot results from the recent Woodland Carbon Guarantee auctions (WCaG), woodland owners can now benefit from an entirely new, and potentially large, income stream.

Tilhill's clients are even better placed to reap the rewards of this exciting new era in woodland ownership. Over the past six months we have been working hard to develop our carbon-offsetting subsidiary, CarbonStore, the key aim of which is to unite landowners and companies who desire to help offset their carbon emission in a transparent, informed and professional way.

CarbonStore is unique. No-one else has our associations or our credentials in woodland planting. We can draw on all the knowledge and expertise gathered under the BSW umbrella of companies in order to bring our clients, be they companies, landowners, or individuals, the very best in the whole process of creating a new woodland.

CarbonStore brings together Maelor Forest Nurseries Ltd, the UK's most progressive commercial tree producer, and Tilhill, who have been creating woodlands for over 70 years.

Unravelling the Mystery

A key function of the WCC is to quantify the volume of carbon sequestered by a woodland of any size, species mix and location. This ability allows (mostly urban-based) companies whose daily operations emit carbon dioxide, to work together with rural-based landowners to neutralise their emissions. One tonne of CO_2e (carbon dioxide equivalent) emissions can be matched against an equivalent tonne of CO_2e sequestered by a landowner's woodland creation scheme.

With the WCC having detailed the rules, the regulations and the processes governing the certification of each ton of sequestered CO_2e, known as Woodland Carbon Units (WCUs), the WCaG then established a price for which they can be traded between buyers (i.e. carbon-emitting companies) and sellers (i.e. landowners). In so doing, the WCaG placed a value on trees' capacity to absorb carbon dioxide.

By quantifying and valuing Woodland Carbon Units, the WCC and WCaG have laid the foundations for a rising tide of money to flow from the corporate sector, where the bulk of CO_2e emissions originate, into the rural sector, which can soak up this CO_2e through its newly created woodlands.

The scale and enthusiasm of these urban-rural fund flows is being intensified by the mounting pressure on companies to achieve net zero carbon footprints. The UK is legally committed to net zero emissions by 2050. However, our current rate of decarbonisation is inadequate to reach this target and rising transparency in corporate emissions accounting is spotlighting the largest polluters. Demand for Woodland Carbon Units is therefore rising.

Farmers' and landowners' ability to help companies reduce their net emissions by planting trees is an increasingly prized service which can generate a potentially lucrative new income stream from their land, especially the marginal, less productive elements. We estimate that the combination of carbon and timber-related income from a new woodland creation project, when combined with grant funded planting, can generate up to £140 per acre annually over 50 years.

> "CarbonStore is unique. No-one else has our associations or our credentials in woodland planting."

CarbonStore™

carbonstoreuk.com
01786 649387

Bringing Us All Together

CarbonStore, together with Tilhill and Maelor Forest Nurseries can help both landowners and companies at every step of their carbon-related woodland creation schemes. Of course, different landowners and companies will wish to participate in these schemes in different ways. In each case, the same knowledge, expertise and services are needed and we are ideally placed to provide them.

CarbonStore can introduce landowners wanting to sell their Woodland Carbon Units to companies keen to buy them, and vice versa. We already enjoy widespread connections in both camps and, amid strong interest all around, this network is growing fast. CarbonStore will also help landowners and companies agree a fair and equitable price for the Woodland Carbon Units. Indeed, when designing the sales process, we have prioritised openness, transparency, and the very best in woodland creation. These are the promises we hang our hat on.

Finally, CarbonStore will advise, explain and guide landowners and companies through the seemingly complex process of registration, validation and sale (or purchase) of carbon units. It is important that both parties find a partner in their woodland project who understands (and respects) each other's needs and constraints and we facilitate this.

Woodland carbon offers exciting opportunities for both landowners and companies. However, the market's infancy, its novelty and its popularity also present risks to capitalising fully from the situation, and there are a lot of misconceptions and false promises out there. CarbonStore's business model prioritises transparency and clarity so that landowners achieve an optimal price for their Woodland Carbon Units.

Standing at this crucial juncture in the industry's evolution, we very much look forward to helping our clients make the most of what is undoubtedly a most significant opportunity.

FOREST CARBON

Forest Carbon

Andy Baker
Carbon Project Manager

According to the International Panel on Climate Change (IPCC), we have less than 11 years to make the step-changes necessary to limit global warming to 1.5°C above pre-industrial levels. Subsequently, more attention is being focussed on woodland creation as a means of tackling the climate crisis than ever before.

But how much of a difference can trees truly make?

When considering these questions, it is essential to bear in mind the myriad of non-carbon related environmental benefits woodlands afford. Flood resilience, air pollution mitigation and soil stabilisation are a few examples of these, which also include the social and economic benefits of planting trees. One enormous indirect carbon emission reduction that is often overlooked comes from material displacement. This is where wood products are used in construction or furniture manufacturing replacing materials with far higher carbon footprints, such as steel, concrete, or plastic.

Woodlands can sequester tremendous amounts of CO_2 from the atmosphere over time. That being said, throughout the life-cycle of a new woodland they have the potential to act as carbon sinks, carbon stores and even carbon sources. This essentially means they can either remove CO_2 from the atmosphere and lock it up in their biomass, maintain a consistent level of carbon in their biomass and remain carbon neutral, or temporarily release more CO_2 than they absorb. These varying states are determined by a multitude of factors species selection, climate, location, soils, site cultivation techniques and more.

Woodland creation in the UK will almost always require some level of cultivation. This can range from the simple clearance of weeds to more significant operations such as mounding or ploughing of the soil. This is an essential step in the establishment of the woodland and will determine the future carbon sequestration (storage) potential of the trees for decades to come. However, any form of site cultivation will release CO_2, to a greater or lesser degree, into the atmosphere. This is largely due to the increased exposure of the organic material in the soil, which elevates levels of biodegradation (essentially respiration of bacteria) thus releasing CO_2. There are a multitude of other processes occurring here, but this is the most significant. Quite logically, as a general rule, the greater the extent of site cultivation, the more substantial the initial carbon release will be. Although, again as a generalisation more significant site cultivation will likely increase the survival rates of the planted trees and improve

> "Tree planting is the cheapest and most effective way of mitigating climate change"

their subsequent yield classes. This means that as they grow, they will be able to absorb more carbon than trees that have had very little cultivation.

The balance between these two factors is critical and is why forest managers must ensure that the level of cultivation is suitable to the site. This is particularly relevant when working on soils with higher levels of carbon content, such as organo-mineral soils. Therefore, the cultivation stage of woodland establishment is more often than not classed as a source of carbon, rather than a sink or a store, although, in reality, any major project will require some level of 'carbon investment'. Think of an average solar panel with a carbon 'return on investment' of approximately three years. It's the same principal. Indeed, everything we eat, wear and utilise has a carbon footprint associated with it. The choices we make on a daily basis can have a far greater impact than you may think.

Back to the forest. Five years on, the trees have been planted and they are now really beginning to sequester carbon. The initial establishment phase is complete and they get busy growing. This is primarily driven by photosynthesis, converting CO_2, sunlight, and water into sugars and oxygen. Counter-intuitively it is complemented by respiration, the conversion of sugars and oxygen into energy, CO_2, and water. As they are growing, photosynthesis dominates this process, and there is a net uptake of CO_2 and a release of oxygen. Over time, the majority of the carbon sequestered is stored in the woody biomass of the tree. Moreover, as leaves and dead limbs fall from the tree as it grows, this material is broken down and increases the carbon stock stored in the soil. This is why when trees are growing rapidly, they are significant carbon sinks.

Once trees reach their apex size, the dominance of photosynthesis and carbon sequestration slows down, almost matching their respiration level. Subsequently, they no longer act as significant carbon sinks, but instead revert to carbon stores. This is a common misconception in public opinion, as terms such as "lungs of the earth" are rather misleading, implying forests continue to sequester significant amounts of carbon no matter their age. In reality, it is in their rapid growth stage that most carbon is drawn out of the atmosphere and sequestered.

Using Sitka spruce as an example, their primary age of rapid growth is between years five and 40. As commercial foresters, we harness this rapid growth and harvest the trees for timber once this carbon sequestration rate slows down. The timber is then converted into products such as furniture and building materials, locking away the stored carbon for the lifetime of the product, potentially for hundreds of years. As mentioned previously, the material displacement of steel, concrete or plastic can lead to a tremendous amount of avoided carbon emissions which are often overlooked.

In summary, trees, quite simply, absorb and store carbon. The rate and longevity of this process is dependent on various factors, primarily on the tree species selected. Ancient woodlands act as fantastic carbon stores, both in their own biomass and the soils beneath them. However, arguably the most effective method of enhancing rapid carbon sequestration is afforestation, hand in hand with ongoing professional management. This is dependent on appropriate cultivation of the soil pre-planting, considerate management and thinning during the major growth phase of the trees and a carefully planned harvesting operation once this growth rate slows down.

If this timber is then converted into products and building materials as the harvested area is being replanted, we'll be well on our way to a sustainable society.

CARBON RESEARCH

Carbon Deep

Trees are good for the environment, not least because they naturally absorb carbon and lock this away in timber which, if gainfully processed and utilised, will maximise their potential to assist with counteracting climate change.

Changing land use to plant more trees is therefore being proposed by the devolved UK governments as one of the component steps required to adjust our society towards net zero emissions over the next 25 to 30 years. However, there are difficult trade-offs to balance, and reducing UK emissions would be invalidated if we then import goods from places with either even worse emissions, produce substantial carbon in transportation (or both), or reduce emissions in one land-use technique but increase it elsewhere.

In April, the UK Government's advisers, the Natural Capital Committee, highlighted that conserving soil carbon must be taken into account with land use change proposals – UK soils contain 4 billion tonnes of carbon (94% of the total biological stock). Or planting millions of trees to increase carbon sequestration in the longer term would be negated if, in the shorter term, the cultivation disturbance caused a significant release of soil carbon.

Fortunately, since the 1990's, no new woodland planting on peat bogs has been permitted, with the currently accepted threshold peat depth limit of 50 cm calculated from research evidence (balancing carbon release from soil disturbance against accumulation in the timber grown). Whilst our most carbon-rich soils are protected, this does not mean that we have room for complacency with regards to soil carbon stocks or site management practices that could decrease carbon stocks. This has been a major challenge faced by Scottish Forestry's Customer Representatives Group, who are tasked with updating the Woodland Creation Cultivation Guidance for Scotland.

Consultation began in 2015 to identify the current cultivation practices and techniques to provide an update to *Bulletin 119 Cultivation of Soils for Forestry*, originally published in 1999.

Reviewing research papers in late 2018 quickly established just how difficult it would be to unpick the details required to help draft appropriate guidance. For example, most of the UK research sites were on peat depths that we would not now be allowed to plant, using cultivation techniques considered as too invasive and therefore would incorrectly predict potential soil carbon losses. There was also very limited UK-specific soil carbon research and information on non-peat soils.

At this point Tilhill was approached by a PhD student, Hamish Creber, seeking an industry work placement. His PhD topic is to investigate the use of bio-charcoal to improve forest soils for carbon storage and to assess its impact on tree growth. This was too good an opportunity to pass and Hamish kindly agreed to develop a model to predict the impact of woodland creation cultivation on soil carbon, with the intention that this would inform the final draft of the Woodland Creation Cultivation Guidance.

It quickly became apparent with the developing net zero emission targets and timescales that our model needed to predict the net carbon flux over time for different soil types, cultivation and establishment methods, tree species and growth rates to include all carbon inputs and outputs over a rotation – from the sapling to the final tree crop.

Andrew Vaughan
Tilhill North Scotland region manager and ICF representative on Scottish Forestry's Customer Representatives Group.

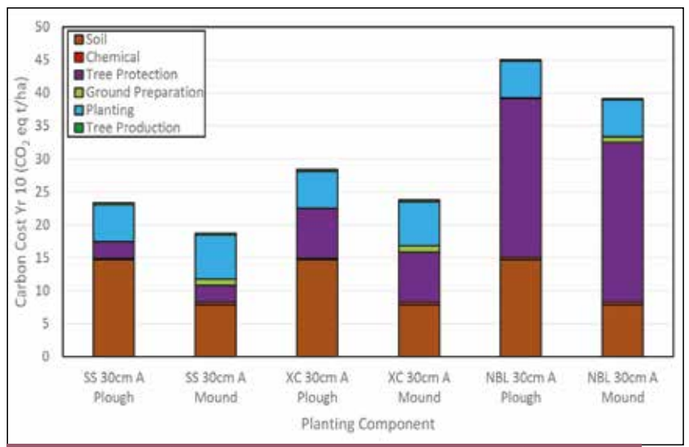


Figure 1 – Breakout of carbon costs (expressed as per ha rate) at year 10 for planting components in a typical 200ha woodland creation in a Surface-water Gley.

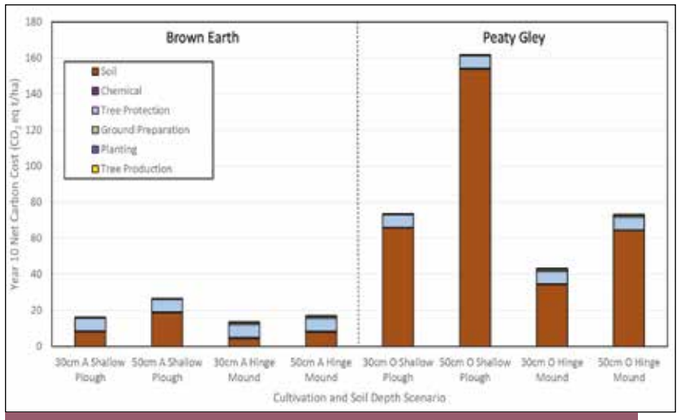


Figure 2 – Modelled results of Year 10 carbon costs (CO2 eq) for a typical 200 ha conifer woodland creation scheme (expressed as per ha rate) for two different soil types, O/A horizon depths and 2 different cultivation methods.

Hamish embraced the challenge. The result is an accurate model that predicts carbon emissions and sequestration for different soils and establishment methods, also calculating the time of net zero emissions and presenting graphs of carbon flux over time.

Sample simulations can be run to compare different establishment options (eg using plastic tubes versus fencing), tree species (eg productive versus native) and to understand the impact of different species growth rates. Once peer reviewed by Forest Research, the model will allow Tilhill managers to make evidence based decisions to reduce establishment emissions and to optimise net carbon storage.

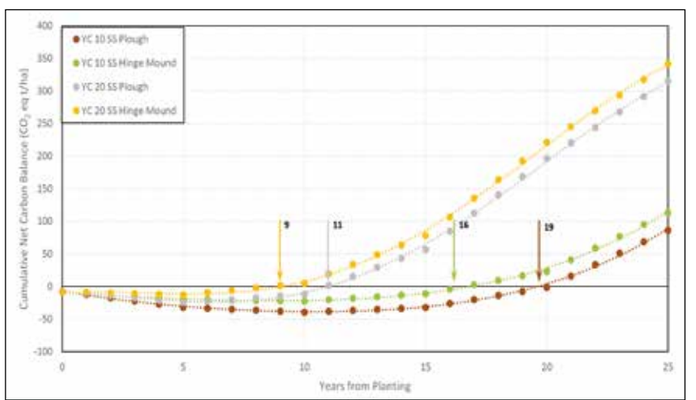


Figure 3 – Cumulative net carbon balance for modelled SS woodland creation expressed per ha for 2 yield classes and 2 cultivation methods for a 20cm O horizon peaty gley (year of net zero is shown by arrows).

The early results are promising and have allowed some broad assumptions to be tested. The initial key learning points include:

1. Optimal silviculture is generated by focussing on inputs to improve tree growth rates which, in turn, generate increased carbon storage and result in a higher and faster net carbon benefit. In other words, the effects of good silvicultural establishment on tree growth outweigh differences in associated emissions.
2. The carbon flux is less sensitive to other contributing factors such as (in decreasing importance): soil type, cultivation technique, use of plastic tree protection, cultivation machinery type and use of pesticides.
3. Previously cultivated Brown Earth soils release relatively little soil carbon from woodland cultivation thus are the most suitable soil type for woodland creation.
4. Ground preparation technique generally has less influence on the end rotation carbon balance than growth rate. Thus, provided above average tree growth rates are achieved, the ground preparation technique is of less consequence.
5. On organo-mineral soils, ground preparation technique may considerably delay the year of net zero, depending on organic horizon depth. This delay is most pronounced in low yield species or environments. High yield production forestry provides the greatest opportunity for greenhouse gas removal from woodland creation by 2045, with biomass accumulation compensating for soil carbon loss.

In Conclusion

It stands to reason that a responsible industry, will seek to impartially understand the potential impacts of its activities and to develop better alternatives to satisfy the objectives and needs of our growers, stakeholders and wider society. With that comes the risk of having to adapt different techniques for establishing and growing timber, but with the potential reward of generating additional financial value from carbon accumulation. Future challenges to address include modelling carbon fluxes beyond the forest gate and on into subsequent rotations, which will, in turn, inform restocking cultivation and thinning regimes.

The Canons

Tilhill was invited by Merton Council to join them in a 34 week project to help restore elements of this historic property dating back to the 1680s. The overall project value totals £4.4 million and includes restoring the façade of the house, all funded by the National Lottery and its Parks for People scheme. The project is currently ongoing.

Tilhill's works total £1.2m and include:

- Removal of existing surfacing, fencing, furniture and play equipment.
- Installing a new playground to existing north car park including new safety mat and resin bound gravel surfacing.
- Improvements to existing footpaths and car park areas including hard surfacing, fencing, gates street furniture and soft landscape works.
- Pond improvement works including clearance, new pond lining and drainage, and marginal planting.
- Restoration of the walled garden and Obelisk.
- Installation of new lighting and footpath creation.
- Environmental mitigation works.

The Canons House

The pond requiring clearance, lining, and marginal planting works.

Railway Technical Centre Derby

This project was aimed at refreshing the tired and outdated landscape of what was once the largest railway research complex in the world. It was also used as the then British Rail's technical headquarters in the 1960s.

The main works for this project included site clearance, hard and soft landscaping, creation of new car parking and associated drainage, lifting and relaying of granite setts, new flag paving, raised lawn area with Corten steel edging, pond improvement works, site furniture and the planting of semi mature trees and shrubs.

The site now boasts a relaxing and enticing environment for the 1,100 strong workforce whilst promoting biodiversity.

Urban Greening – Sudbrook Naturalisation Project

Tilhill was approached after Gloucester City Council secured funding from the European Regional Development Fund to improve/create around 250 hectares of habitat across a number of sites in Gloucestershire.

The first of which was the Urban Greening – Sudbrook Naturalisation project. Works started and finished last year and included a 12 month maintenance programme.

Work involved removing this concrete watercourse

The aim of the project was to create a wildflower meadow.