National Trust

Delivering for Nature at Wallington

Woodland Management Plan (2019 – 2029)

October 2018

Authors : Hewitt, Milligan and Preston

Contents

Summary Vision

The Wallington Estate lies 19km west of Morpeth in Northumberland. It was gifted to the National Trust in 1941 by Sir Charles Philips Trevelyan and has been managed by the National Trust since 1958. It remains NT's largest intact Agricultural Estates at 5,431 hectares and includes agricultural land including 15 farms, commercial forest (FC - Harwood Forest) and woodland (totalling 319ha across 94 compartments)

The Estate came to prominence in the mid Eighteenth Century when Sir Walter Calverley Blackett created his grand Northumbrian Estate. It was Sir Walter who established the overall layout of the Estate with woods, field boundaries and pleasure grounds extending northwards from a grand mansion house close to the River Wansbeck. By Sir Walter's death in 1777 the estate was largely finished with the land having undergone a major transformation. The Estate was inherited by the Trevelyan's, who for the next 150 years were to oversee a period of relative stability. The Estate "matured" as Sir Walter Blackett's hedgerows and woodlands grew. The most significant change came in the 1920s under the ownership of Sir Charles when many of the woodlands were converted from mixed broadleaf to conifer in order to produce timber and Harwood Forest was created. Although there appear to be only small fragments of ancient semi-natural woodland, some of the larger broadleaved woodlands are important for wildlife and support a rich ground flora, rare invertebrates, and a good assemblage of breeding birds including priority species. The woods are also important for red squirrel, and watercourses which flow through many of the woods are home to white clawed crayfish and otter.

Past management such as coniferisation has reduced the value of the woods for wildlife by creating single age, single species stands, with dense shade impacting on ground flora and aquatic habitats. These plantations can also be incongruous to the landscape and the original "Blackett" design. Many are at or nearing harvesting age and others are starting to blow. The emphasis on timber production throughout the Estate has also led to broadleaved woodland being managed as high forest by regular thinning. This has involved large amounts of staff time. Many of the woods are isolated and have poor access. Agricultural activities are a potential threat to some of the woods, but there is also a potential conflict between the conservation/restoration of the designed landscape (particularly around the Hall) and woodland biodiversity.

In 2018, NT Wallington produced a "Vision Statement for Nature" setting out how over the next 50 years we will restore a healthier, more beautiful, natural environment across Wallington. Forestry will play a key driver in this programme offering huge opportunities to increase the biodiversity across the Estate. It will also realise the income from past investment, which can be recycled into nature gain, and to improve the landscape and visitor experience. We also intend to make the woods more robust against the effects of climate change and to reduce the input of resources needed to manage the woods whilst still producing timber from the most appropriate plantations.

By 2068 our vision will mean the majority of the shelterbelts will be established mixed broadleaf/Scots pine woodlands with good species and structural diversity, linked together via a network of hedges, field trees and river corridors. They will provide feeding and breeding habitat for invertebrates, birds, and mammals. The larger mixed broadleaf woodlands will have trees at all stages from saplings to veterans with abundant dead wood. They will support a rich assemblage of woodland birds including spotted and pied flycatcher, redstart, wood warbler and tree pipit. Healthy populations of red squirrel, pine martin, otter and white clawed crayfish will be present. Timber production will be carried out in selected woodlands using continuous canopy systems which are sensitive to both biodiversity and landscape. Visitors will enjoy a network of well maintained trails which link the woodlands via species rich farmland and riparian habitats.

The vision will be achieved by;

- converting approximately 40ha of conifer plantation to mixed broadleaf woodland
- removing conifers from approximately 75ha of existing mixed broadleaf woodland
- managing approximately 60ha of plantation as mixed productive forest using continuous canopy techniques
- extending existing woodlands and creating new woodlands
- eradicating invasive non-native plant species
- managing populations of deer and grey squirrels
- commissioning biological surveys and carrying out monitoring
- maintaining stock proof boundaries around woodland
- restoring hedges and field trees on the wider Estate
- maintaining/improving visitor infrastructure
- high level of presentation

The management plan is made up of two parts; Part 1 (this document) and Part 2 Compartment Notes and Prescriptions.

Forestry Stewardship Council Certification

The Trust has the largest area (25,016 hectares (ha)) of certified woodland in the UK that is not government owned. Certification means that independent assessment has found that its woodland meets the standards of the Forestry Stewardship Council, an international accreditation body, for formal woodland management procedures and a structured long-term management plan. The Trust holds 'Group Certification' whereby its management practices must be consistently applied in all its woods; should any one woodland fail to meet the standards, all woodlands would lose the certification. Currently all NT woods are certified until 3 October 2021 – Certification Number SA-FM/COC-001526.

1 Background information

1.1 Property Details

Name	**WALLINGTON**	National Trust	
Email	wallington@nationaltrust.org.uk	Contact Number	01670 773 600
Agent Name			
Email	Paul.hewitt@nationaltrust.org.uk	Contact Number	01670 773 664
County	Northumberland	Local Authority	Northumberland County Council
Grid Reference	NZ 030 843	Single Business Identifier	106327021
What is the total area of this woodland management plan? (In hectares)		319	
You have included an Inventory and Plan of Operations with this woodland management plan?		Yes	
You have listed the maps associated with this woodland management plan?		Yes	
Do you intend to use the information within this woodland management plan and associated Inventory and Plan of Operations to apply for the following?		Felling Licence	Yes
		Thinning Licence	Yes
		Woodland Regeneration Grant	No
You declare that there is management control of the woodland detailed within the woodland management plan?		Yes	
You agree to make the woodland management plan publicly available?		Yes	

1.2 Description of the woodlands in the landscape

The Wallington Estate covers 5431 ha of agricultural land, commercial forest and woodland (of which 1031ha at the northern end of the Trusts landholding is held on a long lease by the Forestry Commission and is not included in this plan). Within the remaining Estate (henceforth 'the Estate') the ground rises from 120m above sea level at Wallington House to 280m at Greenleighton in the north. The Estate is underlain by Carboniferous sedimentary rocks. Glacial till covers much of the land with broken outcrops of sandstone on higher ground. The land is generally undulating with small valleys formed by Fallowlees Burn in the north, the Hart Burn and tributaries in the centre and the River Wansbeck in the south. The watercourses all flow from west to east. The Estate is divided into 15 tenanted farms. The woodlands cover 319ha in 94 compartments scattered widely across the Estate (see Map 1). An additional 110ha of forest is leased on shorter tenancies to the Forestry Commission or private tenants at Elf Hills, Fairnley Plantation, Gallows Hill and Greenleighton Wood. Taken together, the in hand woods and leased areas give a woodland cover for the Estate of approximately 10%.

Around the House and at Rothley Lakes the woods form an important part of the two distinct designed landscape areas created by Sir Walter Calverley Blackett between 1728 and 1777. The home woods are designated by Historic England and form part of a Grade 2* Listed Park and Garden Wallington 1001054. This pleasure ground was created with advice from designers William Joyce and James Paine in the 1730's and 1740's. The pleasure ground at Rothley incorporating a deer park, lake and castle were all influenced by designers Garett (1742), Newton (c1750), Wright (1769) in part by Lancelot 'Capability' Brown (1769). Despite their exceptional design and pedigree of landscape designers the area is not listed.

The largest areas of woodland are the Home/Wansbeck Woods (c70ha), Delf and Thistleby Plantations (34ha) and Rothley Lakes (33ha). Most of the remaining woodlands are small, and about 80 of the compartments are shelterbelts or shelter plantings around farmsteads (accounting for about 20% of the total area of woodland). Today there is an almost equal split between conifer and broadleaved woodland within the woodlands managed by the Trust.

The woodlands lie within an intensive agricultural landscape with the farms producing predominantly sheep and beef, with occasional arable crops. The landscape is characterised by large rectilinear fields divided by a strong pattern of hedges, stone casts or fences with sparse field trees. The small woodlands, separated by wide open spaces, are therefore prominent and can be seen from the network of roads and paths which cross the Estate. The frequency of conifer (particularly Spruce) in the shelterbelts produces a rather stark and uniform appearance. This is further enhanced by the backdrop of extensive uniform conifer plantations of Harwood Forest. Shelter plantings around the farmsteads frequently hide unsightly modern farm buildings.

Wallington lies within two National Character Areas; the Northumberland Sandstone Hills (NCA2) - northern area, and Mid Northumberland (NCA12) - southern area and is immediately south of Northumberland National Park.

1.3 History of Management

Many of the woods present today were already established by 1777 and up until the late 1800s they were largely of hardwoods (particularly beech, oak, common lime, ash and sycamore). It was only in the mid 1900's, that these were being replaced with or supplemented by softwoods, primarily Scots pine, Sitka and Norway spruce, and European and Japanese larch.

Harwood Forest - The biggest change to woodland landscape came about in May 1929 when Sir Charles sold Harwood Farm (617 hectares) on the northern boundary of the Estate to the newly established Forestry Commission. In 1933 he then leased a further 1,031.62 hectares from what had been Redpath, Fallowlees and Harwood House Farms. In all 1,648 hectares of the Estate was sold or leased to establish Harwood Forest. The resulting large conifer plantation remains the single biggest landscape scale change on the Estate since its inception in the 1730s.

View looking North to Cambo Village and Harwood Forest beyond

National Trust took on the management of the Wallington Estate in 1958. Early woodland management saw a programme of felling and restocking of woods with fast growing conifers, in all probability driven by the desire to provide a source of income, as there was no large endowment to assist with running of the estate. These early plantations have now reached harvesting age. Until now the Estate woods have been managed largely for timber production on a clear fell and restock basis for softwoods, and regular crown thinning for hardwoods. Various Woodland Grant Scheme agreements have helped to cover restocking and thinning costs. Large thinning/felling operations are carried out by contractors whilst smaller projects are carried out by the Trust's own Countryside Team. In the 2010, a biomass heating system was put into the Regional NT Offices at Scots Gap and in 2012 a boiler was installed with the glasshouse at the Wallington Garden. So between 2012 and 2016 these boilers were being run with wood fuel the estate and so were a major driver of forest operations. In 2016 though the Scots Gap boiler was decommissioned and with the installation of new biomass boilers to the house in 2017, wood fuel was outsourced. Over the last ten years, timber and firewood sales have brought in about £15k per annum to the property and all this money has been recycled back into the woodlands themselves. Historically several woodlands were managed as nature reserves by Northumberland Wildlife Trust from the 1970's until 1999. These included Elf Hills (compartments 25 and 26) and Whinney Plantation, and Rothley Lakes (compartments 50-52). Map 4 shows the current stand types.

Within the 2013-18 Wallington Woodland Plan (EWGS Ref: 30587), there was a change in emphasis from timber production towards biodiversity and landscape conservation. Several old shelterbelts which had been open to grazing for many years were fenced and restocked with mixed broadleaves (e.g. compartments 11b, 18a, 29, 43, 74a and 74b), and areas of conifer plantation have been restored to native woodland (e.g. Delf compartments 44, 45 and Rothley Lakes compartments 51, 52). The 2013 plan incorporated thinning, clearfelling and restocking in 83 compartments (c170ha). Some of this work was completed, however a lot was too ambitious and weather conditions and staffing resources meant some work did not progress as planned. The felling licence for this plan expired in March 2018.

Pheasant shooting – There is now only one expansive shoot on Wallington reduced from three in 2010. This is based around Catcherside and Elf Hills Farms.

Deer Management – Since 2016 deer control has been undertaken 'in-house' by the Ranger Team and is being manged in accordance with the Deer Management Plan written in July 2015.

Red squirrel Conservation - Since 2012, there has been a major red squirrel conservation project running over the entire Estate. This was initially primed by a EWGS ref: 28499, which ran for 5 years from March 2012 and provided some funding toward the conservation effort. This was always supplemented by NT and has established an estate wide grey squirrel control programme, and has now been running for 6 years. In 2017 a full time dedicated Red Squirrel Ranger was employed by NT which is unique to NT properties and stands out as an exemplar model of red conservation. A delicately balance red population now exists across the whole estate from having nearly lost the population in 2011. Previous management for reds had meant several plantations (mainly Norway spruce) were retained beyond their normal rotation to provide a food source and classified as reserve for squirrels. However, with concentrated grey control this retention policy is not felt necessary anymore.

Public access - The Trust has also sought to increase public access away from the House and gardens with a series of permissive footpaths and a cycle trail, many of which go through the woodlands.

Infrastructure – In April 2018 a 0.7km forestry access road was created to allow forestry operations into the Delf Burn Plantation. The track runs through compartments 46a and 47b.

2 Woodland Information

2.1 Areas and features

Designated Areas	In Woodland	Adjacent to woodland
Special Areas for Conservation		
Special Protection Area		
Ramsar Sites		
National Nature Reserves		
Site of Special Scientific Interest		✓
National Park		
Areas of Outstanding Natural Beauty		
Local Nature Reserves		
TPO / Conservation Area	✓	✓
County Wildlife Sites	✓	

Details

SSSI. Compartment 62 a,b,c and 56d is adjacent to Greenleighton Quarry SSSI
Fallowlees SSSI near the northern boundary of the Estate is adjacent to an area of semi-natural wood pasture but this is not included in this plan.

National Park. Northumberland National Park boundary runs along the northern edge of the NT landholding (Harwood Forest)

TPO/Conservation Area. Compartments 22b and 80 lie within the Cambo Conservation Area. See Map 3. There are no TPOs

Local Wildlife Sites. The Wansbeck Woodlands are part of the Wallington and Little Harle LWS (CM006) Rothley Lakes is also a LWS (AL004) See Map 3

Rare and important species	In Woodland	Adjacent to woodland
Schedule 1 Birds	Common crossbill Goshawk	Barn owl Kingfisher
BAP Birds	Bullfinch Dunnock Lesser redpoll Marsh tit Reed bunting Song thrush Spotted flycatcher Starling Tree pipit Turtle dove Willow tit Wood warbler	Corn bunting Curlew Grey partridge Merlin Skylark Yellowhammer
BoCC Red List Birds (not BAP)	Mistle thrush Pied flycatcher Woodcock	Grey wagtail Linnet Meadow pipit

BoCC Amber List Birds (not BAP)	Kestrel Redstart Willow warbler Tawny owl	Dipper
BAP Mammals	Brown hare Hedgehog Red squirrel Otter Water vole	
Other protected mammals	Badger	
Bats	Natterer's, Brown long eared, Whiskered, Brandts, Daubentons, Common pipestrelle, Soprano Pipestrelle, Noctule and Alcothoe.	
BAP Reptiles/Amphibians	Common lizard Common toad	
BAP Invertebrates	White clawed crayfish	
BAP Plants		
BAP Fungi/Lichens		

Details

Birds. 85 species are recorded as breeding on the Estate (CBC John Day Undated- list from P Hewitt). Wallington Dean is thought to be particularly rich with wood warbler, pied flycatcher, redstart, tree pipit and grey wagtail all recorded in the 1999 Biosurvey. Turtle dove was recorded in West and East Woods (comp 7 and 9) in 2008. A nestbox scheme has operated in several of the woods (including woods around the Hall, compartments 50-52 Rothley Lakes, 32 Coldwell Hill and 31 Halls Hill) for nearly 30 years with records submitted to BTO. Redstart and pied flycatcher use these boxes in small numbers (full details held in Rangers Office).

Mammals. 12 species of terrestrial mammal have been recorded on the Estate (Rutherford 2016). Brown hare is fairly common on the Estate and is known to utilise the woodlands as well as the agricultural land for cover and food. The population of red squirrels is small but increasing since concerted control of grey squirrels started in 2012. Reds have been recorded in many of the woodland compartments and are now regularly watched by visitors from the hide in West Wood (compartment 7a). Otter have been recorded recently from several compartments; Rothley Lakes (comp 52), Sawmill Wood (comp 28) and Delf (comp 45). The status of water vole on the Estate is unknown (mentioned in 2013-18 plan).Badger sets have been recorded in several woodland compartments (see Compartment Notes). Pine Martins have been recorded 5.5km to the north of the Estate in Coquetdale and so there is a strong possibility of natural recolonization if connectivity issues across the Estate can be resolved.

Bats. Nine species of bat have been recorded on the Estate (Natterer's, brown long eared, whiskered, Brandt's, Daubenton, common pipistrelle, soprano pipistrelle , noctule and alcathoe) making Wallington of regional significance (G Smart Northumberland Bat Group 2016 quoted in Rutherford 2016) . There are a number of known roosts within the complex of buildings around the House supporting common pipistrelle, soprano pipistrelle, Myotis species bats and brown long-eared bats. In addition, 10 plus Natters Bat roost have been identified between 2013 and 2015 within individual trees in the West Wood (Comp 6 and 7), Wallington Dean (Comp 1 and 2)

and Fountains Plantation (Comp 12) by S. Mordue (2015)

Reptiles/amphibians. Common lizard has been recorded in compartments 52 Rothley Lake and 88 Gallows Hill, their distribution elsewhere is not currently known. A good population of common toad has been recorded in the West Wood (comp 6 and 7) and Rothley Lakes (Comp 52) but they almost certainly exist elsewhere. Adder are present within Harwood Forest in good numbers and have been recorded in 88 Gallows Hill

Invertebrates. White clawed crayfish are found in the River Wansbeck tributaries including the Hart Burn and its tributaries. (2007 survey J Jamieson and S. Morley 2013). Record from Delf Burn (comp 45) and Rothley Lakes (comp 52) in 2016 (G Graham and P Hewitt)

At least four scarce species and one rare species of invertebrate for Northumberland are associated with semi-natural woodland areas on the Estate, with the rare hollowed glass snail (Zontitoides excavatus) recorded in semi-natural woodland on the northwest side of Rothley Lake. For a complete list of species see Wallington Biological Survey 1999. Several of the woods have assemblages of invertebrates which are typical of ASNW or long established woodland or wood pasture (compartments 27 Newbiggin Railwayline, 28 Sawmill Wood, 44 Delf and 50-52 Rothley Lakes) (1999 Biosurvey).

Plants. There are no BAP species however downy currant , a Nationally Scarce species , has been recorded in Wallington Dean (compartment 4 and others?).Several of the woods support a flora suggestive of ASNW or long established woodlands (compartments 1-4, 26, 39, 44). Uncommon species include broad leaved helleborine, giant bellflower, oak and beech fern , lesser twayblade, moschatel, melancholy thistle and common wintergreen (1999 Biosurvey)

Fungi/Lichens. 90 species of fungi have been recorded in the Home Woods at Wallington (NE Fungus Study Group 2013/NT Staff) with 47 species recorded at Rothley Lakes (NE Fungus Study Group 2016) 171 species of lichen have been recorded in the Home Woods at Wallington (British Lichen Society 2016)

Habitats	In Woodland	Adjacent to woodland
Ancient semi-natural woodland (ASNW)	✓	
Other semi-natural woodland	✓	
Plantations on ancient woodland sites (PAWS)		
Veteran and other notable trees	✓	✓
BAP Priority Habitats		✓

Details

ASNW

The only areas on the Estate shown as ancient woodland on the Inventory are compartments 2 Wallington Dean and 3 Huntley Banks. Parts of these compartments are known to have been unwooded in the past. Other woods which are thought to be at least partially ASNW are 1a Wallington Dean, 44c Delf Plantation.

There are no plantations on ancient woodlands.

Veteran tree surveys have been undertaken between 2013-17, but require updating.

Water	In Woodland	Adjacent to woodland
Watercourses	✓	✓
Lakes	✓	
Ponds	✓	
Wetland habitats	✓	✓

Details

All the woodlands are in the Wansbeck catchment. A large number of the compartments are located on watercourses. 18 of these are conifer plantations with no buffer strip (see list in section 2.4, 1d for details) See Map 2.

Compartments 50-52 surround Rothley Lake, the only lake on the Estate

The ponds in compartments 7a West Wood, 9 East Wood and 12e Fountains Plantation are ornamental and are part of the formal pleasure grounds around the House created c1740. 28e Sawmill Wood has a mill pond. There is a natural seasonal pond (old river channel) on the River Wansbeck in compartment 1b.

Wetland habitats -there are small areas of wet woodland in many compartments. Some of these have been affected by planting of conifers.

Landscape	In Woodland	Adjacent to woodland
Landscape designated areas		
Landscape features		✓
Rock exposures	✓	✓
Historic landscapes	✓	✓

Details

Although there are no specific landscape features within the woods (see below for cultural and archaeological features) many of the woods and shelterbelts are themselves prominent in the landscape. Rock exposures are visible where past quarrying has taken place e.g. 21a Farfoot Crag or on natural outcrops such as Rothley Crags (adjacent to compartment 99)

Whilst the House and surrounds are a Registered Park, the wider Estate is also a historic landscape, the pattern of farms and woodlands having been largely established by Sir Walter Blackett by 1777 and modified by his successors.

Cultural features	In Woodland	Adjacent to woodland
Public rights of way	✓	✓
Prominent viewing points		✓
Existing permissive footpaths	✓	✓
CROW Access land		✓
Public recreational facilities	✓	
Visitor information	✓	

Details

Public rights of way and Permissive paths. There are very few public rights of way within woodland compartments (only 1b Wallington Dean, 18 Black Belt, 61a Greenleighton Shelter and 101 Oakford Bridge) although many compartments have rights of way adjacent to them. A larger number of woods have permissive paths.

CROW Access Land. Rothley Crags and Greenleighton Moor is designated open access land under the CROW Act. Greenleighton borders Harwood Forest and shelter belts of Greenleighton Farm.

Recreational facilities. There is a large car park at the House together with cafe, shop, toilets and information point. Rangers lead guided walks. There is also a car park at Greenleighton Quarry. Planning permission has been granted for 2 small car parks in Thistleby Plantation compartment 47a and Catmire Plantation compartment 100. A new cycleway was created in 2017 from the House over Broomhouse Farm and through compartments 7,12,18,20,11. There are adventure playgrounds in compartment 7a and 7b. Viewing hides are present in compartment 7a West Wood and 52 Rothley Lakes. Rothley Lakes is currently maintained as permit only access with several open days per year.

Visitor information. Information board at Rothley Lakes.

Archaeological Features	In Woodland	Adjacent to woodland
Scheduled monument		
Unscheduled monuments	✓	✓
Registered parks and gardens	✓	✓
Listed buildings/structures	✓	✓
Other		

Details

There are no scheduled monuments in the woodlands on the Estate

Unscheduled monuments

The National Trust Sites and Monuments Record shows archaeological features in the following compartments; 2, 7, 9, 10, 12, 13, 21, 22, 26, 28, 47, 52, 56b and c, 61. See https://heritagerecords.nationaltrust.org.uk/map for locations and details.

Registered Parks and Gardens

The environs of the Hall are a Grade II* listed park and garden (Ref 2056). This includes woodland compartments 1,2,3,4,6,7,8,9,10,12,13,14,43,74, 75 and 79. See Map 3.

Listed Structures

There are listed structures in four compartments near the Hall;

Comp	Structure	Grade
7a	Ice House	II
	Urn	II
9	Standing stone (E side of Chinese Pond)	II
	Sir Walter's privy	II
	Privy near Owl House	II
	Portico House and Terrace	II
10	Milestone (may be on roadside?)	II
	Piers and screen wall (car park entrance)	II
75	The Arches	II*

2.2 Woodland resource characteristics

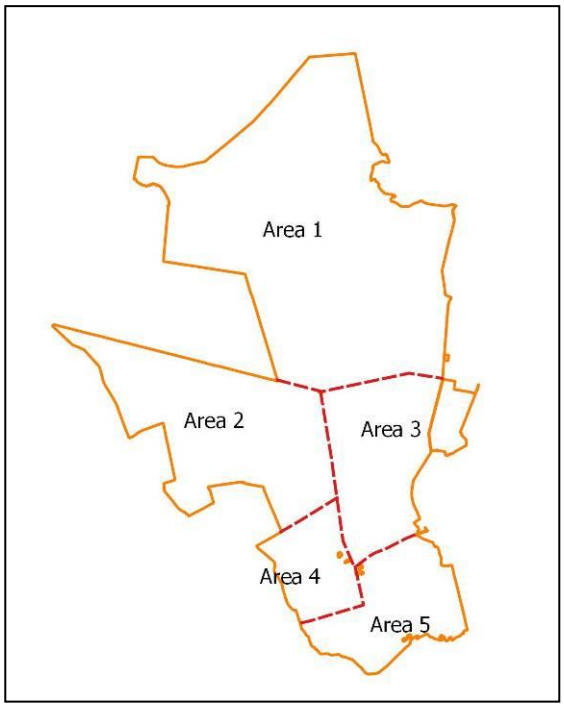
For the full compartment schedule see Appendix 1. Note; compartment numbering is not systematic and there are no compartment numbers 55, 60, 71, 73, 91, 93 and 94.

Stand Type	Area (ha)	%
Broadleaf	155.77	49
Conifer	145.90	46
Open ground	17.4	5
Total	319.07	100

See Map 4 for current stand types

2.3 Site description

Individual details of each compartment are provided in the Compartment Notes (separate document). A general overview is given here. For convenience the Estate is divided into five areas using the minor roads (See Map below);



Area 1 North (Greenleighton and Rothley)

The largest areas of woodland in this part of the Estate are Rothley Lakes (32.81ha), Kiln Wood (12.64ha), Gallows Hill (4.93ha) and Greenleighton Shelter (3.93ha). The remaining ten compartments are all small shelterbelts and shelters around farm steadings. Rothley Lakes (compartments 50-52) is one of the most important features on the Estate, both for landscape and biodiversity. This has its own Conservation Action Plan (Rutherford 2018). The 7.5ha lake and woodlands were designed by Lancelot 'Capability' Brown for Sir Walter Blackett in 1765. The lake supports valuable plant and invertebrate communities, breeding and wintering birds, whilst the surrounding woodlands, primarily broadleaf and Scots pine (see Map 5c), support red squirrels and a range of breeding birds. Kiln Wood (compartment 56) is a mix of P1970 Sitka spruce and P2000

oak/Scots pine plantation. Gallows Hill (compartment 88) is a strip of secondary birch woodland forming the western fringe of Gallows Hill Plantation (leased to third party) with remnant heathland vegetation. Greenleighton Shelter (compartment 61) is an M shaped P1970 shelterbelt of Sitka spruce immediately north of Greenleighton Farm and adjoining Greenleighton Wood (FC lease)

50-52 Rothley Lake

Area 2 North West (Catcherside and Fairnley)

The main woods in this area are Stockcrag Plantation (13.54ha), Catcherside Plantation (6.95ha), Coldwell Hill (6.32ha) and Halls Hill (4.55ha). The remaining 18 compartments are mainly small shelterbelts and blocks, most of which are currently Sitka spruce. Stockcrag Plantation (compartment 36) is a commercial plantation with stands of P1954 Scots pine and Norway spruce and P1985/P2008 Sitka spruce, together with some recent mixed broadleaved planting at the southern end (see Map 5d). Catcherside Plantation (compartment 39) is a T shaped shelterbelt which is over 1km long from west to east. It is thought to have been part of the original C18 planting of the Estate and contains some large (and veteran) mixed broadleaves, but was underplanted with Sitka spruce in the 1970's. Halls Hill (Compartment 31) and Coldwell Hill (compartment 32) are both areas of secondary birch woodland which are starting to become more diverse in species and structure either through felling and restocking (31) or natural processes (32). Several of the small Sitka spruce shelterbelts are on burns and the conifer canopy completely shades the watercourse (12c, 35b,c, 36j and k, 37, 39a, 41, 42a, 56b,c, 57, 65,67,69, 70,77, 92)

36 Stockcrag Plantation

Area 3 East (Delf and Rothley Park)

The Delf/Thistleby Plantation (34.61ha) is the largest woodland block in this area. Other significant woodlands are Sawmill Wood (10.77ha) and Christmas Tree Plantation (10.60ha). The remaining 15 compartments are mostly small shelterbelts or blocks around steadings, but also include some C18 landscape features. Delf/Thistleby (compartments 44-47) was formerly managed as a commercial plantation but many stands have been converted from conifer to broadleaf in recent years so that now only 13ha is spruce plantation (46a,c, 47b,d). See Map 5a. Delf is important for the semi-natural woodland along the Delf Burn (compartment 44) which may be one of the only areas of ASNW on the Estate. A new forestry track was installed into the Delf Plantation

in 2018 to allow for more effective management of the woodland including the forestry resource, deer and grey squirrel control. Sawmill Wood (compartment 28) is a mixed woodland with conifer and broadleaf, containing the Trust Sawmill and a Scout campground. Christmas Tree Plantation (compartment 95) is a narrow strip of P1983/1995 Norway spruce within Rothley Park on the eastern boundary of the Estate. A number of the smaller compartments are C18 landscape features which are now also important for biodiversity. These include 27 Newbiggin Railway line (1.92ha) which has been partly coniferised, 29 Holyburn Plantation (1.39ha) a mature beech shelterbelt, and 101 Oakford Bridge (0.89ha), an area of mature and veteran beech and alder on the Hart Burn, currently in the Tuthill Farm tenancy.

Area 4 South West (Elf Hills and Cambo)

The main woodlands are Whinney Plantation (7.12ha), Elf Hills (6.03ha), and Farfoot Crag (4.29ha). Most of the smaller woods are C18 shelterbelts and plantings. Whinney Plantation (compartment 25) is a commercial plantation of mainly P1947 mixed conifer (Scots pine, Sitka and Norway spruce and European larch) with small areas of recently established spruce and some broadleaf (see Map 5e).It was thinned in 2016. Elf Hills (compartment 26) is a mixed plantation which has been partly converted to mixed broadleaves. Farfoot Crag (compartment 21) is a P1960 plantation of larch with some Sitka and mixed broadleaves (see Map 5e). Both Elf Hills and Farfoot Crag are located on old quarries. This area also includes a number of C18 mixed broadleaf shelterbelts (compartments 18,19,20, 82, and 83). Compartment 22b lies within the Cambo Conservation Area.

Area 5 South (House and Wansbeck Valley)

The area around Wallington has a series of interconnected woods including the Home Woods and the Wansbeck Valley Woods which together make up about 70ha. The woods are largely mixed broadleaf with some specimen conifers and small areas of more recent conifer plantation and are of considerable importance for landscape and biodiversity (see Map 5b). A number of the woods lie within the registered park (see Map 3). West Wood (compartment 7), East Wood (compartments 8 and 9) and North Wood (compartment 10) are part of the ornamental woodland planting established by Sir Walter Blackett in the C18. The Wansbeck Valley Woods (compartments 1-5) lie in the shallow valley of the River Wansbeck. They have a rich ground flora and may contain remnants of ASNW. They have been designated as a Local Wildlife Site (see Appendix for details). The only other large wood in this area is Forty Acre Plantation (15ha) a P1970 mixed conifer/mixed broadleaf plantation which is being managed as continuous canopy productive woodland. Compartment 80 lies within Cambo Conservation Area (Map 3).

4 Wallington Dean veteran beech

2.4 Constraints, threats and opportunities

2.4.1 Past Management

Past management of most of the woodlands at Wallington has been geared towards timber production. This has led to coniferisation of woodlands and shelterbelts with the resultant loss of broadleaves and impacts on ground flora, watercourses and the landscape. Broadleaf stands have also been managed as productive high forest, including those within the designed landscapes close to the House and at Rothley Lake. This has resulted in woods with an even age structure with little or no dead wood and little regeneration.

The plantations established between the 1940's and 2000's, including numerous shelterbelts, are predominantly pure stands of Sitka or Norway spruce (48 compartments/ 80 sub-compartments of which 69.67ha are Sitka spruce and 24.13ha are Norway spruce).The predominance of spruce is problematic for silvicultural (practical and economic) landscape, biological and environmental reasons as discussed below:

a) Silviculture

A considerable number of the plantations are on exposed sites and are now reaching the stage where they are becoming more prone to wind throw. In order to avoid the substantial costs and dangers to clear the subsequent damage, many of these stands will therefore have to be felled prematurely before optimum economic felling size. For these compartments, leaving the stand beyond the normal economic rotation is not an option.

Silvicultural thinning would make these stands more vulnerable to wind throw and therefore most of them have been left unthinned. This means the potential income from the stand is reduced as both timber volume and quality will be lower when the crop is finally harvested.

The majority of the compartments are small linear shelterbelts of under 1ha, are remote and isolated, and a considerable distance from roadside and with poor access. This significantly increases the costs of management and harvesting the timber. Linear plantations in exposed locations have an increased edge effect resulting in a disproportionate number of low quality trees with poor form.

The cycle of planting and clearfelling of commercial tree species often requires intensive and costly management compared to other methods of woodland management. This also increases the risk of soil erosion and compaction.

There are an overly complex number of compartments as a result of managing stands primarily for timber. This has led to compartmentalised thinking about future management and a lack of an overview and vision for all the woodlands on the Estate.

Broadleaves have been established in many of the stands but have been drawn up and will not survive the clearfelling of the dense stands of conifers.

Clearfelling shelterbelts will have a negative impact on farming operations until new woodland cover is established. This is exacerbated by the fact that there are limited alternatives for shelter as a result of the loss of hedgerows and field trees on the rest of the Estate.

b) Landscape
Several historic landscape features and shelterbelts which would have been originally broadleaf have been either underplanted or replaced by conifer species. Areas of woodland near the House have been managed as working plantations rather than as a pleasure ground. (in compartments 6,7,8,9,10,12,14)

Many of the compartments are characterised by geometric shapes with limited species, uniform colour, texture and diversity both in the landscape and over the seasons. Several compartments are linear features along the skyline and others do not relate to the local topography. These isolated stands therefore often sit uncomfortably in the landscape.

The geometric layout of the enclosure pattern and woodlands limits the opportunities to improve or enhance the landscape.

For many compartments clearfelling / restocking is the only silvicultural method available (thinning will open them up to wind throw) and this will result in sudden and dramatic changes to the landscape.

c) Biological
Many of the woodlands have limited value for wildlife as a result of non-native species with even-aged structure and single species stands. This has resulted in little understorey and ground flora, coupled with little or no connectivity to other woodland habitats. The woodlands are small and are widely scattered across the Estate. Small sites tend to support smaller numbers of species than larger sites (species-area relationship).

Enrichment/contamination from agricultural activities impacts on smaller woods (with a large edge to area ratio) more than larger woods where a 'buffer zone' protects a core area. Fragmentation also prevents or severely affects species dispersal - new woods which are isolated from established woodlands are unlikely to be colonised by woodland plants for example.

d) Environment
Many of the conifer plantations have been established along water courses, often small burns less than a metre wide. The deep shade they cast leads to loss of aquatic and riparian vegetation, invertebrates, fish and other wildlife, increases the potential for soil erosion and changes in water chemistry. The following compartments are currently conifer plantations where watercourses are being affected:

	Woodland	Watercourse
12c	Fountains Plantation West Belt	Source of small stream that feed garden ponds. Tributary of Wansbeck
35b	Catcherside South	Chesters Burn
35c	Catcherside South	Chesters Burn
36j	Fairnley Burn West	Fairnley Burn
36k	Fairnley Burn West	Fairnley Burn
37	Fairnley Burn South	Fairnley Burn
39a	Catcherside North	Fairnley Burn
41	Fairnley	Tributary of Hart Burn
42a	Low Fairnley	Fairnley Burn
56b	Kiln Wood	Tributary of Harwood Burn
56c	Kiln Wood	Tributary of Harwood Burn
57	Dyke Head South	Tributary of Harwood Burn
65	Harwood Head	Source of Hartburn
67	Chesters North East	Tributary of Fairnley Burn
69	Chesters Burn	Chesters Burn
70	Chesters Sheepwash	Chesters Burn
77	Newbiggin Shelter	Tributary of Middleton Burn
92	Chesters Burn	Chesters Burn

Opportunities

Many of the conifer plantations are now reaching a harvestable age, meaning there can be an opportunity to capitalise on past investment.

Clearfelling of these plantations presents the opportunity to convert them to broadleaf stands which will benefit the landscape, wildlife, and watercourses. Re-planting with broadleaf woodlands on sites that were previously conifer can also be a part of a wider programme of flood alleviation, the protection of rivers and streams from farming activities and the restoration and enhancement of traditional hedgerows and boundary trees throughout the whole Estate.

The move away from clearcut/restock productive forestry to broadleaves will reduce the management input required in the long term. It will also mean that shelter around farms and fields is stable, permanent, and long term.

Commercial timber production can be concentrated on a smaller number of larger compartments which have the appropriate terrain, infrastructure and economies of scale to be economically viable and less damaging to wildlife and the landscape.

There is the opportunity to create woodlands that are more biologically diverse by including a wider range of native tree and shrub species.

The more recently established Sitka spruce plantations have a greater proportion of mixed broadleaves and consequently their conversion to native woodland will be easier and less disruptive.

2.4.2 Pests and diseases

Red Band Needle Blight (RBNB) *Dothistroma septosporum.* Lodgepole pine was showing the symptoms of RBNB at Gallows Hill Wood (NT but leased) in 2016. RBNB can been found on a range of conifer species, especially lodgepole, Corsican and, to a lesser extent, Scots pine. Whilst Scots pine has generally been considered to be of low susceptibility, an increase in the distribution and severity of the disease on this species is now being seen. It weakens the tree, reduces productivity and vigour and eventually leads to mortality. Dispersal is thought to occur through moist winds and mist along with the movement of infected material. Scots pine is a major constituent of the woodlands and landscape at Wallington and an outbreak of RBNB could have a serious consequences.

Phytopthora ramorum (Sudden oak death) mainly affects larch, but also has a wide range of conifer (Douglas fir, Sitka spruce) and broadleaf hosts (Turkey oak, beech, sweet chestnut, horse chestnut) as well as affecting rhododendron and bilberry. It is now well established in the UK and has already made a significant impact on UK forestry. If a stand does become infected there is a statutory requirement to fell the diseased trees and rhododendron, plus susceptible trees and rhododendron within a 250m buffer zone of the infected site. There are also severe restrictions on harvesting and processing, and on what could be re-planted. Larch is not a major component at Wallington, however an outbreak of Phytopthora in either larch or rhododendron would cause serious disruption and actions to control its spread could be a considerable threat to many of the special features within the Estate. (compartments with stands of larch- 6, 12e,f, 14 a,b,c, 17, 21a,b, 23, 24, 25c,d, 26b, 38b,d,e, 31b, 42a, 78, 87, 98, 100)

Ash dieback (*Chalara fraxinea*) was discovered at Wallington in March 2017 in compartment 7a West Wood. Its impact is likely to be high since ash is a major component of several woodlands. It is surmised that the spread of this disease is inevitable and its control is unlikely. The reaction and resistance of native ash to the disease is currently unknown.

The threat and impact of such tree diseases will limit the number of tree species that can be planted at Wallington.

Opportunities
Conversion of conifer plantations to broadleaf will allow a wide range of native and near native species to be planted at Wallington, reducing vulnerability to pests and improving resilience.

2.4.3 Non-native invasive plant species

Non-native invasive plant species are not a major threat to the woodlands at Wallington but several species are present. The table below identifies the compartments where the species were found in 2016, and the level of threat (red-high, yellow-medium, green-low).

Cpt	Name	Rhodo-dendron	Cherry Laurel	Red osier Dogwood	Snow berry	Giant Hogweed	Skunk cabbage	Notes
1b	Wallington Dean							
5	Garden House Plantation							Programme of works began in 2018 to address these issues.
7a	West Wood							
7b	West Wood Rock Wood							
7c	West Wood							
9	East Wood							
10	North Wood							
14b	Crossroads Covert West							
21a	Farfoot Crag							
51a	Rothley Lake							Snowberry on adjacent NT land
51c	Rothley Lake							
52a	Rothley Lake							
52d	Rothley Lake							
52h	Rothley lake Island							
100	Catmire Plantation							

The damage caused by rhododendron and cherry laurel in woodland and other habitats is well documented. Once established it is difficult and costly to eradicate. Over the last 20 years a considerable effort has been made to remove rhododendron from many of the woodlands at Wallington. Follow up treatment is now required in some woods to complete the job.

One small patch of Himalayan balsam, was noted in Wansbeck Woods in 1999 but this is thought to be no longer present.

Non-native invasive plants can become established via a variety of routes, including escapes from gardens (through seed dispersal or vegetative spread), deliberate planting, tipped garden waste and seed/propagules being transported by water. Some of these plants are hard to eradicate once they have become established. Constant vigilance and good plant identification skills are required to spot new non-native plants before they become an issue.

2.4.4 Management of the wider Estate.

Throughout the Estate there has been a gradual loss of hedges and field trees (Debois Landscape Survey Group 2011) resulting in a lack of connectivity and habitats for wildlife and isolation of the woodlands in the landscape. It also means there is no alternative shelter for farmsteads and farm stock once the decision is made to clearfell the coniferous shelterbelts until new woodland cover is established.

Repeated grazing of woodland on a regular basis prevents natural regeneration which leads to a more simplified woodland structure, lower humidity, and a reduced bryophyte flora. In addition, selective grazing reduces the vascular plant flora. Over a prolonged period, the woodland becomes fragmented and ultimately turns into wood pasture. The majority of the woodlands at Wallington are stockproof and there is a comprehensive programme of maintaining and replacing fences and woodland boundaries.

The following woodlands were not stockproof and are grazed.

Cpt	Compartment Name	Comments
5	Garden House Plantation	River bank erosion from adjacent landowner's stock
27a	Newbiggin Railway Line (North)	Adjacent fields are arable and possibly not grazed
31a	Halls Hill	
32b	Railway line	Low Priority
34b	Chesters Plantation	High Priority
39e	Catcherside (North)	
76	New House	High Priority
78	Prior Hall	High Priority
82	Billy's Bank	
83c	Rugley Walls Shelter	
101	Oakford Bridge	New Compartment. Old landscape feature. High Priority

A pheasant shoot has a shooting lease over a large part of the Estate. There are about 80ha (72 compartments/sub compartments) of woodland within this area of which eight currently have release pens. Feeding is also carried out in a number of other woods. The larger areas of Delf, Rothley Lakes, Sawmill Plantation and the Wansbeck lie outside the shoot lease. Pheasant rearing can have negative impacts on woodland and its wildlife, e.g. damage to ground flora and invertebrate populations from high densities of birds, soil enrichment and erosion, imbalance of species due to predator control, manipulation of habitat through planting of inappropriate species as cover, and artificially high populations of some species due to supplementary feeding. (Game Conservancy Trust 2003) Pheasant rearing and shooting activities can cause a high level of disturbance in woodlands which could otherwise act as low disturbance 'sanctuaries' for wildlife. Pheasant rearing can also restrict activities associated with commercial timber growing.

The storage of farm equipment, silage and the disposal of farm waste and manures in woodlands can lead to contamination, soil degradation, soil compaction, and loss of ground flora to weed species. It also looks unsightly. Wire, metal and plastic are all a threat to wildlife and can be a danger to the public. Enrichment/contamination from agricultural activities from adjacent farmland (eg through spray or fertiliser drift) can also affect the biodiversity of woodlands.

Large blocks of conifer plantation leased and managed by the Forestry Commission at Harwood Forest currently protect the shelterbelts at Greenleighton (compartment 61). When the FC plantations reach economic felling age (within the next 10 years) and are clearfelled, the shelterbelts will be opened up to the prevailing winds and this may result in the catastrophic windthrow of these stands. Prompt pre-emptive felling of the shelterbelts will therefore have to be considered.

A number of other woods are also leased to individuals/Forestry Commission or are included in farm tenancies. The Trust has no control over how these are managed. This may lead to the eventual loss of woods through grazing, or to continued commercial forest management which may detract from the overall landscape vision for the Estate.

For many of the stands where clearfelling has been recommended, there are no tracks to the site. Extraction of timber will have to be across agricultural land. This will limit the timing of the work and the volumes harvested. It will also compromise farming operations, cause damage to soils and likely incur costs as a result of the long extraction routes and restoration of the land after operations have been completed.

Opportunities
A programme of woodland management and the conversion of many of the stands from single species conifers to mixed native broadleaves can be combined with the planting more field trees, planting hedges, extending woodlands, watercourse protection and the creation buffer strips throughout the whole Estate. This has been laid down in a 50 year Estate Vision and Management Plan.

Woodlands that are currently tenanted or leased to other organisations will be taken back in hand where possible allowing more comprehensive influence over the wider Estate. This would enable management to enhance and protect wildlife and improve and restore the landscape at Wallington.

Managing the majority of shelterbelts for biodiversity in future will remove the need for access across farmland for harvesting

Woodland management and creation of new woods on the Estate can also be used part of a programme of flood alleviation and protection of watercourses for a significant proportion of the Wansbeck catchment.

2.4.5 Tree safety

There are many large specimen and significant veteran trees at Wallington. Older trees are naturally colonised by wood decay fungi and other pathogens leading to loss of limbs or the whole tree. Trees can fail without warning, and can be a danger to the public and property. As a consequence Trust staff dedicate considerable time and resources to tree health inspections. Remedial action is often difficult and dangerous and requires highly skilled personnel to carry out the work safely and sensitively. The loss or removal of these large specimen trees has an impact on the designed landscape and biodiversity. Replacing these specimens may not be possible as the replacements, especially if they are the same species, are more than likely to be infected by the same pathogen which resulted in the failure or removal of the original tree.

2.4.6 Conflicts between objectives.

There is always the potential for conflicting priorities when considering biodiversity and landscape objectives. For example if some of the proposals outlined in Wallington's Landscape Action Plan

(Rutherford 2016) were implemented there could be a significant impact on biodiversity. The restoration and management of the designed landscape around the House and within the registered park and garden will be carefully considered and weighed up to ensure biodiversity priorities are meet. Objectives, such as the removal of established woodlands, removing standing and lying dead wood and natural regeneration will all have to be carefully considered. There sometimes may be a tendency to give greater weight to the 'uniqueness' of the designed landscape and downplay the biodiversity value of the woodlands in restoration schemes even though the true biodiversity value of the woodland is unknown.

Other threats to the cultural and designed landscape include; inappropriate planting, new developments, loss and lack of successional habitats and the loss of landscape features.

In addition, promoting/accepting only a limited range of tree species in the woodland to reflect the original plantings will provide habitat for only a limited range of plants, animals and other wildlife.

Conversion of conifer woods to mixed broadleaf could have a negative impact on the red squirrel population. Opening up woods to public could be negative for wildlife through levels of disturbance, dogs etc (e.g. Rothley Lakes, Broomhouse Farm with Cycle Trail). In compartments 7 and 9 there may be a conflict between woodland management objectives and gardening for example the retention/planting of exotic species.

Opportunities.
The Landscape Action Plan 2016 was written with a natural bias towards the historic environment; however NT staff do have considerable knowledge and experience in the management of designed landscapes, parklands and biodiversity. Therefore, best practice can be followed which acknowledges the importance of biodiversity and what measures are needed to protect and enhance wildlife habitats when restoring these important landscapes. These techniques will be applied at Wallington without compromising the programme of restoring the designed landscape.

To ensure that biodiversity is a key priority in all operations a comprehensive and targeted system of surveying and monitoring of wildlife and habitats needs to be established. This would guide and inform any future management. This chance to study and record biodiversity could also allow it to be made available to a wider audience and increase the understanding of important wildlife species.

Whilst carrying out any management on the Estate there are many ways to involve and engage the public which can reduce possible conflict.

2.4.7 Resources.

The human and financial resources available for managing the woodland are limited. The National Trust Countryside Team at Wallington are skilled and trained in forestry and arboriculture and are more appropriately employed where management requires a high degree of sensitivity, care and public interaction. Contractors will therefore be needed in order to complete the work programme.

Contractors often require a high level of monitoring and management to ensure that they understand and appreciate the high standards required by the National Trust regarding biodiversity, water quality, landscape, health and safety, biosecurity and public safety. These higher standards will incur costs and reduced income for the Trust. Supervision will be required to ensure that the contractors leave the site in a fit condition as outlined in the contract.

The costs of establishing woodland and restocking recently cleared plantations can be high. Newly planted trees need protection from deer, rabbits and hares. In many locations deer/rabbit fencing is impractical and expensive and therefore individual tree tubes are the only alternative resulting in a high cost per individual tree.

Many of the woodland parcels are linear features and therefore have a disproportionate length of fence to area ratio.

On deep rich moist soils, vigorous ruderal vegetation can become established on recently cleared sites hampering natural regeneration and out competing planted trees. These sites may require mounding prior to planting and /or regular weeding in order to guarantee the required stocking levels.

Felling a coniferous crop produces a large increase in breeding material for the large pine weevil *Hylobius abietis*, whilst plant material suitable for adult feeding is reduced. Young trees used for restocking are liable to be heavily attacked by adult pine weevils feeding on the stem from the root collar upwards and by adult black pine beetles tunnelling in at the root collar and feeding on the main part of the root system. Heavy damage can completely girdle stems and cause plant death. Apart from chemical control, a fallow period of 3 to 4 years is the main method of control. This can result in the establishment of dense ruderal vegetation (see above).

The House and its immediate surrounds require more intensive management and resources. A consequence of this could be that more distant woodlands or woods with poor access become neglected or ignored.

Opportunities.
Changing woodland management to continuous canopy systems in selected areas and minimal intervention in others will reduce the amount of resources and staff time needed on lower priority woodlands.

Resources can be concentrated on the immediate environs near to the House and gardens and a small number of the more productive commercial stands.

2.4.8 Grey Squirrels

Grey squirrels are present in small numbers across the Estate, but have been actively controlled as part of a Red Squirrel Conservation Programme since 2012. Whilst they are not currently causing damage to trees, they will always be a threat to the red squirrel population through the transmission of disease and competition for food. Maintaining a viable red squirrel population therefore requires regular shooting and trapping of greys which is carried out by a member dedicated full time Red Squirrel Ranger in post since 2016. Red squirrels benefit from the presence of large areas of conifer (particularly Scots pine and Norway spruce) on the Estate (Sitka spruce is less valuable as a food source). Felling of adjacent areas at the same time may not only result in immediate loss of food, but may also prevent animals moving around the Estate. Restoration of plantations to mixed broadleaves will reduce the food available and certain broadleaved species are likely to favour grey squirrels (e.g. oak, chestnut and hazel)

Opportunities
Retaining stands of Norway spruce and Scots pine within broadleaved woodland can provide a valuable food source for red squirrels.

When converting plantations to broadleaf, the inclusion of Scots pine will provide a future food source for reds. Hawthorn and yew should also be included, as well as birch, rowan, willow, aspen and alder.

Management of productive forest as continuous cover rather than clearcut/restock will maintain a stable habitat and food supply

2.4.9 Deer

Roe deer are present and are maintained at an estimated population of 120 individuals. Browsing and impacts on ground flora are currently moderate. Without control, numbers would increase preventing natural tree regeneration, and causing damage to plantings. This would make restocking more expensive as deer fencing would be required. Old deer fences are a hazard to Roe deer which can become entangled. A higher deer population could also lead to increased mortality on the roads around the Estate. Muntjac are not currently found on the Estate, but this is likely to change over the next 5 years (Graham 2015). This could have a serious impact on natural regeneration and ground flora. Further Information – Wallington Deer Management Plan (Graham – Mar 2018)

Opportunities

Improving access and infrastructure for timber production in some of the larger plantations will facilitate more effective deer control.

Clearfelling and restocking conifer plantations provides an opportunity to plan deer glades and rides in the new woodland

2.4.10 Birds, bats and badgers.

Incidental damage to a breeding site or resting site of any European bat species an offence under the Habitats Regulations (revised 2007). It is an offence to damage or obstruct a badger sett which shows signs of current use under the Protection of Badgers Act 1992. Forest operations such as tree felling and timber extraction are sources of damage and disturbance. See Forestry Commission publication 'Forest Operations and Badger Setts'. 1995. Practice Guide 009. This concentrates on methods of safeguarding setts and managing woodland for the benefit of badgers. The bird nesting season from April to mid-August inclusive is a constraint. Forest management should avoid unnecessary disturbance during this period.

2.4.11 Lack of knowledge

Although a number of surveys have been carried out many of these are out of date (e.g. 1999 biosurvey), the actual number of species at Wallington will be far greater than the number recorded. Management decisions can only be based on what is known, but may be detrimental to species not yet known to be present. Prior to any management or the development of any future infrastructure in woodlands, thorough surveys for all forms of wildlife should be carried out at appropriate times of year.

2.4.12 Access and infrastructure

Access for woodland management varies across the Estate but is generally poor. Suitable tracks, roads, timber storage areas, vehicle turning points and parking are essential if woodlands are to be managed effectively. Where stands are deemed to be suitable for commercial timber management, infrastructure will require a high initial capital expenditure and continuing input of resources for maintenance.

The small, isolated and inaccessible nature of the many woodland compartments indicate that they are unsuitable for economic forestry and should therefore be converted from a commercial conifer crop to a mixed broadleaf stand and managed for wildlife, resource protection and landscape.
Access is also required for effective deer management and grey squirrel control.

Opportunities
Once established, tracks can be multipurpose and will not only facilitate woodland management but also deer control, wildlife surveying and monitoring as well as public access.

Permanent tracks away from the House and gardens will allow the public to visit the wider Estate.

2.4.13 Public recreation and Public perception

The Trust has a high profile amongst its visitors with many people interested in the way we manage our land. Information and consultation would be best practice for much of our work via on site or social media. Visitors provide an extremely important source of revenue, and any actions that adversely affect visitor numbers and revenue (e.g. temporary closures of parts of the Estate, unattractive clear fells,) could have consequences for our ability to manage the House and Estate. This is not an argument for not doing these things, but means that NT staff and contractors will need to carry out forest operations in a sensitive manner and inform and educate visitors about woodland management to retain their support.

Education may be required to change people's perception of woodland management (e.g. about the importance of dead wood). Reinstatement of public and permissive paths to a high standard after any forest operations is vital. Other operations will also be constrained by visitor numbers on some sites.

High visitor numbers and the installation and construction of visitor infrastructure can cause, damage, trampling, erosion and compaction of soils around tree roots which may directly affect the health of trees.

Visitor numbers were 234,000 in 2017/18 and the ambition is to see numbers rise to 300,000 by 2024/25.

Increased visitor access and the development of facilities such as car parks, trails, mountain bike tracks and play areas are likely to conflict with objectives for wildlife conservation and quiet enjoyment. These visitor facilities may also compromise the type of woodland management that was originally intended for the stand by limiting the timing and type of forestry operations that can be carried out.

Opportunities
Forest operations provide a great opportunity to explain the complexities of woodland management to visitors which will foster a greater interest in and support for the work being carried out.

2.4.14 Climate change

Natural England has identified possible threats to semi-natural woodland posed by climate change and many of these are applicable to Wallington. Warmer winters may allow the expansion in distribution of many tree pests and diseases, as well as increasing the over-winter survival of mammals such as grey squirrel and roe deer. An increase in the frequency of storms is likely to lead to more regular disturbance of the woodland canopy which may change the species composition. Increased occurrence of summer drought will lead not only to tree stress, but also to increased fire risk.

Another consequence of increased summer drought will be reduced flows in watercourses which could lead to lower lake levels and loss of biodiversity from riparian zones. See Natural England and RSPB (2014) Climate Change Adaptation Manual.

Historic England has also identified impacts which climate change may have on the historic environment. The following are relevant to Wallington;

Historically authentic tree plantings may be difficult to conserve in a warming climate. Change in the distribution of pests may threaten the integrity of designed landscapes, increases in the frequency and geographical range of extreme weather could pose an increased risk of damage to historic landscapes. Changes in vegetation patterns may threaten the visibility and integrity of historic landscapes.
See Historic England (2008) Climate Change and the Historic Environment

Opportunities
Management such as maintaining a continuous canopy, diversifying the species and structure in order to ensure that the woodlands more resilient to possible effects of climate change are also sound sustainable silvicultural techniques which also benefit wildlife , protect natural resources and enhance the landscape.

3 Long term vision, management objectives and strategy

3.1 Long term vision 2068

The vision is intended to be aspirational. It describes what the woodlands could look like in 50 years.

The woodlands at Wallington make a significant contribution to the rich biodiversity and important historic landscapes of the Estate. As envisioned by Sir Walter Blackett and his successors the Trevelyan's, the Estate has numerous small shelterbelts which are predominantly broadleaf with Scots pine, as well as larger blocks of semi-natural woodland. There is a high degree of connectivity between the woodlands due to the presence of well managed hedges and abundant field trees. The shelterbelts and blocks fit into the landscape, softening rather than accentuating the often very geometric field pattern, and changing with the seasons.

The woodlands have a good range of native and near native trees and shrubs, providing important feeding and breeding areas for numerous invertebrate species, birds and mammals. Dead wood is abundant and trees at all growth stages are present, from saplings to veterans. The larger, longer established woods have an attractive ground flora which includes bluebells, wood anemone, wild garlic and primrose, and support a good assemblage of breeding birds including redstart, pied flycatcher and wood warbler. Deer are present but at levels which do not threaten natural regeneration and the population of red squirrel is self-sustaining. Pine Martins will have recolonised through much improved connectivity of stream, hedges and woods. The Wansbeck and its tributaries flow through the Estate in dynamic channels and boast clear pure water which supports populations of white clawed crayfish and other wildlife. The sparkling ponds and lakes are not only attractive features but provide habitat for another suite of plants and animals.

Visitors can enjoy many of the woodlands on foot or cycle via a network of well-marked and well maintained paths. A series of interesting routes with different starting points around the Estate connect the woods via pleasant farmland and riparian habitats.

Timber production is concentrated on a small number of woods which have good access and infrastructure. Here both hardwoods and softwoods are managed in a continuous canopy system which is sensitive to the landscape yet produces a steady supply of high quality timber for use on the Estate and to generate income.

3.2 Management Objectives

1. Protect and enhance biodiversity of the woodlands.
2. Conserve the historic designed landscape and archaeological features.
3. Encourage safe and sympathetic public access and extend opportunities for education, recreation, and participation where this does not conflict with the other objectives.
4. Ensure the woodlands are resilient to climate change and plant diseases.
5. Improve the capacity of the woodlands for resource protection.
6. Produce a small but sustainable supply of timber for use on the Estate and to generate income.
7. Comply with UK Forest Standard, UK Woodland Assurance Scheme and statutory requirements.

3.3 Strategy

3.3.1 Protect and enhance biodiversity of the woodlands.

a) Manage the woods primarily for biodiversity and long term retention
b) Replace the majority of even aged conifer plantations with mixed broadleaves and Scots pine
c) Improve the structural and species diversity of broadleaved woodland
d) Encourage dead wood volumes to increase
e) Identify and conserve current and future veteran trees
f) Use opportunities provided by natural processes (e.g. storms) in management
g) Develop/establish a detailed up to date record of species and habitats by commissioning surveys and encouraging recording by groups and individuals
h) Protect and maintain populations of priority/rare plants and animals
i) Maintain areas of low disturbance
j) Eradicate invasive non-native species
k) Increase connectivity of isolated woods
l) Protect woodland biodiversity from agricultural/other activities

3.3.2 Conserve the historic designed landscape and archaeological features.

a) Retain the historical pattern of woodland planting as far as possible
b) Restore shelterbelts and woodlands across the wider Estate to mixed broadleaf/Scots pine
c) Protect archaeological features within woodland compartments
d) Restore historic paths and views
e) Implement proposals in the Conservation Action Plans for the House and Rothley pleasure grounds where this does not conflict with other objectives.
f) Follow advice from the Regional Archaeologist and Historic England

3.3.3 Encourage safe and sympathetic public access and extend opportunities for education, recreation, and participation where this does not conflict with other objectives

a) Maintain the network of permissive paths to a high standard
b) Increase opportunities for access to woodlands throughout the wider Estate where this does not conflict with other objectives
c) Carry out tree safety inspections and undertake work appropriate to the risk zone
d) Provide information for visitors and use the woods to educate the public about woodland biodiversity and management
e) Recruit, involve and support volunteers

3.3.4 Ensure woodlands are resilient to climate change and plant diseases

a) Diversify woodlands by encouraging a wider range of native and near native tree and shrubs
b) Carry out risk assessments for tree diseases which may affect the Estate and draw up contingency plans
c) Maintain high biosecurity in all forestry operations and in the Estate gardens
d) Favour natural regeneration over tree planting as much as possible
e) Reduce the impact of other pressures on woodland such as non-native invasive species, deer, effects of adjacent land use.

3.3.5 Improve the capacity of the woodlands for resource protection

a) Remove conifers from watercourses and create buffer zones
b) Extend woodlands on watercourses where this will not damage other riparian habitats
c) Encourage natural processes in woodland watercourses and allow the accumulation of coarse woody debris
d) Seek opportunities to expand existing woodlands and create new ones on agricultural land to slow flows, reduce soil erosion and to link/buffer existing woods where this will not compromise the historic landscape

3.3.6 Produce a sustainable supply of timber for use on the Estate and to generate income.

a) Concentrate timber production in a small number of larger plantations with easy terrain and good access
b) Improve infrastructure in these woods to facilitate management and timber extraction
c) Adopt continuous cover forestry techniques and restructure even aged stands to provide regular income generation over the long term and reduce re-establishment costs
d) Convert inappropriate and uneconomic plantations to low maintenance mixed broadleaved woodlands

3.3.7 Comply with UK Forest Standard, UK Woodland Assurance Scheme and statutory requirements.

a) Comply with statutory requirements
b) Keep up to date records of management, monitoring etc
c) Follow guidance in all operations (e.g. protection of watercourses, use of pesticides, felling and restocking etc)

4 Management prescriptions/operations

4.1 Silvicultural systems

4.1.1. Felling

Zoning of operations
The woodlands will be classified into four categories for management purposes (see Map 7)

1. Existing mixed broadleaf/Scots pine woods managed primarily for biodiversity and landscape
2. Conifer plantations to be converted to mixed broadleaf/Scots pine and then managed for biodiversity
3. Conifer/broadleaf plantations managed for timber production
4. Woodland blocks inappropriate to the landscape to be removed

1 Existing mixed broadleaf/Scots pine managed primarily for biodiversity and landscape
This category is specifically for wildlife and landscape conservation and areas of native woodland on the Estate. It could also be applied to areas of the Estate with low productivity or where timber extraction is both difficult and potentially damaging. The woodland will be allowed to progress towards an "Old Growth" type, rich in veteran trees and dead wood habitats. Timber removal will generally be minimal. Intervention may be required for safety reasons or to prevent unwanted species becoming established or too dominant. In areas where biodiversity is a key feature, felled wood will be used to boost the dead wood habitat and increase nutrient recycling. The woods will be managed for the long term to maximise their value for the landscape and wildlife. This does not mean non-intervention. Active inputs such as deer management, maintaining public access, the upkeep of stockproof boundaries and the control of non-native species will be required. **In certain woods/compartments significant targeted restoration management and intervention (e.g. thinning out or felling of conifers) will be required to achieve a more semi-natural state after which the management will revert to long term retention for biodiversity and the landscape.**

Total area 214ha (67%) See Compartment Schedule (Silvicultural Type) for details.

2. Conifer plantations to be converted to mixed broadleaf/Scots pine then managed for biodiversity
This operation applies to the small conifer plantations and shelterbelts primarily on the wider Estate. Priority will be given to i) stands with watercourses flowing through them, ii) stands approaching maximum mean annual increment and iii) stands which are not wind firm. Once converted and broadleaves and have been established successfully, the stand will be retained in the long term for biodiversity and resource protection.

For restocking See 4.1.3 Establishment, restocking and regeneration

Total area to be converted 37ha (12%) See Compartment Schedule (Silvicultural Type) for details

3. Conifer/broadleaf plantations managed for timber production

This applies to a small number of selected woodlands with good access and proven productivity. (Compartments 15 Forty Acre, 36 Stockcrag Plantation, 46 Delf (part) and 47 Thistleby and 56 Kiln Wood and 95 Christmas Tree Plantation (Total 63ha 20%). 25 Whinney Plantation is also a possibility as it has reasonable access

Low impact silvicultural systems will be used as an alternative to clearcut systems. These may include:

- True selection system which manages the establishment, continued growth and final harvest of multiple age classes of trees within a stand
- Uniform shelterwood which is the gradual removal (2 or more successive fellings) of canopy with the objective of securing good natural regeneration. The canopy protects and shelters the developing regeneration until it is well established.
- Uniform shelterwood 'with reserves' is a variant of the shelterwood method in which some/all shelter trees are retained well beyond the normal period of retention to attain goals other than regeneration (e.g. veteran trees, biodiversity)
- Irregular / group shelterwood is not applied to the whole compartment but carried out in scattered groups in which the foci of regeneration can be progressively enlarged so that they ultimately merge.

In these woodlands operations will require suitable infrastructure of forest tracks, permanent extraction routes, stacking and transfer areas. Compared to clearfell and restocking regimes, continuous canopy silvicultural systems will require a greater understanding of individual stand dynamics, local ground conditions and more input from the woodland manager. In order for the continuous canopy silvicultural systems to be successful small scale but regular intervention will be required. This will ensure that there is adequate natural regeneration, the desired species mix, multiple age classes and the retention, promotion and development of potential crop trees.

4. Woodland blocks inappropriate in the landscape to be removed

A very small number of compartments have been identified for removal as they inappropriate in the landscape. Compartment 7b will returned to parkland gradually over time with retained veteran/future veteran parkland trees. Compartments 65 and 66 will be returned to moorland (3.74ha 1%).

Harvesting Methods. In all of the above, where timber is to be harvested, low impact harvesting systems will be used to reduce (as far as possible) soil compaction and minimise disturbance to the forest ecosystem and routes planned to avoid sensitive areas. This will include

- Use of smaller machines where possible
- Use of horses in particularly sensitive areas
- Timing operations to avoid wet periods
- Retaining broadleaves wherever possible and protecting other habitats. Unstable broadleaves could be coppiced.
- Timing operations to avoid the bird breeding season in sensitive areas
- Avoiding forwarders using hard permanent access tracks

Marking of selective thinnings. Selective thinnings will be marked rather than feller-selected wherever possible. Opportunities will be taken to mark a pool of 'final crop' or 'future trees' which can then be released during successive thinnings. This will also identify the stems that are worthy of high pruning. Some lower grade trees will be marked for felling to waste or for killing standing to increase deadwood habitats in line with UKWAS recommendations. Bat habitat assessments will be carried out at the time of marking by the forester, and any suspected or known bat roost trees a will be marked for retention and guidance followed as to buffer zones around them. (see Woodland Management for Bats. FC. 2005)

Brash. The management of brash should be considered during harvesting and restocking operations. The use of brash mats will protect forest soils from physical damage during extraction. Brash is also an important component in the forest ecosystem and its management can make a difference to the sustainability of a site. Brash will also affect the economics and the performance of restocking both planting and natural regeneration. It is important that brash does not constrain access to the site for follow-up work such as tree planting or weeding.

Management of brash also influences soil and water acidification. The storage and retention of brash near watercourses may cause eutrophication especially where soils have little buffering capacity. Felling conifers into watercourses will be avoided. Brash will be removed within 5 metres of all watercourses, waterbodies and wetland habitats during all harvesting operations. Dense brash can smother the ground flora and sensitive habitats.

At locations which have high public usage or which are highly visible within the designed landscape, any quantity of brash would be inappropriate and its removal will be required. Where possible this should be chipped and the arisings transferred elsewhere. The smothering of important habitats with chippings will be avoided. Burning causes damage to soils and pollution. Lop and top will only be burned where there is a demonstrable benefit and after all considerations and alternatives have been investigated. Soils, bare rock surfaces and adjoining habitats and trees will be protected. All burning is subject to Schedule 3 Waste Management Licensing Regulations 1994.

4.1.2 Phased felling and restructuring of plantations

Phased felling

This applies to stands that have been identified for clearfell of conifers and restocked with mixed broadleaves. Factors that will determine the prioritisation for conifer stands to be felled include:-

- Exposed stands that are prone to windthrow, or stands that will be exposed to the prevailing wind when adjacent plantations (both NT and other owners) are harvested (e.g. Greenleighton).
- Stands that have reached harvestable age/size
- Stands adjacent to watercourses

Some stands will be retained in the short term to ensure shelter on farmland until newly restocked compartments, new shelterbelts and hedgerows have become established. Where larger woods are to be converted, leeward stands will be felled first and harvesting will then work towards the windward edge. Adjacent landowners, tenants and other interested parties will be consulted prior to a timetable of phased felling in put into place.

4.1.3 Establishment, restocking and regeneration

Natural regeneration will be favoured wherever possible this may result in the establishment of both native and non-native and also desirable and undesirable species.
Planting will be needed;

- To restock clearfelled conifer plantations with mixed broadleaves
- To maintain the continuity of a species or species mix in the landscape where they are not regenerating naturally or at a sufficient stocking density.
- To re-establish a species in a stand.
- The restocking of woodland will be carried out in conjunction with the restoration and re-planting of hedgerows and field trees across the rest of the farmed landscape.

Many of the shelterbelts and smaller woodlands will in future be managed for their biological and landscape interest not timber production, and will therefore include a larger proportion and a more diverse range of lower canopy tree and shrub species, and species which provide food (e.g. nectar, pollen, seeds and fruits) for a range of wildlife. See 4.6.2 for more detail on suitable species.

Planting will also reflect the traditional species mix at Wallington. As well as native broadleaves, plantings will include an element of Scots pine (for red squirrels, historic and landscape reasons) and other near native species such as beech, sweet chestnut, lime and sycamore.

Where planting is necessary, it will be ensured that the tree species chosen do not generate a new threat to the woodland's health and structure.

A tree nursery was established in 2017 by the Wallington garden team to provide some trees of know provenance i.e. seed taken from existing veteran trees at Wallington. Due to the scale other trees and shrubs will have to be bought in from a reputable nursery.

All recently established trees will need protection from grazing deer either through targeted deer control, individual tree protection or temporary exclusion.

Resources will be allocated to the assessment and aftercare of the young trees in the years immediately after establishment and this will be carried out until the planned species mix and stocking levels are achieved. The removal of undesirable species will be carried out during the weeding phase of the establishment process. Records will be kept for all stages during the establishment process.

If tree guards and tree protection are used they should be fit for purpose, appropriate to the location within the estate, maintained and removed and/or recycled when no longer required.

4.2 New planting

This plan does not propose any new planting, however there are opportunities to restore areas of woodland which have disappeared, to extend existing woodlands or to create new woodlands for landscape, biodiversity and resource protection. This subject will be looked at as part of the new 10 year Wallington Estate Plan (2018).

Prior to any planting, a full survey and analysis of the proposed area will be undertaken to cover soils, hydrology, biodiversity, landscape and historic features. A detailed plan will then be drawn up taking account of the survey findings, and will include the species to be planted, stocking levels, proposed infrastructure and access, tree protection and aftercare.

4.3 Other operations

A number of woods that are currently grazed will be made stockproof (5, 11c, 27a, 31a, 32b, 41, 76, 78, 82, 83c and 101).

Boundaries of all woodlands should be maintained in good stock proof condition. Regular inspection and repair of boundaries will be written into a work schedule. If appropriate, practical and cost effective traditional boundaries will be repaired. Priority will be given to external boundaries and those visible in the landscape where fencing would be visually intrusive.

Where fences are used, alignment shall be designed to minimise impacts on access, landscape, wildlife and archaeological sites.

4.4 Protection and maintenance

4.4.1 Pest and disease management

Deer

Deer will be managed in accordance with the Deer Management Plan (Graham 2015)

Grey Squirrel

Grey squirrel control will continue to be a conservation priority and follow the strategic approach already adopted. This will ensure that methods of control follow best practice and are targeted, humane, discreet and timed to be most successful and cost effective. Planning will target resources where they are needed most. The level of damage will be assessed as a measure of the effectiveness of the control. Squirrels are highly mobile and soon re-colonise cleared woodlands. Therefore grey squirrel control will be a long-term project.

Climate change and the expansion of international trade are likely to increase the threat posed to Britain's woodland by tree pests and diseases. The National Trust will preserve the health and vitality of its woodlands by excluding, detecting and responding to existing and new pests and pathogens of trees.

Phytopthora ramorum

The gradual thinning out of larch as part of the restructuring process will be reduce the amount of larch in the woodlands and reduce the impact of Phytopthora if it does arrive. It is important to note

that other species including Rhododendron are hosts of this pathogen, so removal of larch will not remove the risk of infection
Constant vigilance is the key to preventing the spread of this disease. Staff and volunteers on the Estate will be made aware of the disease, its symptoms and the reporting process.

Biosecurity - Spores can be carried on footwear, clothing, plant material, machinery and tools. Contractors when arriving at Wallington will follow FC advisory note FC 30/4/2010 (available on FC website).

If any National Trust woodland does become infected by *Phytopthora ramorum* and is served notice by the Forestry Commission this will have dramatic consequences.

To prepare for a possible future outbreak, an Emergency Plan will be drawn up covering:-

- Biosecurity measures for the public, operators, staff, machinery and tools
- Details of grants available for felling and restocking
- Details of suitable contractors
- Details of the felling operations, measures to avoid damaging important adjacent habitats.
- The movement and storage of timber, restocking and the prevention of re-infection of restocked areas and the disposal of infected material.

Red Band Needle Blight. *Dothistroma*
When planting pine, trees should only be imported from nurseries known to be free of the disease. The conditions that enable its colonisation can be avoided by the heavy thinning and pruning of dense closed canopies. Species diversification should also be considered including the use of other appropriate broadleaf and conifer species.
see http://www.forestry.gov.uk/dothistromaneedleblight
and http://www.forestry.gov.uk/pdf/DNBStrategy11-04-2012.pdf/$FILE/DNBStrategy11-04-2012.pdf

Ash dieback
Ash dieback was identified at Wallington (West Wood 7a) in 2017, staff are aware of symptoms of and will be vigilant when visiting and monitoring woodlands. The extent of the disease and advice regarding its control is updated on a regular basis. Advice provided by the Forestry Commission and other agencies should be followed. Any actions which may encourage the spread of the disease or increase its potential to cause more harm to the ash (e.g. new planting, coppicing or pollarding) should be avoided at all costs. Natural regeneration of ash, which may be genetically resistant to ash dieback, should be encouraged wherever possible.

4.4.2 Fire plan
Four Fire Plans to cover the Estate are currently being prepared in partnership with the Northumberland Fire Service (May 2018)

4.4.3 Waste disposal and pollution
- The Trust will comply with COSHH regulations. (See also 4.4.4 Pesticide Use)
- Storage of fuel will follow FC Forestry and water guidelines.
- Burning of cut rhododendron, lop and top will only occur if no alternative available. See 4.1 Brash. Fires will not be started on bare rock surfaces. Ash will be disposed of away from sensitive habitats, wetlands and watercourses.

- Emergency Pollution control. A contingency plan will be drawn up to deal with accidental spillages.- (See FC Forestry and Water Guidelines)
- Old fencing wire, posts and plastic tree shelters will be collected removed from site and disposed of appropriately
- All wastes will be disposed of via a reputable and licensed waste disposal contractor.
- Timber harvesting (or any other potentially polluting) operations near to water will be planned under the relevant site risk assessment, and oil-scouring booms and silt traps will be deployed / constructed at suitable points downstream of the area(s) of possible disturbance.
- Biodegradable chain oil will be specified for all users on the Estate.
- Machines with biodegradable hydraulic oil will be used for any works near or in water as specified by the Environment Agency.
- Contractors with machinery will be required to have anti-spill oil clean-up kits on site at all times with their machines.
- Suitable refuelling and overnight parking points will be discussed and marked on a map with the site risk assessment, to avoid sensitive areas such as proximity to water bodies or particularly sensitive ground vegetation.

4.4.4 Pesticide Use

- Pesticide use will be minimised. Users of pesticides will take all precautions to protect the health of humans and safeguard the environment and avoid the pollution of water.
- Pesticides will be stored, used and disposed of responsibly and sustainably
- The responsible and sustainable use of herbicides will only be one element in the effective control on non-native invasive plants
- One method of herbicide reduction will be the direct targeting of key areas for control for non-native invasive plants.
- Mechanical control such as complete stump removal of rhododendrons will be the preferred method of control especially near sensitive habitats, wetlands, watercourses and areas of high public use.
- Where chemical control is the only option most of the foliage will be removed prior to treatment. The application herbicide will primarily be directly on freshly cut stumps or the regrowth. The regrowth is considerably easier to treat than full grown bushes, requires less herbicide and is much more responsive to chemical treatment. This will also reduce the risk of spray drift affecting the environment and the operator. The removal of foliage also has the added benefit of removing the seed source.
- Young seedlings will be eradicated as soon as they establish preferably by hand, before they have a chance to spread. It is easier to control small seedlings by hand than large bushes.
- Pesticide application will take careful consideration of buffer areas, weather and ground conditions and the risk to water supplies.

4.4.5 Protection of other identified services and values

Soils

- Soils will be protected and enhanced in terms of physical, chemical and biological properties
- Estate and forest operations will be planned and managed in order to avoid damage to the soil structure and function. If damage does occur, reinstatement work will be undertaken.
- Timing of extraction will be flexible to take into account the season and weather. Dry soils have a greater bearing capacity than wet soils. Operations will be monitored and modified, postponed or stopped if degradation starts to occur. If adverse conditions rule out operations, coordination of a harvesting plan throughout the whole estate will enable alternate sites to be worked until the situation improves or if remedial action is taken.
- Permanent or temporary tracks, stack areas, turning circles and loading bays will be identified and/or constructed to enable the safe and non-detrimental extraction of timber. Appropriate infrastructure will allow a greater flexibility in the timing between felling, conversion and extraction resulting in less soil compaction, the prevention of erosion and pollution and reduce restoration and re-establishment costs after operations have been completed. The success of establishing continuous canopy silvicultural systems also depends on a suitable track infrastructure being in place allowing for repeated small scale interventions over a longer period of time.
- Roads, timber extraction tracks, turning points and stacking areas will be designed, constructed and maintained to minimise environmental impact. Features of historic, cultural or biological value will be avoided. The visual impact of tracks will be minimised by blending with landforms and respecting the local character of the designed landscape. Road surfaces, drainage and harvesting access points will be designed to avoid erosion and soil compaction and minimises the risk of water pollution. Tracks will be designed and implemented to minimise energy use.
- Low impact harvesting systems will be used to reduce (as far as possible) soil compaction and minimise disturbance to the woodland ecosystem. A protective cover of vegetation can reduce the risk of erosion. Horse extraction may be more appropriate in some situations such as sensitive or inaccessible sites.
- Timber will be harvested without excessive waste of marketable or useable material.
- Low ground pressure machinery will be selected wherever possible or required and extraction routes planned to avoid sensitive areas identified in the harvesting plan. 4WD tractors with driven or drag trailer crane forwarder will be used where ground conditions and terrain will permit. Layers of fresh brash will be used on extraction routes to spread the load and minimise compaction.

Water

- Woodland management at Wallington will ensure the highest quality of fresh water, that the Estate and neighbouring properties are protected from natural hazards such as flooding and soil erosion and the needs of aquatic species are protected.
- Riparian woodland buffer areas will have a key role in intercepting sediments, nutrients and contaminants. Watercourses and water bodies will be identified and appropriate buffer areas

established and maintained to protect the aquatic and riparian zone. Forest restructuring, especially converting conifers to native broadleaves along streams and rivers will reduce acid pollution capture and reduce the risks of increased acidity of the watercourse. Native riparian woodland is ideal cover for linking disconnected habitats. The variable density of tree cover will ensure the right balance of light and shade to help control temperatures. The felling of conifers in the riparian zone will ideally be phased to enable the ecological recovery of the watercourse and maintain a mix of shaded and open sections.

- Forest operations will avoid creating pollution, erosion and sedimentation. Inspections will be carried out during forestry work and action will be taken immediately if pollution or sedimentation starts to occur. Forest machinery will not operate in or ford watercourses.
- Buffer zones and stream sides will be kept free of brash. The felling of trees into watercourses will be avoided but the brash removed immediately if it occurs.

4.5 Game management

Pheasant rearing is only allowed in woodland compartments where woodland management, biodiversity or public enjoyment is not be compromised. It is regulated by a formal licence with strict conditions on stocking densities (following GCT guidelines), number of pens, removal of rubbish, predator control and restoration of habitat when pens are removed. There is one licenced shoot on Wallington currently.

4.6 Protecting and enhancing landscape, biodiversity and special features

4.6.1 Management of designated areas

Staff and contractors will be made aware of the status of the Wallington Hub site as a Grade 2* listed park and garden and works will follow current best practice. Work will also be informed by the Conservation Action Plan for Wallington's Listed Park and Garden (Rutherford 2016). The impact of forestry operations will be minimised. Specialist advice will be sought prior to any operation. Management proposals must be consented by English Heritage prior to work going ahead. Tree felling within the Cambo Conservation Area will require approval from the local authority.

4.6.2 Measures to enhance biodiversity and other special features

Manage the woods primarily for biodiversity and long term retention

The majority of the woods will now be managed for biodiversity (and landscape) rather than timber production. See Map 7

Replace the majority of even aged conifer plantations with mixed broadleaves and Scots pine

See section 4.1.1. Silvicultural Systems and Map 6 and 7

Improve the structural and species diversity of broadleaved woodland

Trees will be retained beyond normal rotation and regular thinning will cease allowing a more natural structure to develop. In restocking a wider range of native and near native species will be used with a larger proportion of sub canopy and shrub species including hawthorn, blackthorn, crab apple, guelder rose, rowan, goat willow, wild cherry, bird cherry, hornbeam, hazel, etc.

Allow dead wood volumes to increase

Windblow will only be harvested where it is of significant value, where there is more than enough dead wood already or where leaving it will hinder management or access. Standing dead wood (snags and ring barked trees) and fallen dead wood will be created where necessary. The aim should be to have 20m^3 of dead wood per hectare. See Humphreys and Bailey 2012 for more guidance on dead wood conservation

Identify and conserve current and future veteran trees

The Wallington Hub Veteran Tree Survey (Dec 17) has recorded 114 trees to date. This survey will be continued and expanded upon with recommendations for management of trees being produced. All veterans in woodland will be prioritised and retained with conservation methods such as Halo thinning a priority.

Use opportunities provided by natural processes (eg storms) in management

Natural regeneration will be used in restocking where possible. There is an assumption that windthrown trees will be left in situ to encourage establishment of young trees. However, they may be partial removed if they pose a public safety issue, have significant aesthetic impact or are effecting farmland.

Develop/establish a detailed up to date record of species and habitats by commissioning surveys and encouraging recording by groups and individuals

A repeat of the NT Biosurvey (1999) for the whole Estate is highly desirable. Regular monitoring of breeding birds will be established in key woodlands. Rare/uncommon plants will be resurveyed Other surveys will be commissioned e.g. invertebrates, fungi, crayfish

Protect and maintain populations of priority/rare plants and animals

Red squirrel will be protected through grey control (see 4.4.1), retaining some areas of mature Scots pine and Norway spruce on the Estate and restocking conifer clearfells with mixed broadleaf and Scots pine. In addition Scots pine and Norway spruce will form the main conifer component of the productive woods which will be managed under a continuous canopy system. This system will avoid the need for large clearfells which can fragment woods and lead to loss of a food source.

Establishment of new riparian woodland and conversion of conifer plantations on watercourses to mixed broadleaf will help improve water quality.

Maintain areas of low disturbance

Quiet areas (either whole woods or parts) will be retained in any future extension of the footpath network. Habitat and breeding areas of rare/sensitive species will be identified and protected

Eradicate invasive non-native species

A priority will be the removal of rhododendron from Rothley Lake during the life of the plan period and work will also be carried out to remove non-native invasive species from the woodlands highlighted in the table in 2.4 (3)

Increase connectivity of isolated woods

The restoration of old hedgerows and field trees across the wider Estate will be undertaken to link currently isolated woodlands and increase species connectivity. Where possible, woodlands will be extended and will be a prime consideration as part of the conifer reversion process.

Protect woodland biodiversity from agricultural/other activities

The Trust will liaise with tenants to maintain buffer strips around woodlands particularly on arable land. Farm waste, silage and old pheasant pens etc will be removed.

Woodland boundaries will be maintained in a stockproof condition and woodlands which are currently grazed will be protected to encourage natural regeneration.

4.6.3 Special measures for ancient semi-natural woodland (ASNW) and semi-natural woodland (SNW)

All Ancient Semi-Natural Woodland will have their own specific nature conservation management plans (Wansbeck Valley and Delf Burn). All semi natural woodland will be managed in accordance with the principle laid out in the Forestry Commission guidelines 'Managing Ancient and Native Woodland in England' guide and the Practice guides to semi-natural woodland relevant to the type of woodland.

4.6.4 Special measures for plantation on ancient woodland site (PAWS)

There are no PAWS woodlands on the Estate

4.6.5 Measures to mitigate impacts on landscape and neighbouring land

The felling and restocking of shelterbelts proposed in this plan will have an impact on farm tenants and other residents. Proposals will be discussed with tenants in good time before work starts. The Trust will try to minimise disruption and damage through appropriate timing and sequencing of operations. The effect of any individual tree felling operation on the landscape will be evaluated especially on prominent landforms. The public will be kept informed of any operations and management including up to date interpretation and notices. Contact and dialogue will be maintained with neighbours as necessary to ensure that any woodland management takes in to account their plans for neighbouring land uses.

4.6.6. Measures to mitigate against climate change

See NE Lowland Mixed Deciduous Woodland - Climate Change adaptation manual

- The impacts of other pressures, such as pests, invasive non-native species, diseases, pollutants, development, damage, compaction and erosion of soils and will be reduced.
- Regeneration will be encouraged and protected.
- The future suitability of species present on the site will be assessed.
- A greater mix of native trees will be encouraged through active management. The age structure and structural heterogeneity of woodland will be increased
- Contingency planning will be undertaken for potential new pests or major new disturbance events such as wildfire.
- Near native species such as beech, sycamore, sweet chestnut, hornbeam will be accepted as a component of semi-natural woodland as they may be more suited to future climates.
- Positive steps will be taken to increase the proportion and diversity of decaying wood to ensure both resilience of dependant species, and to replenish the organic content of woodland soils and hence maintain their capacity for moisture retention and provision of other essential ecological functions needed by trees and other species.
- New planting will increase the size of small woods and reduce edge effects. This will help reduce water loss and also the effects of spray drift from adjacent farmland.

- A greater mix of species will be established.
- Promoting natural colonisation to generate new semi-natural woodland adjacent to existing woodland will be considered, allowing locally native species to develop resilience through natural processes.

4.7 Management of social and cultural values

4.7.1 Archaeology and sites of cultural interest

Sites of archaeological interest will be identified and mapped. All features will be protected. Specialist advice on conservation and management will be sought from the Regional Archaeologist as necessary. Archaeology will be protected during all woodland and arboricultural operations, sensitive areas will discussed at pre-works site meetings and physically identified on the ground to warn operators of their presence.

4.7.2 Public access and impacts on local people

Timing of operations will take account of traffic and visitor levels. The public will be kept informed of major management works and woodland operations through temporary on-site signage prior to work starting. Public rights of way and permitted paths used as access routes will be reinstated promptly. An annual ongoing programme of roadside and property tree safety surveys will aim to ensure the safety of people and property on or passing near to the National Trust Property. Improvement works and woodland furniture such as signs, waymarkers and path surfaces will be maintained and be in keeping with the surrounding estate. All woods will be managed to a high standard demonstrating the National Trust's care for the countryside. Where possible the Trust will seek to support local employment. Volunteers will be actively encouraged to participate in the monitoring, management and maintenance of the National Trust woodlands at Wallington.

5 Detailed Management Prescriptions

6 Work programme

Cpt no	Activity	Year					
		19	20	21	22	23	24-29
Clearfell conifer and restock MB/SP							
6b	P1951 NS Landscape (0.46ha)			*			
12c	P1970 SS on watercourse/landscape and amenity impact (1.33ha)						*
18b	P1980 SS/SP Landscape (0.29ha)		*				
19	P1989 NS Landscape and biodiversity (0.27Ha)	*					
20b	P1995 MC On watercourse (0.34ha)		*				
26a	P1940 NS Reached harvesting age (1.61ha)		*				
26f	P1987 SS Conifer stand in high biodiversity woodland (0.54ha)		*				
27b	P1970 MC Conifer stand in high biodiversity woodland (0.85ha)			*			
28d	P1950 NS Conifer stand (2.46ha)						*
31b,c	P1974/85 SS/SP Conifer stand in high biodiversity woodland (0.58ha)		*				
33	P1960 SS Landscape (0.83ha)				*		
35a, b, c	P1970-73 SS Wind throw occurring/on watercourse (2.10ha)		*				
36 a	P1985 SS Landscape (1.03ha)						*
36j, k	P1990 SS On watercourse (0.93ha)		*				
36f	P1954 NS (1.87ha)			*			
37	P1960 SS On watercourse (1.44ha)					*	
38	P1960 SS Reached harvesting age (1.4ha)					*	
39a	P1972 SS Conifer stand in high biodiversity woodland/watercourse (2.03ha)	*					
41	P1960 SS/NS Landscape (1.1ha)						*
42a	P 1960 MC On Landscape/watercourse (1.05ha)				*		
42b	P1987 SS/NS Landscape (0.72ha)					*	
48	P1986 SS Wind throw occurring (0.85ha)						*
49a, c	P1987/90 SS Young plantation (1.77ha)						*
50b	P1986 SS Conifer stand in high biodiversity woodland (1.13ha)	*					
53	P 1957 NS Reached harvesting age (1.81ha)					*	
54a	P1975 SS Reached harvesting age (0.61ha)						*
56b	P1975 SS Reached harvesting age (3.75ha)			*			
57	P 1984 SS On watercourse (0.77ha)			*			
58	P1984 MC Young plantation (0.6ha)			*			
59a,b,c	P1980/86 SS Young plantation (1.46ha)						*
61a, b	P1970 SS Reached harvesting age (1.76ha)				*		
61c - g	P1970 SS Reached harvesting age (2.13ha)						*
63a,b	P1985 SS Young plantation (0.52ha)						*

67	P1981 MC On watercourse (0.5ha)		*				
68	P1981 MC Landscape (0.42ha)		*				
69	1981 MC On watercourse (0.95ha)					*	
70	P1970 SS On watercourse (1.2ha)		*				
77	P1974 SS On watercourse (1.14ha)				*		
92	P1985 SS On watercourse (0.34ha)			*			
Thinning and selective felling							
1b	Douglas Fir (0.12ha)		*				
6a	Sitka spruce and larch (3.79ha) – sensitive thinning over period	*	*	*	*	*	
7a	Mixed conifer (4.23ha)- sensitive thinning over period	*	*	*	*	*	
7b	Mixed conifer and Broadleaved trees (1.52ha) - sensitive thinning over period	*	*	*	*	*	
8	Thin MB and MC sensitively over period (1.77ha)	*	*	*	*	*	
9	Mixed conifer and MB (1.9ha) - sensitive thinning over period	*	*	*	*	*	
10	Thin MB and MC sensitively over period (1.26ha)	*	*	*	*	*	
12e	European larch/Norway spruce (1.25ha)	*	*	*	*	*	
12f	Douglas fir/European larch (2.66ha)						*
14a	Douglas Fir/European Larch (0.20ha)		*				
14b	Mixed conifer (0.43ha)	*					
14c	Japanese Larch (0.25ha)		*				
17	Japanese Larch						*
20a	P1972/87 SS Reached harvesting age (1.35ha)	*					
21a	Sitka spruce and European Larch thin (1.12ha)						*
21b	Japanese and European Larch thin (2.65ha)						*
22a	Thin MB						*
22b	Thin MB						*
23	Mixed conifer (0.28ha)						*
24	Western Hemlock, Japanese and European Larch					*	
31c	Norway spruce (0.43ha)						*
34a	Norway spruce (0.37ha)						*
39 b, c, d	Sitka spruce (4.51ha)	*					
44a	Sitka spruce (0.14ha)			*			
47e	Sitka spruce (scattered trees only)	*					
88	Sitka spruce (scattered trees only)						*
21b	Mixed conifer (2.65ha)						*
24	European larch (1.29ha)						*
25a-f	No action this plan period						
28e	Mixed conifer (1.94ha)			*			
98	Mixed conifer (1.03ha)					*	
99	Scots pine (3.71ha)					*	
100	Mixed conifer (1.99ha)		*				

Manage selected plantations for long term timber production using continuous canopy systems (63ha)							
15	Improve track and infrastructure for timber extraction						*
	Halo thin conifers around MB				*		
	Thin 50% of wood every 5 years					*	*
30	Thin MB along water course	*					
36	Improve infrastructure for timber extraction						*
36e	Thin P87 SS						*
36f	Heavy thin P54 NS leaving seed trees						*
46a	Thin P2002 SS favouring BI to achieve greater mix						*
46c	Halo thin P2001 SS from around POK	*					
	Heavy thin P2001 SS to encourage MB RN	*					
47a	Thin/respace BI	*					
47b	Thin/respace P2005 SS to favour BI and other MB	*					
47c	Mound and restock with SP/BI	*					
	Protect from deer	*					
47d	Thin P1995 SS to favour MB	*					
56	Create new track and infrastructure for timber extraction						*
56a	Remove deer fence						*
	Halo thin SP from around POK						*
	Fell P70's SS around watercourse						*
56b	Clearfell SS and restock POK/SP with MB fringe (3.75ha)						*
	Protect from deer						*
56c	Halo thin SS from around MB and buffer strip along watercourse						*
95a,b	Thin NS and create gaps						*
	Restock existing/create gaps with MB and MC (RN or planting)						*
	Soften edges by scalloping/planting MB						*
Remove inappropriate plantations and return to OG (3.74ha)							
65	Restore to moorland (1.15ha)				*		
66	Restore to moorland (1.07ha)				*		
Make woods stockproof (3.05ha)							
5	Repair/replace fence on riverside	*					
11c	New boundary fence	*					
27a	New boundary fence	*					
31a	New boundary fence					*	
32b	New boundary fence	*					
76	New boundary fence	*					
78	New boundary fence					*	
82	New boundary		*				
83c	New boundary		*				
101	New boundary						*
Eradicate Invasive non-native plants							

1b	Rhododendron	*	*	*			
5	Red osier dogwood, snowberry, giant hogweed	*					
7a	Rhododendron	*	*	*			
7 b,c	Cherry laurel	*	*	*			
9	Rhododendron, cherry laurel	*	*				
10	Rhododendron, cherry laurel	*	*				
14b	Rhododendron	*					
21a	Snowberry					*	
51a	Snowberry in adjacent area	*					
51c	Rhododendron	*	*				
52a,d	Rhododendron- High Priority	*	*				
52h	Skunk cabbage	*					
100	Rhododendron	*	*	*			
Restock existing clearfell/open areas with MB (3.03ha)							
12a	0.82ha	*					
27a	0.12ha	*					
28c	0.67ha						*
44a	0.29ha	*					
44b	1.0ha		*				
51b	0.13ha		*				
Supplementary planting of MB/SP							
11 a,c	Huntley Plantation	*					
13	The Octagon	*					
29	Holyburn Plantation			*			
82	Billy's Bank			*			
83a,b,c	Rugley Walls Shelter				*	*	
ALL Compartments	**Remove old tree guards, old fences and farm/pheasant rubbish**	*	*	*	*	*	*
Ride and glade creation/maintenance for deer							
15	Forty Acre			*	*		
36	Stockcrag Plantation	*					
46, 47	Delf	*	*				
56	Kiln Wood					*	
Generic Activities							
All	**Manage deer populations**	*	*	*	*	*	*
All	**Conserve red squirrels**	*	*	*	*	*	*
All	Carry out tree safety inspections in line with TSM Policy	*	*	*	*	*	*
All	Carry out veteran tree survey	*	*	*	*	*	*
All	Monitor/increase dead wood volumes	*	*	*	*	*	*
All	Repeat Biological Survey	*	*	*	*	*	*
All	Commission/carry out biological surveys (birds, mammals, invertebrates, vascular plants, bryophytes, lichens, fungi)	*	*	*	*	*	*

All	Maintain boundaries in stockproof condition	*	*	*	*	*	*
All	Maintain visitor infrastructure	*	*	*	*	*	*
All	Protect archaeological features	*	*	*	*	*	*

7 Monitoring

Indicator	Operation	Method of assessment	Notes
Negative impacts from deer	Deer Impact assessment, cull records	Deer Initiative system	See Wallington Deer Management Plan. Annual cull targets will be informed by outcomes from the deer impact assessment and observations from Deer/Red Squirrel Ranger
Sustainable Red Squirrel Population	Grey squirrel control	Ranger observation, camera and hair traps monitoring	Fulltime NT Ranger involved in red squirrel conservation.
Presence of rare and important species of bird	Annual surveys	Nest box bird ringing, BTO constant effort site (mist netting)	Ongoing monitoring since 1995 on boxes, Fallowlees, Wallington and Rothley Lake
Presence of all 9 species of bats found in Northumberland	Surveys	Roost counts	Surveys restricted to home woods and the buildings around Wallington.
boundaries			
Beat up surveys			
TSM			
Dead wood?		30 cubic metres of dead wood per hectare in key areas	
Veteran Trees Surveys			volunteers
Rubbish control			volunteers
Invasive species			

8 Stakeholder Engagement

Individual/ Organisation	Date Contacted	Date feedback received	Response	Action
NE				
RSNE				
Northumberland National Park				
Rothley and Holling Hill PC				
Wallington Dean PC				
Wallington Farm Tenants (15)				
Charlie Bennet				
John Palmer Anderson				
Lord Davenport				
FC Enterprises				

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