ROYAL FORESTRY SOCIETY

MANAGING ASH DIEBACK CASE STUDIES 2019

In partnership with

Forestry Commission

Introduction

Canopy decline near Eastbourne

Ash dieback (formally known as Chalara) is caused by the fungal pathogen Hymenoscyphus fraxineus and was first identified on ash trees in the UK in 2012. It is now thought to have been present at lower levels since 2005/6 or earlier, having arrived both on imported planting stock and via spore masses blown across the Channel from mainland Europe.

This document presents examples of a range of approaches being used to manage ash dieback in woodlands and the issues encountered along the way. All those featured in the case studies are happy to be contacted for further information. A brief overview of the disease is given here and pages 16–18 give details of further guidance and reading.

Ash dieback is present in all counties of England and in large areas of Wales. Experience in mainland Europe suggests that the majority of ash trees in woodland infected with the disease could decline and die over the next 10–15 years.

The current population of the pathogen in Europe consists of two genetically divergent strains and the introduction of further strains could have significant consequences for the level of virulence. Therefore, a Plant Health Order continues to prohibit all imports and internal movement of ash seeds and planting stock.

The total cost of ash dieback to the UK is estimated to be £15 billion, half of which will be incurred over the next ten years (report published in *Current Biology by University of Oxford*). Almost one third of this cost arises from safety felling of dead and dying trees and almost two thirds from loss of benefits provided by trees, e.g. water and air purification and carbon sequestration. The remaining few percent is composed of research and replanting costs as well as a loss of profits to the forestry and nursery sectors predicted to be £78 million and £2 million respectively.

Ecology and symptoms

Symptoms of ash dieback include leaf loss, crown dieback and bark lesions in affected trees. Spores from the fungus colonise ash foliage which eventually falls to the ground where the fungus overwinters in the central leaf stalk (rachis) before fruiting and releasing more spores in the spring. The fungus often goes on to colonise branches and can infect the lower stem through lenticels - raised pores in the bark that allows gas exchange between the atmosphere and the internal tissues.

These symptoms can cause mortality directly or stress the tree to the point where it succumbs to secondary pathogens. Honey fungus (Armillaria spp.) in particular can colonise weakened trees resulting in root or lower stem rot. Heavily affected trees can become brittle and unstable making them dangerous to climb or to fell by chainsaw or manually, and present a potential hazard particularly along road sides and in areas of public access.

Away from woodland and especially in urban settings, low spore levels and a lack of secondary pathogens may mean trees are barely affected. In addition, research suggests that some ash trees (1-5 %) will have genetic tolerance to the fungus. Clones taken from these trees are being planted as an archive to provide material for a breeding programme to generate stocks of resilient native ash to plant in the future.

Symptons include basal lesions

Ash dieback weakens trees increasing susceptibility to secondary pathogens such as honey fungus - Armillaria spp.

What you can do

The approach taken to management of woodland will depend on individual management objectives, the age and proportion of ash, the site conditions, and the level of infection. There is no approved or efficient preventative or curative treatment (i.e. silvicultural or chemical approach) that will alleviate or mitigate the effects of ash dieback. However there are actions all landowners can take:

- **Planning:** Consider the impacts that ash dieback may have in your woodland. Where possible, update or create management plans to take into account current or future impacts of ash dieback and re-prioritise operations accordingly. Having a felling licence and other permissions in place prior to the worst effects will allow greater management flexibility should the need to fell dangerous trees arise.
- **Safety:** Safety is a primary objective of all landowners.

  Public safety: *Trees and woodlands should be risk zoned, monitored and managed to an appropriate protocol. Monitoring is likely to have to be carried out at increased frequency where ash is adjacent to roads, facilities and areas of public access.*

  Safety of forestry operators: *The works manager should ensure all those working with diseased ash trees are aware of the risks and trained to an appropriate level.*

- **Restrictions:** The felling of diseased ash within woodlands continues to require a felling licence from the Forestry Commission unless they are dead or pose a real danger. Woodland owners and managers should also be aware of the good practice guidance on European Protected Species and any Tree Preservation Orders on the site.
- **Silviculture:** Where timber production is a primary objective, the best way to reduce future disease impact is to promote fast, healthy growth of selected trees and ensure high standards of silviculture. Where biodiversity is more of a priority, suggestions include maintaining potentially tolerant trees as long as possible, promoting conditions for natural regeneration of both ash and other species, and underplanting.
- **Locating tolerant trees:** Ideally, ash trees which appear to be less affected than those around them should be identified when in leaf and promoted in subsequent operations. Consideration should be given to windthrow risk and possible changes in the water table. Natural regeneration from potentially tolerant trees should be encouraged.
- **Biosecurity:** Good biosecurity standards should be followed including cleaning/disinfecting boots and equipment before entering and leaving a wood, and sourcing planting stock responsibly. Reporting of suspected ash dieback is only required in areas where it has not already been reported.

Restocking

Woodland owners and managers can apply for a Countryside Stewardship Tree Health Grant to support the cost of restocking due to ash dieback. Consult the Forestry Commission web pages or speak to your local Woodland Officer to find out if you are eligible. There is no single species that can be a replacement for ash. Choice of restock species will depend on management objectives, site conditions (soil, aspect, climate) and designations.

Detailed guidance on appropriate species to mitigate the impact of ash dieback from an ecological perspective can be found in Forestry Commission guidance (FC Research Note 029). The Ecological Site Classification tool can also help to identify tree species that will be well suited to the site but accurate soil and/or ground vegetation information is essential to achieve reliable outputs.

Use trees bought from responsible and sustainable sources with a known provenance. If restocking with native trees, the Forest Research report *Genetic considerations for provenance choice of native trees under climate change in England* identifies factors which may influence the risk, suitability and desirability of the use of local versus non-local seed under climate change. The prevalence of deer and grey squirrels can impact the success or failure of any restocking and this must be taken into account. Soil condition is another critically important factor. Sites should only be worked in conditions which will avoid compaction and/or erosion.

Regeneration from a stand using coppice shoots from infected felled trees is not recommended as recent observations in East Anglia have shown that over 80% of coppiced ash dies within four years.

Links to further information are provided on pages 16-18 in this report.

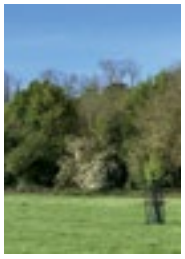
Case studies

The case studies brought together here represent some of the scenarios woodland owners and managers are faced with in light of ash dieback. They are not prescriptive but aim to demonstrate the variety of possible responses which may be applicable dependent on local factors and management objectives. Follow the live links to the case studies or scroll through the report to read them all.

Backhouse Wood, Ashford, Kent:

Group felling of areas most affected by ash dieback in a small woodland; contributing material to the breeding programme for tolerant ash

Page 4



Burghley Woods, Cambridgeshire:

Pre-emptive felling and innovative restocking in Grade II listed landscape*

Page 5

Harting Down, roadside safety partnership approach, West Sussex:

Multiple landowners share costs to enable safety felling along 1.5 km section of B road

Page 6

Hockeridge and Pancake Woods, Hertfordshire/Buckinghamshire borders:

Thinning of ash to achieve commercial return while retaining tolerant trees in Ancient Semi-Natural Wood (ASNW)

Page 7

Norbury Park, Surrey:

Regeneration felling of ash within 30m of high risk areas including footpaths in Site of Special Scientific Interest (SSSI) and Special Area of Conservation (SAC) landscape

Pages 8-9

Norfolk Estate, Arundel, West Sussex:

Restocking with mixed species following rapid deterioration and clear felling due to ash dieback in a 7.5 ha compartment

Page 10

Old Wood, Yorkshire:

Wait-and-see approach to 30-year-old ash with natural regeneration of sycamore being encouraged as potential secondary crop

Page 11

Warren Woods, Somerset:

Ash coppice grown for walking sticks business. Potential change in coppice species to retain specific business interests

Page 12

Watersend, Kent:

MOD land with Site of Special Scientific Interest (SSSI) designation, bringing over-stood coppice back into rotation for safety and for timber return

Pages 13-14

Weston Park, Gloucestershire:

Pre-emptive fell and restock with oak and beech in Area of Outstanding Natural Beauty (AONB)

Page 15

Backhouse Wood, Ashford, Kent

Backhouse Wood felled ash and retained tolerant trees and other species

Key points

- *Mix of ash dominated Ancient Semi-Natural Woodland (ASNW) and Plantation on Ancient Woodland Site (PAWS) undergoing restoration*
- *Dieback of ash observed since 2007/8*
- ***Small scale on-going management with potentially tolerant trees retained and monitored***

Tolerant ash trees adjacent to those with ash dieback

Ash removed, understory and tolerant trees retained, restocked with oak

Backhouse Wood is a 30ha ancient semi-natural woodland owned and managed by Jim and Mary Reid. It is on the heavy clays of the Low Weald adjoining the floodplain of the East Stour river. Large parts of the wood are flooded each year.

Substantial areas of the woodland were felled and replanted with poplar and conifers during World War 2 and remained unmanaged until 2001. In 2001 the Reids took ownership of the wood and set about promoting existing broadleaves and restoring the PAWS areas. The woodland is now composed of 60% ash (of varying ages up to 70 years) with poplar, hornbeam, chestnut and oak.

The objective of management is to restore the ancient semi-natural woodland while producing timber.

Ash dieback was first observed in the wood in 2007/8.

Interventions

Having promoted ash for many years, the Reids have been prioritising its removal alongside the remaining poplar since 2012/13. Each year, 0.5 – 1ha areas are felled with areas more heavily affected by ash dieback prioritised.

A key motivation is to maintain the genetic diversity of the ash population. Potentially tolerant trees throughout the wood have been located and cuttings taken from these to become part of the breeding programme for tolerant ash. Any ash which appear less affected than those around them are left standing and natural regeneration from these will be monitored.

The owners carry out the felling themselves using chainsaws* and use contractors with a tractor and forestry trailer to extract the timber to roadside. In 2018/19 this created three lorry loads of timber which went for local firewood processing. The sale of the timber covered the extraction costs but not the time and effort put into felling and managing the wood.

Restocking

Up to now, restocking has taken place at the owner's expense with pure oak at approximately 2 x 2m spacing. However a Tree Health grant for restocking is currently being applied for and future restocking will use a wider palate of species including cherry, field maple and wild service. Group planting of oak at tighter spacing to improve form will be explored with other species and natural regeneration used in the wider matrix.

Lessons learnt

The Reids have observed dieback of ash for many years and began felling heavily diseased ash earlier than many. They suggest that planning and management should begin sooner rather than later, especially if trees are suitable for timber.

**NB, hand felling of ash with dieback should be avoided where possible and otherwise should be carried out by a competent person trained in how to manage the particular risks involved.*

Contact: **Jim Reid**, Woodland Owner
Email: **jimreid48@hotmail.com**
Call: **01303 261878**

Chabonel Wood, Burghley, Cambridgeshire

Bottle Lodges – a park view framed by Chabonel wood

Key points

- *150-200 year old ash being felled to achieve optimum timber values*
- *Grade II* landscape listed on the Register of Parks and Gardens*
- *Restocking informed by Ecological Site Classification system includes natives and non native species*

Backdrop of mature P1800 ash behind a younger P1974 mixed hardwood planting established to ensure internal landscape continuity within the park and the approach to Bottle Lodges

Burghley park was extended by Capability Brown and Chabonel Wood was planted in the late 18th/ early 19th century to compartmentalise the new extension. The Bottle Lodges were built just after Capability Brown to celebrate the Cecils' 'promotion' from Earls to Marquis. The Chabonel Wood frames that internal park view.

Around 40% of the compartment is ash with some outstanding examples of mature trees. The remainder is sycamore, horse chestnut and hornbeam with around 20% of the area open ground following windblow.

Ash dieback was first spotted on ash regeneration elsewhere on the estate in 2017/18 but has not yet impacted the mature trees in Chabonel Wood.

Management objective

Preserving the Capability Brown historic landscape is a primary objective. The Chabonel sub compartment forms part of the backdrop that frames the view from the park to Bottle Lodges.

There is no public access into the compartment but health and safety across the estate is key.

Interventions

The aim is to remove the mature ash in the compartment while it is still healthy to maximize its value. The timber – estimated 350m^3– has been sold standing and will primarily be used for furniture.

As a mature stand, the felling is part of an existing management plan. The quality of the ash stems is expected to deliver an income of 60-70% above expenditure for the works.

The compartment is screened by plantings that took place in the 1970s (partly as a result of storm damage). To retain the historic landscape and views it is vital that the compartment is restocked so that the new trees are mature before the screening requires harvesting.

Felling is expected to begin in October/November 2019 with planting likely to follow in March 2020.

Restocking choices

The estate is not just facing the challenges of ash dieback; horse chestnut is suffering from canker and sycamore from sooty bark. These species were therefore not considered options for replanting.

The following mix has been agreed to help build resilience into the wood against future pests, diseases and climate change.

15%	small leafed lime	5%	wild cherry
10%	hornbeam	15%	Norway maple
10%	pendunculate oak	10%	wild service tree
10%	black walnut	10%	woody shrubs
5%	red oak	5%	Turkish hazel
5%	European walnut		

Recommendations

The Forestry Commission's Ecological Site Classification decision tool is easy to use to determine site adapted species but local soil data must be added by the user to ensure an accurate result.

Contact: **Peter Glassey**, Head Forester, Burghley Estate
Email: **Peter.Glassey@burghley.co.uk**
Call: **07714 127146**

Harting Down, West Sussex

All ash within one tree length of the road cleared

Key points

- *All ash felled within one tree length along 1.5km of the B2141*
- *Ash dieback first observed in 2015*
- *Two-week road closure costs shared between three adjacent land owners*

Forwarders at work on the B2141

The B2141 crosses the main ridge of the South Downs between South Harting and Lavant. Descending southeast from the ridge the road is wooded on both sides and traffic often travels at high speed. The woodland along this section of road is under multiple ownerships with large parts belonging to the Uppark estate and the National Trust.

Soils are a mixture of rendzinas and calcareous brown earths. The woodland is made up of multiple compartments including 1940s beech, pine and larch plantation, yew woodland and mixed broadleaves including ash, sycamore, oak and field maple. The mixed broadleaves dominate the immediate road edge forming a closed canopy over the road. Ash constituted approximately 50% of this including veteran trees and regeneration of various ages.

The majority of the woodland was historically under-managed but large sections were thinned in 2013 with the aim of removing mature ash over successive thinnings to promote the sycamore understory and manage on a continuous cover basis. Ash dieback was later observed in 2015.

Interventions

High levels of dieback were evident in the ash and safety of road users was a major concern for land owners, especially following windblow of infected trees across the road. MJO Forestry Ltd, initially working with Uppark estate engaged the National Trust and a further private estate to agree coordination of works. This resulted in the cost of a two week road closure along 1.5 km of road being shared between the three owners.

After discussions with the Forestry Commission, all ash were felled within one tree length of the road.

While public safety was the primary motivation for the works, realising the commercial value of the timber was important as this funded what would otherwise have been a costly operation. There was minimal timber for quality logs and felled ash went as cordwood to MJO's established local clients.

Lessons and recommendations

Few concerns were raised by the public about this felling. Those that were centered around the perceived untidiness of the lop and top. Biomass markets for leaf free lop and top may allow this material to be removed in future.

MJO Forestry Ltd has witnessed a range of responses from woodland owners to ash dieback. They advise owners to create a plan for managing public safety at the very least, and begin to implement ash management in a way which balances other estate interests, funds the tree safety work and leaves them prepared should the effects become more severe.

Notice of works

Contact: **Marc Odin**, MJO Forestry Ltd
Email: **marc@mjoforestry.com**
Call: **01243 811806**

Hockeridge and Pancake Woods, Herts/Bucks

Thinning out the most diseased ash in Hockeridge Wood

Key points

- *Mixed woodland on the edge of the Chilterns Area of Outstanding Natural Beauty (AONB) with some areas of Ancient Semi Natural Woodland (ASNW)*
- *Ash dieback identified in two compartments in 2018*
- *Diseased ash being thinned to meet management objectives for income from firewood and to maintain safety*

Thinning is bringing more light to the woodland floor to encourage an increase in important woodland flora species

Hockeridge and Pancake Wood is owned by the Royal Forestry Society (RFS) and situated between Ashley Green and Berkhamsted on the Hertfordshire and Buckingham border, on the edge of the Chilterns AONB.

It consists of 74ha of mixed woodland and single species plantations (PAWS). There are also a number of specimen trees. Ash is not a major component of the wood but grows mainly on the chalkier valley sides at around 150m above sea level.

Interventions

Ash dieback was first confirmed in 2018 in two compartments totalling around 4ha. These compartments are an ash/sycamore mix with a hazel understory and had been previously thinned in 2012/13.

Once ash dieback was confirmed a decision was made to thin those trees which had been identified with ash dieback under licence in early 2019 - approximately 15% of the trees. Many were 20-30cm DBH and thought to be around 50 years old.

Looking ahead

It is hoped the thinning operation will slow the progress of the disease within the woodland. The remaining ash trees will be regularly monitored in summer and it is likely that further thinning or group felling will be necessary.

Ash is scattered within a number of other compartments and there are concerns where ash trees are beside roads and paths. These are being actively surveyed in line with a proactive health and safety policy and it is likely they will need to be removed in the next few years – a potentially costly exercise.

Financial implications

Ash thinnings were sold standing for firewood and generated income which more than covered the costs of work. In the future decisions may need to be made about whether to thin sooner rather than later to sell some better quality timber before it deteriorates.

Opportunities

The compartment is an ASNW and has a rich diversity of indicator flora such as bluebells. The decision to thin at 15% enables the woodland canopy to be maintained while increasing the likelihood of locating tolerant ash. The increased light levels will encourage the ground flora and understory and may promote natural regeneration.

In another compartment in Hockeridge Wood, where beech had been extensively thinned in 2014/15, there are high levels of ash and other species regenerating. The ash regeneration may act as a useful nurse to other regenerating species in particular, sycamore, hornbeam and hazel. While some ash may reach maturity it is thought that most will eventually succumb to the disease.

Contact: **John Morris,** Manager
Email: **woodlands@chilternsaonb.org**
Call: **01844 355503**

Norbury Park, Leatherhead, Surrey

Furniture quality logs for export

Key points

- *Large areas of under-managed ash regeneration following loss of beech in 1987 storm*
- *Ash felled within 30m of high risk areas including footpaths*
- ***Majority of timber sold to wood fuel market with a small proportion sold for furniture***

Ash trees suffering from dieback prior to intervention

Norbury Park is a 500ha site on the shallow clay soils of the North Downs managed by Surrey Wildlife Trust. Just over 140ha of the site, including much of the 206ha of woodland, are designated as a Site of Special Scientific Interest (SSSI) and a Special Area of Conservation (SAC).

Ash accounts for around 15% of trees across the site. Large areas of the site were previously beech dominated but regenerated with ash following the loss of beech in the 1987 storms. Other species include beech, yew, oak, elm and holly. Woodland across the site has been historically under-managed and in places the ash is closely spaced with poor diameter growth. Ash dieback was first recorded in the woodland in 2016.

Interventions

Norbury Park is an extremely busy site and footpaths, bridleways and boundaries bordering houses and roadside are categorised as high risk zones in the Trust's tree safety planning. Site wide assessments of the location and condition of ash were carried out and combined with this zoning information to prioritise safety works. This process confirmed that there were large areas of unthinned even-aged ash with high levels of infection overhanging busy tracks and footpaths.

The decision was taken to remove all ash within 30m (two tree lengths) of high risk locations across 20ha of the most ash dense part of the site. This area was approximately 75% ash by canopy cover with a DBH range up to 55 cm.

A regeneration fell was carried out in Jan/Feb 2019 with non-ash species being retained. Due to the sensitive nature of the site, it was a requirement of the SSSI consent that where non-ash species had to be felled to enable ash to be removed, the logs were left on site for dead wood habitat. Ash in lower risk areas will be left standing with the objective of locating potentially tolerant trees and retaining as much of the designated habitats as possible.

Economics

In total, 7.3ha of ash were harvested. This resulted in 1500 tonnes of timber to wood fuel markets and a further 60 logs of furniture quality to the export market. The income generated from the timber covered the cost of operations and the extensive surveying for European Protected Species (EPS) carried out prior to the operation. However, the cost of further surveys, mitigation works and soft take down of some ash trees retained for EPS will lead to a small net cost.

Separating logs for sale

Norbury Park, Leatherhead, Surrey

Leaving beech and other species standing

Throughout the works banksman were stationed on adjacent footpaths to meet members of public

Restocking

A long period for facilitating natural regeneration was agreed with Natural England and the Forestry Commission in order to find potentially tolerant ash and maintain the genetic stock of other species on site.

Regeneration will be monitored and if it has not reached sufficient levels after six years restocking to achieve 1600 stems/ha of mixed native broadleaves will be required.

Lessons learnt

- Extensive EPS surveys were carried out by ecologists in the months prior to the operations and potential bat roosts marked for retention. However, in future operations surveying and planning of mitigation works will begin up to a year in advance. It is also important to engage local species interest groups early.
- A large amount of staff time and communications expertise was required to communicate plans and deal with queries. In part, this may be due to the fact that aside from coppicing and some Plantation on Ancient Woodland Site (PAWS) restoration, little large scale forestry has been seen at the site since the late 1980s.
- Conversations with the Forestry Commission and Natural England started in August/September 2018. However, due to the complexity of the site the timescales to receive licenses to undertake the work were longer than expected.

Tree shears are used for soft felling of ash trees

Contact: **Leigh Thornton**, Estate Manager, Surrey WT
Email: **Leigh.Thornton@surreywt.org.uk**
Call: **01483 910087**

Norfolk Estate, Arundel, West Sussex

Chipping branch wood on site

Key points

- *Pure ash on the South Downs*
- *Clearfelled following rapid deterioration in the condition of ash*
- *Restocked with a mixture of site adapted species*

Planters at work on a tidy restock site with retained beech

The Norfolk Estate is located centrally along the length of the South Downs and close to the town of Arundel. There are large amounts of ash present across the estate on a range of calcareous soils. Ash dieback was first identified in the woodland in 2014.

This case study focuses on a 7.5 ha compartment on the thin rendzina soils of the steep northeast facing scarp slope between 10 and 70 metres above sea level. This consisted of almost 100% ash approximately 40 years old and last thinned in 2007. The site is designated ancient woodland, within a registered parkland, and parts are within an area of Special Scientific interest (SSSI).

Interventions

There were three reasons behind the decision to work this compartment. Firstly, while an extremely rapid demise in the health of the ash had been observed, the timber was still in saleable condition. Secondly, safety surveys identified a public footpath along the southern edge of the site as a high risk area. Finally, the harvester available was not capable of felling some larger trees so it was important to work the stand while it was still possible to fell by hand.

Works were carried out over three months in autumn 2018. Due to the lack of natural regeneration and the intention to restore the site to a more diverse and locally adapted species composition the compartment was clearfelled. Areas were left standing along one edge to maintain a pheasant drive and around a disused chalk pit containing some veteran beech.
A condition of the harvesting contract was that the site be left ready for planting with no stumps left higher than 3 inches. This combined with the good weather conditions and brash removal have led to an extremely tidy restock site.

Markets

Hurley's were cut from the lower part of the trees if they were suitable. Branch wood was harvested in addition to round wood and chipped on site for removal to wood fuel markets. The felling operation more than covered its costs.

Restocking

A Tree Health Grant covered most of the costs of restocking the site with 6400 cell grown broadleaves (40% beech, 30% sycamore, 15% whitebeam, 10% field maple and 5% yew) in 1.2m tree guards. Although all well suited to the site, the species choice was influenced by site designations and maintenance of landscape character.

Lessons learnt

Key to the overall success of the operation was working with safe, trustworthy and reliable contractors. There are fears there may be too few qualified contractors as the full impacts of ash dieback are realised.

**NB, hand felling of ash with dieback should be avoided where possible and otherwise should be carried out by a competent person trained in how to manage the particular risks involved.*

Contact: **Mark Aldridge**,
Head Forester, Norfolk Estate
Email: **mark.aldridge@norfolkestate.co.uk**
Call: **07775 743075**

Old Wood, Yorkshire

Old Wood natural regeneration with sycamore

Key points

- *75% ash on magnesium limestone*
- *Sycamore regeneration is being encouraged*
- *A wait-and-see approach is being adopted while 30-year-old regenerated ash continues to grow*

Old Wood

Old Wood has a high proportion of ash. Most of the ash has regenerated since 1986.

The woodland has previously been thinned on rotation and was respaced seven years ago to favour trees with good stem form.

There is also a considerable quantity of naturally regenerated sycamore in the wood. This was previously considered to be a useful nurse to ash regeneration but is now likely to become a crop in its own right.

Ash dieback was first noted in the woodland in 2016.

Management objective

A commercial return is the main management objective. There is no public access within the woodland.

Ash had been seen as a reliable crop with multiple potential markets. Past thinnings have been sold primarily for wood fuel, although some high quality stems were sold to the export market.

Interventions

Many of the regenerated ash trees are now 25 ft high. While there are signs of ash dieback in the woodland it is not extensive. Ash is continuing to grow and a decision has been taken to monitor the woods for further progress of the disease.

This 'wait and see' approach will help identify any individual trees which might prove to be genetically tolerant of the fungus.

There is a recognition that many of the ash are likely to succumb to ash dieback over a period of time and market prices will be a key factor in deciding at what point to thin or fell.

Meanwhile, with growth continuing, the trees are increasing in size and hence potential final crop value without significant deterioration to the timber.

Restocking

Natural regeneration of sycamore is being encouraged as a secondary crop which it is hoped will have a commercial return in several decades time as it replaces the ash.

Contact: **Andrew Woods**, Manager
Email: **woodsfortrees@yahoo.co.uk**
Call: **07957 867472**

Warren Wood Classic Canes, Somerset

Ash coppice with standards

Key points

- *Annual coppice crop supplies home grown ash for walking sticks – a unique selling point*
- *First signs of ash dieback 2016; widespread in 2018*
- *Business may consider replacing ash coppice with hazel or hazel/ blackthorn mix*

2018 sticks harvest

Carrying sticks on a telehandler

The 7ha Warren Wood was planted as ash coppice nearly 40 years ago by Ben and Diana Porter when they established their Classic Canes business. Their daughter Charlotte Gillan is now the Managing Director. Ash was considered to be a reliable crop, with a strength which made it ideal for the end products – rustic walking sticks.

The woodland is on chalk soils and intensively planted with coppice spaced at approximately 1.2m. A few of the trees have been left as standards but most are coppiced on a rotation of about four years.

Classic Canes has grown into an international wholesale producer and supplier of walking sticks. It also has hazel coppice woodland which supplies hazel walking sticks and it sources further materials from around the world.

Impacts

It takes around four years to grow an ash walking stick. Once cut, sticks are barn dried for 1-2 years before being steamed, straightened and formed.

Current stocks being manufactured were coppiced in 2016 and 2017 and remain largely free of ash dieback. Materials coppiced in 2018 and onwards are unlikely to be suitable for walking sticks. Ash dieback discolours the wood and leads to loss of its integrity and strength, making it unsuitable for steam bending or for weight bearing.

Some of the coppice which is partially damaged by ash dieback may prove to be of use for shorter, non weight-bearing products like umbrella handles. However this would be in limited volumes and will not replace the lost product volume of walking sticks.

Interventions

By summer 2018 ash dieback was widespread within the coppice although the standards have not been affected. Charlotte and her team are waiting to see whether the woodland recovers at all in 2019 and whether any of the coppice looks resistant to ash dieback before making long-term decisions.

One option being discussed is to partially or completely remove the ash and re-plant with hazel - a proven and popular alternative to the ash walking sticks but of a different colour. Replanting with a hazel/blackthorn mix or expanding the amount of blackthorn currently grown are further options.

Business implications

The ability to market home grown walking sticks is very important to Classic Canes. The ash woodland has an emotional importance. Whilst it accounts for a small percentage of overall turnover, its marketing value is far higher. Maintaining a supply of home grown walking sticks into the future from a woodland which pays for itself will remain integral to the business.

Contact: **Charlotte Gillan,** Classic Canes
Email: **charlotte@classiccanes.co.uk**
Call: **01460 75686**

Watersend, MOD Cinque Ports Training Area, Kent

Watersend Woods

Key points

- *Extensive spread of ash dieback has led to areas being placed "out of bounds" to troop training*
- *Large area of ash coppice cut and plans to fell high forest ash over the next five years to minimise disruption and reinstate access as quickly as possible*
- ***A comprehensive risk zoning and survey programme has allowed a prioritised response***

Harvesting

Harvester waiting for collection

Watersend is a 93ha block of contiguous ancient semi-natural woodland in the Kent Downs owned by the Ministry of Defence and managed by Landmarc. It is on the north eastern edge of the much larger Cinque Ports Training Estate which is managed by Landmarc under contract from the Ministry of Defence. The woodland is designated as a Site of Special Scientific Interest (SSSI) both for the diverse tree species and the rich and varied species of ground flora.

The soils vary from calcareous loams on the slopes to acid - neutral clays on the plateaux. The Watersend complex as a whole is approximately 80% ash with other species including hazel, hornbeam, field maple, sweet chestnut and pedunculate oak. Portions of the site have been in coppice management historically.

Ash dieback has been present on the site since at least 2014 and has caused widespread deterioration and mortality in the ash population. Much of the site has therefore been put "out of bounds" for troop training.

Management Objective

The primary management objective is to provide a safe and appropriate site for military training. Maintaining the status of the SSSI and Ancient Semi Natural Woodland (ASNW) designations and raising funds for management through the sale of timber are additional objectives.

Public roads and access tracks are considered a high priority for safety works. However, unlike many sites the entire interior of the woodlands has a relatively high level of access and must also be made safe.

Prior to the spread of ash dieback, management aimed to bring old coppice stools back into rotation while attending to larger dead, diseased or dangerous trees overhanging tracks and access routes. Coppicing had already been completed in two ash dominated compartments in the woodland.

Interventions

One compartment at Watersend has been worked since the onset of ash dieback. This 1.37ha ASNW area of over-stood, primarily ash coppice (DBH 30-40cm) was cut in late 2018 and has since been restocked.

The site was conventionally harvested with a purpose-built harvester and roundwood was extracted with a forwarder which was also used to collect the branch wood.

A condition survey of ash trees across the Cinque Ports Training Estate was carried out in 2018 and will be repeated in 2019 to allow a prioritised response in the remaining areas. The speed of ash dieback infection in the Watersend woodlands has been significantly faster than was anticipated and the intention is to work the remainder of this wood later in 2019 following Felling Licence approval.

Watersend, MOD Cinque Ports Training Area, Kent

Restocking with space left around non-ash coppice stumps

To restore access to out of bounds areas for training as soon as possible and to maintain access to less affected areas, Landmarc aims to remove all standing ash over the next five years. A combination of clear felling and regeneration felling will be carried out predominantly by mechanical harvesters. Tree shears will be used where danger zones need to be minimised.

Areas with no public access and are deemed to be of low importance for training will be left un worked and the ash within them monitored.

Designations and restocking

Landmarc had extensive discussions with Natural England on regenerating the woodland. Space was left around non-ash coppice stumps and the remainder restocked with hornbeam, small leaved lime, field maple, and some oak and wild service tree – all of which can be found in adjacent woodlands (and have regenerated in other locations where trees have been felled). The intention is to maintain the current ground flora to the extent possible and therefore maintain the SSSI status.

A small proportion of felled timber will be left on the site to provide deadwood habitat.

The resilience of the woodlands is seen as extremely important – not just for its ongoing military use, but also for maintaining woodland in the landscape.

Economics

As a government department, the MOD does not qualify for Forestry Commission grants so all works must be sustainable and self-funding.

Timber was sold standing and went to the wood fuelled power plant at Sandwich in Kent with the operation breaking even. In the future, Landmarc is hoping to generate income from branch wood as well as the roundwood and plans to offer larger contracts.

Lessons learnt

Further essential safety works were carried out around the estate in 2018. Landmarc would normally post information notices and/or speak with Parish Councils at least one week prior to works beginning. In one case where this was not possible, the temporary closure of a public car park caused local public outcry. This was a good reminder of the sensitivity required where public access exists.

Soil preservation is a key factor in the timing of felling works. Soil damage at Watersend was minimal but other sites felled slightly later saw more ground damage. To avoid soil damage in wet weather, future felling across Watersend is likely to be planned in for September or October with extraction delayed until dryer weather in early spring (subject to nesting bird checks and necessary consents).

Contact: Judith Peachey, Landmarc Forestry Harvesting and Marketing and Arboriculture Advisor
Email: **judith.peachey@landmarc.mod.uk**
Call: **07717 801459**

Weston Park, Gloucestershire

Weston Park, Gloucestershire where an initial 3ha of ash will be clearfelled

Key points

- *Woodland made up of 90% ash*
- *The woodland falls within the Cotwolds area of Outstanding Natural Beauty (AONB)*
- *3ha pre-emptive clearfell to maximise commercial returns*

Weston Park in the Cotswolds AONB

Weston Park is an estate woodland on Cotswold limestone and clay in Gloucestershire.

Ash was planted in the 1940s and are now reaching maturity. There is just one highway boundary and no public access.

Ash dieback was first noted on young trees in the woodland in 2018.

Management objectives

Weston Park is managed primarily for the commercial value of its timber and to preserve biodiversity.

Situated within the Cotswold AONB landscape the woodland is important as part of the wider broadleaf woodland landscape.

Interventions

The threat of ash dieback to mature woodland has prompted an initial pre-emptive clear felling of 3ha under licence between June-August 2019 to realise timber values before deterioration timber values.

The timber was sold standing at auction at the end of May 2019, fetching £45 per tonne.

The wood was last thinned seven years ago with some of the thinnings sold to a local biomass venture.

Other areas of the estate woodland are being monitored and market prices will determine whether more ash is pre-emptively felled.

Restocking

The restock choice has been informed by the AONB and by the ancient woodland site it lies within.

The clearfelled areas will be restocked with oak and beech which flourish in local soils. Active squirrel control measures already in place across the estate will protect the oak. It is also hoped that sycamore will regenerate to produce a viable crop in the future.

A Tree Health Grant has been applied for and it is expected that the works will generate an income.

Contact: **Andrew Woods**, Manager
Email: **woodsfortrees@yahoo.co.uk**
Call: **07957 867472**

Online Guidance

Overview and symptoms

- Detailed information on ash dieback from the Forestry Commission including symptoms and ecology:
  www.forestresearch.gov.uk/chalara
- Forestry Commission map of wider environment infections:
  www.chalaramap.fera.defra.gov.uk/
- Defra Ash Research Strategy:
  www.gov.uk/government/publications/ash-tree-research-strategy-2019

Management guidance

- Forestry Commission Operations Note on managing woodlands affected by ash dieback:
  www.gov.uk/government/publications/managing-ash-in-woodlands-in-light-of-ash-dieback-operations-note-46
- Natural England and Forestry Commission guidance on managing woodland SSSIs containing ash:
  www.gov.uk/government/publications/managing-woodland-sssis-with-ash-dieback-hymenoscyphus-fraxineus
- Forestry Commission Operations Note on managing individual ash trees affected by ash dieback:
  www.gov.uk/government/collections/forestry-commission-operations-notes-england
- Tree Council guidance on managing ash trees outside of woodlands:
  www.treecouncil.org.uk/
- Forestry Commission information on applying for a felling licence:
  www.gov.uk/guidance/tree-felling-licence-when-you-need-to-apply
- Forestry Commission guidance on woodland management, biodiversity and wildlife including the UK Forestry Standard:
  www.gov.uk/guidance/how-to-benefit-species-and-habitats-biodiversity-in-your-woodland
- Forestry Commission/Natural England advice on managing SSSI sites for ash dieback::
  www.gov.uk/government/publications/managing-woodland-sssis-with-ash-dieback-hymenoscyphus-fraxineus

Online Guidance

Health & safety

- Forest Industry Safety Accord and Euroforest guidance on working with diseased ash trees: www.ukfisa.com/safety-information/safety-alerts1/felling-dead-ash-safety-guidance-for-managers.html?searched=euroforest+ash&advsearch=allwords&highlight=ajaxSearch_highlight+ajaxSearch_highlight1+ajaxSearch_highlight2
- National Tree Safety Group guidance on trees and public safety: www.ntsgroup.org.uk/guidance-publications/

Restocking

- Countryside Stewardship Woodland Tree Health: Restoration grant: www.gov.uk/government/collections/countryside-stewardship-woodland-support
- Forestry Research Ecological Site Classification tool for identifying site type and selecting appropriate species: www.forestresearch.gov.uk/tools-and-resources/forest-planning-and-management-services/ecological-site-classification-decision-support-system-esc-dss/
- Forestry Commission Research Note on selecting replacement tree species based on ash associated biodiversity and ecosystem services: www.forestresearch.gov.uk/research/ecological-impacts-of-ash-dieback-and-mitigation-methods/
- Forest Research: Genetic considerations for provenance choice of native trees under climate change in England www.forestresearch.gov.uk/research/genetic-considerations-provenance-choice-native-trees-under-climate-change-england/

Resilience Planning

- Forestry Climate Change Working Group: Action Plan for Climate Change Adaptation of forests, woods and trees in England: www.rfs.org.uk/about/publications/rfs-research-reports/
- Forestry Commission information on preventing the spread of tree pests and diseases: www.gov.uk/government/collections/tree-pests-and-diseases
- 2012 plant health order: www.legislation.gov.uk/uksi/2012/2707/contents/made

Further Reading

A number of relevant articles have been published in the RFS Quarterly Journal of Forestry (QJF) and are also available on line to members. The QJF is free to RFS members and available to non-members in the UK to purchase. Details are available at www.rfs.org.uk/about/publications/

April 2019 Vol 113 No 2

Ash Dieback and Associated Vegetation Changes in the Coppice of Bradfield Woods by Rob Fuller, Dorothy Casey, Markus Melin and Ross Hill

October 2018 Vol 112 No. 4

Rapid Progression of Ash Dieback Disease in an Ancient Wood in the UK by Anne Edwards & J. Allen Downie

April 2018 Vol 112 No.2

Silvology - Redefining the biological science for the study of forests by Gabriel Hemery & Jens Peter Skovsgaard

Future-proofing your Woodlands by Adam Todd, John Weir, Stephen Bathgate

Jan 2018, Vol 112, No.1

Risk Assessing for the likely loss of Ash by Joe Alsop, Emma Goldberg

Forest Genetics: A Key to the Future Health of Trees and Forests by Simon Lloyd

July 2017 Vol 111 No.3:

Evaluating Options for Robust Forest Adaption to Climate Change by Michal Petr & Duncan Ray

April 2017 Vol 111 No.2

Ash Trees for the Future? by Jo Clark

Academic Papers from other journals

- **Responding to ash dieback (Hymenoscyphus fraxineus) in the UK: woodland composition and replacement tree species, Forestry by A Broome, D Ray, R Mitchell, R Harmer:** An International Journal of Forest Research, Volume 92, Issue 1, January 2019, Pages 108–119, www.doi.org/10.1093/forestry/cpy040 (open access)
- **Maintaining ecosystem properties after loss of ash in Great Britain by L Hill, G Hemery, A Hector, N Brown:** J Appl Ecol. 2019; 56: 282– 293. www.doi.org/10.1111/1365-2664.13255 (open access)
- **Silvicultural strategies for Fraxinus excelsior in response to dieback caused by Hymenoscyphus fraxineus, Forestry by Jens Peter Skovsgaard, Georg Josef Wilhelm, Iben M. Thomsen, Berthold Metzler, Thomas Kirisits, Ludmila Havrdová, Rasmus Enderle, Dorota Dobrowolska, Michelle Cleary, Jo Clark:** An International Journal of Forest Research, Volume 90, Issue 4, October 2017, Pages 455–472, www.doi.org/10.1093/forestry/cpx012 (open access)
- **The £15 billion cost of ash dieback in Britain by Louise Hill, Glyn Jones, Nick Atkinson, Andy Hector, Gabriel Hemery, Nick Brown:** Current Biology, Volume 29, Issue 9, 2019, Pages R315-R316, ISSN 0960-9822, www.doi.org/10.1016/j.cub.2019.03.033

The Royal Forestry Society
The Hay Barns, Home Farm Drive, Upton Estate, Banbury OX15 6HU.
Tel: **01295 678588**
Fax: **01295 670798**
Email: **rfshq@rfs.org.uk**
Visit: **www.rfs.org.uk**

Follow the RFS at: **@RoyalForestrySociety**
@royal_forestry

Rob Coventry
Email: **robert.coventry@forestrycommission.gov.uk**
Tel: **0300 067 4366**