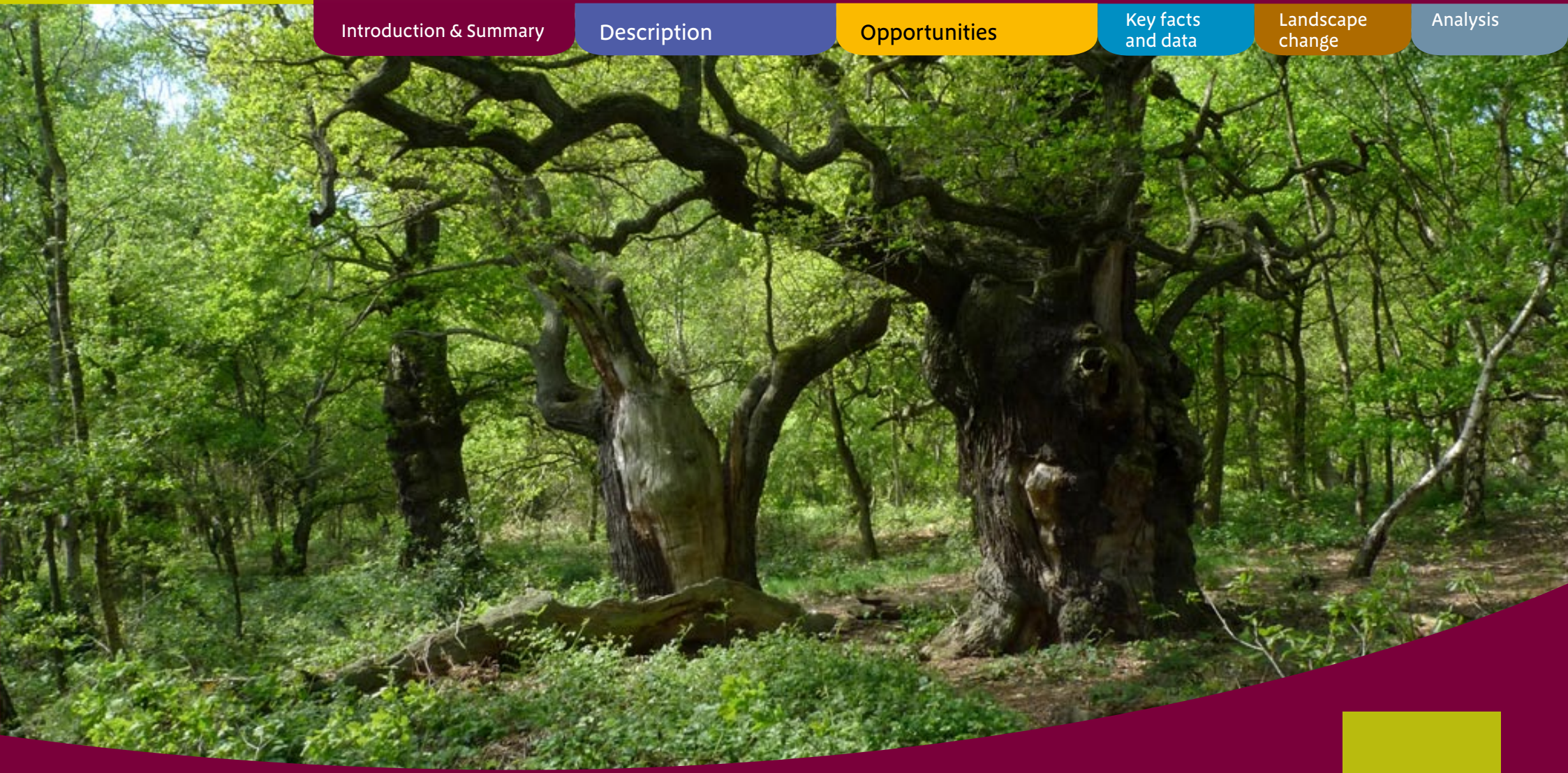
National Character Area profile:

49. Sherwood



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Introduction

As part of Natural England's responsibilities as set out in the Natural Environment White Paper[1], Biodiversity 2020[2] and the European Landscape Convention[3], we are revising profiles for England's 159 National Character Areas (NCAs). These are areas that share similar landscape characteristics, and which follow natural lines in the landscape rather than administrative boundaries, making them a good decision-making framework for the natural environment.

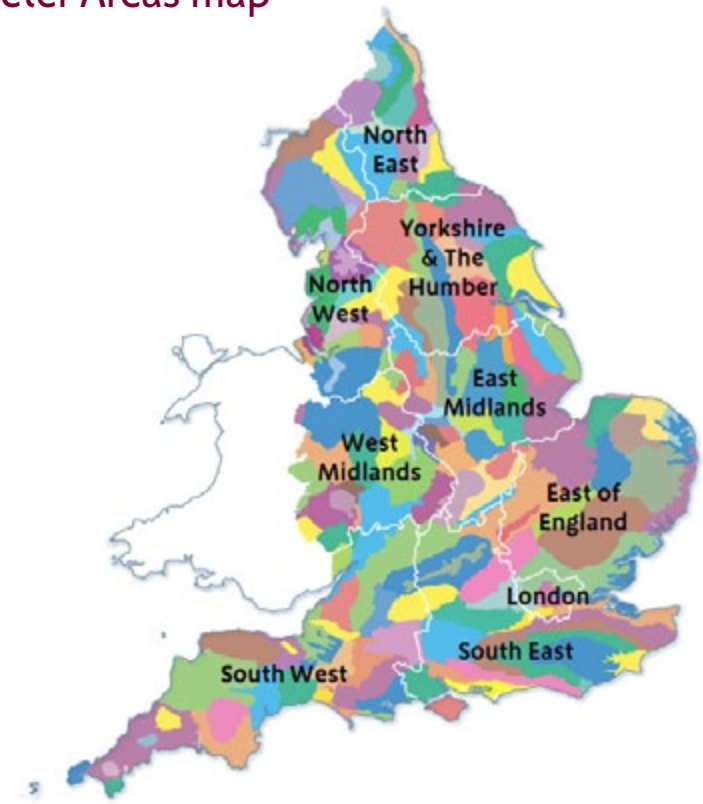
NCA profiles are guidance documents which can help communities to inform theirdecision-making about the places that they live in and care for. The informationthey contain will support the planning of conservation initiatives at a landscape scale, inform the delivery of Nature Improvement Areas and encourage broader partnership working through Local Nature Partnerships. The profiles will also help to inform choices about how land is managed and can change.

Each profile includes a description of the natural and cultural features that shape our landscapes, how the landscape has changed over time, the current key drivers for ongoing change, and a broad analysis of each area's characteristics and ecosystem services. Statements of Environmental Opportunity (SEOs) are suggested, which draw on this integrated information. The SEOs offer guidance on the critical issues, which could help to achieve sustainable growth and a more secure environmental future.

NCA profiles are working documents which draw on current evidence and knowledge. We will aim to refresh and update them periodically as new information becomes available to us.

We would like to hear how useful the NCA profiles are to you. You can contact the NCA team by emailing ncaprofiles@naturalengland.org.uk

National Character Areas map



[1] The Natural Choice: Securing the Value of Nature, Defra (2011; URL: www.official-documents.gov.uk/document/cm80/8082/8082.pdf)
[2] Biodiversity 2020: A Strategy for England's Wildlife and Ecosystem Services, Defra (2011; URL: www.defra.gov.uk/publications/files/pb13583-biodiversity-strategy-2020-111111.pdf)
[3] European Landscape Convention, Council of Europe (2000; URL: http://conventions.coe.int/Treaty/en/Treaties/Html/176.htm)

Summary

The Sherwood NCA extends north from Nottingham, principally coinciding with an outcrop of sandstone which forms a belt of gently rolling hills. Historically it was managed as woodland and remains a well wooded area. The oak and birch wood pasture in the heartland of Sherwood Forest and more recent pine plantations, contribute strongly to the sense of place. Large estate parklands, heathland, open arable land and a strong mining heritage also characterise the area. The area contains the settlements of Mansfield, Worksop, Retford and Ollerton around its peripheries and sits on an aquifer that provides water to the area.

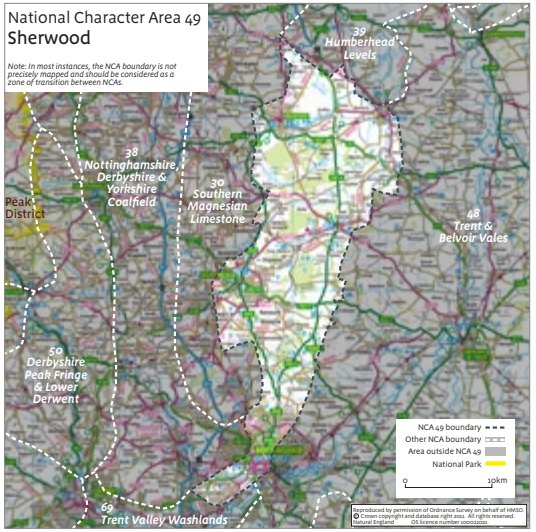
The woodlands of Sherwood support internationally important oak woodland and associated invertebrates. The area also supports nationally important assemblages of farmland birds. In addition Sherwood's strong cultural associations with Robin Hood help attract around one million vistors/year to the forest. Recent change has led to some increase in heathland through forestry clearance and conservation efforts, particularly on ex-industrial sites, and an increase in hedge size (largely through current agri-environment incentives). However, high recreation use in protected areas, over abstraction from the aquifer, soil erosion (in arable areas), and restoring derelict landscapes continue to provide challenges and opportunities.

Statements of Environmental Opportunity

- **SEO 1**: Protect, enhance and promote Sherwood as a landscape of international environmental and cultural significance by securing and expanding the iconic mosaic of woods, heaths and parklands, and enhancing recreation and education opportunities.

- **SEO 2**: Promote sustainable agricultural practices to help protect the major under lying aquifer, manage issues with soil erosion in Sherwood and increase farmland birds.

- **SEO 3**: Integrate new green infrastructure and conservation of historic features into the redevelopment of derelict land to establish high quality characteristic local environments.



Click map to enlarge; click again to reduce.

Description

Physical and functional links to other National Character Areas

The agricultural land and woodlands of the Southern Magnesian Limestone, and beyond that the Nottinghamshire, Derbyshire and Yorkshire Coalfield, lie to the west of Sherwood where the legacy of the coal mining industry is a strong physical and cultural link throughout.

The open arable land of the Trent and Belvoir Vales lie to the east. The narrow river valleys and corridors of riparian vegetation form links between these character areas. Areas alongside these rivers provide flood storage. This has an influence on flooding downstream in the Humberhead Levels which lie to the north and the Trent Valley Washlands to the south.

The sandstone aquifer which underlies the majority of the Sherwood NCA and the adjoining NCAs provides functional inks between these areas and the population of the East Midlands region whose water the aquifer supplies.

Sherwood has a significantly more wooded and heathy character than adjoining character areas, due historically to the poor agricultural potential of the surface sandstone. In the past, Sherwood Forest would have covered a much larger area and extended into neighbouring NCAs, such as Trent and Belvoir Vales NCA, but the area of woodland is now much reduced. Despite some similarities, the landscape character differentiations with neighbouring areas are well defined.

Views between Sherwood and neighbouring character areas are limited because of the rolling landform and the woodland. From within Sherwood the rolling landform means there are views of varying distance within the character area, frequently shaped by wooded skylines or the heads of dry valleys. A high level of connection to surrounding character areas, for the movement of animals and plants, is provided through Sherwood's woodland and farmland networks.

Distinct areas

- Historic heartlands of Sherwood Forest.
- Parklands and estates of The Dukeries.

Nottingham Castle on its distinctive sandstone outcrop.

Internationally important wood pasture containing veteran stag-headed oaks, which supports a great diversity of wildlife.

Key characteristics

- A gently rolling landform of low rounded sandstone hills, which principally coincide with an outcrop of the Permo-Triassic Sherwood Sandstone Group. The sandstone gives rise to well drained, acidic, sandy soils.
- Magnesian limestone and marl are exposed to the west of the area and underlie the sandstone, forming the base of a major aquifer.
- Woodland is a distinctive feature of the area with a mosaic of broadleaved, mixed and coniferous woodlands, including ancient oak wood pasture and parkland, and pine plantations.
- Wooded horizons frame extensive areas of open arable farmland with large, geometric fields contained by low, often treeless, hawthorn hedges.
- Commercial agriculture, especially in the north of the character area, is focused on root crops, although pig and poultry units are also characteristic.
- The free draining geology and acidic soils support many areas of unenclosed lowland heathland and acid grassland often associated with the wood pasture areas, but also found on marginal agricultural land, on rail and roadsides and on restored colliery sites.
- Narrow river corridors, associated with marshy flats and flood meadows, drain the area and dry valleys are characteristic because of the permeable geology.
- A dispersed settlement pattern of small villages and farmsteads is common in the agricultural areas, with larger settlements surrounding the perimeter of the area. Characteristic building materials are local red sandstone, and red brick and pantiles.
- Large country houses, their associated parklands and, in some cases, their narrow engineered lakes, are a distinctive feature of this character area.
- Coal Measures beneath the sandstone have been extensively mined and the industrial heritage is visible in the landscape. Disused sites are progressively being restored.
- The area, especially Sherwood Forest, is intrinsically linked to the internationally renowned legend of Robin Hood.

Characteristic Sherwood building materials are local red sandstone and red brick and pantile.

Wooded horizons frame open farmland with geometric fields bounded by low, often treeless, hawthorn hedges.

Thoresby Hall in the Dukeries - large country houses are a distinctive feature of Sherwood.

The free draining geology and acidic soils support many areas of unenclosed lowland heathland.

Sherwood today

The area largely coincides with an outcrop of the Permo-Triassic Sherwood Sandstone Group, comprising the Nottingham Castle and Permian Lenton Sandstone Formations. This underlying geology forms a belt of low, rolling hills and has strongly influenced the natural and cultural evolution of the landscape. Some sandstone outcrops are prominent in the landscape, the most famous being Castle Rock in Nottingham, and artificial caves are also distinctive features of this area. The sandstone is underlain at depth by the Coal Measures of Carboniferous age (which form the concealed coalfields), and also by impervious Permian marl, which forms the base of a major aquifer.

Views through Sherwood are characteristically over agricultural land and bounded by woodland. Wooded horizons are a common feature.

Sherwood has a strongly wooded character, with a mix of broadleaved, mixed and coniferous woodland.

Sherwood is well wooded with a varied patchwork of broadleaved and coniferous woodland. The wood pasture in Sherwood Forest National Nature Reserve (NNR) contains more than a thousand ancient oaks, most of which are known to be over 500 years old. The most famous of these, the Major Oak, may be nearly twice that age. Clearings in the coniferous woodland provide habitats for nationally significant populations of woodlark and nightjar, while the wood pasture has been designated for its internationally significant old acidophilous oak woodland and the invertebrate assemblages which are associated with its deadwood and veteran trees. "Sherwood Forest" also has a strong cultural history and is internationally renowned as the home of Robin Hood, the heroic outlaw of English folklore.

Large-scale planting of conifers occurred during the first half of the 20th century and provide a strong contrast to native woodland elsewhere. There is generally less woodland cover in the north than in other places. Views throughout the area are often bounded by woodland on all sides, giving a sense of enclosure and tranquillity.

Often found within the wood pasture, the lowland heathland and acid grassland mosaic is a distinctive characteristic of this landscape. Open tracts of dry sandy heathland, dominated by heather, gorse and bracken, were once widespread across the great Forest of Sherwood, and remain in some areas such as Sherwood National Nature Reserve and Birklands and Bilhaugh Special Area of Conservation (SAC). The habitats are home to a wide variety of species, including one of the few remaining UK populations of the Hazel Pot Beetle.

The sandy soils of the Sherwood Sandstone have historically been poorly suited to arable farming, but modern farming methods have overcome many of these problems and the land is now intensively farmed, predominantly for root crops. Livestock rearing is evident, although mainly confined to pigs and poultry. Parliamentary enclosure field patterns remain the framework of the agricultural landscape, and medium to large rectilinear fields, divided by low treeless hawthorn hedges, are characteristic, especially to the north.

Rivers are not common due to the highly permeable nature of the bedrock and those that do flow across the landscape flow in narrow alluvial corridors with occasional wetland marshy flats. The large houses in the area dammed their rivers to create ornamental lakes in their grounds and narrow artificial lakes are now a feature of the landscape, such as at Clumber, Welbeck and Newstead.

Settlement throughout Sherwood was traditionally scattered villages and farmsteads. Many of these small farming settlements expanded during the last century to become mining villages. There is a variety of traditional building materials in the area. Red brick and pantiles are frequent in the east, limestone in the west, and older buildings are generally local sandstone with pantile roofs. In the area known as 'The Dukeries' (large estates originally owned by English Dukes), there are nucleated estate villages and some isolated farmsteads, but the large ducal houses define the area and include Welbeck Abbey, Thoresby Hall, Rufford Abbey and Newstead Abbey. Newstead Abbey was the family home of the poet, Lord Byron.

The coal industry has played a significant role in shaping the area and its decline has left behind a legacy of former colliery sites and spoil tips. Many of these have been reclaimed to agriculture, heathland, woodland, business, community and amenity uses and some mining relics are now landmark features.

The landscape through time

The area is characterised by a north–south ridge of Triassic Sherwood Sandstone. This sandstone was deposited by rivers that flowed northwards across the area. During the Quaternary geological period the area was periodically glaciated leaving deposits of clays, sands and gravels capping hills and filling valleys.

Coal measures have been extensively mined and the industrial heritage is visible in the landscape and settlement pattern. Land is now progressively being restored.

Sherwood is intrinsically linked to the internationally renowned legend of Robin Hood and this cultural heritage is reflected through out the area.

From the earliest periods of occupation the constraints imposed by the porosity and fragility of the soils have been a major influence on settlement and land use. There is limited evidence of occupation during most of the late prehistoric period, but there is some evidence of iron-age/Romano-British settlements and field systems.

During the Roman period, archaeological evidence indicates that much of the woodland was cleared, although substantial stands may have remained in the south, based on the density of crop mark evidence. In the post Roman period the area became largely depopulated allowing much of the woodland to regenerate. However by 1086 the area is recorded as wood pasture, and is likely to have been managed by the larger settlements on the margins of the area.

The Norman kings brought the area under Forest Law and by 1300 there was little land that was not linked to the economies of royal or monastic estates or of local manors and communities. Throughout the 12th, 13th and 14th centuries, documentary references indicate a process of continual piecemeal enclosure, assarting (woodland clearance under licence from the lord) and illegal encroachment by both individuals and whole communities. It was during these medieval times that Robin Hood is said to have lived in Sherwood

Thoroton's history of Nottinghamshire (written in 1677) describes Sherwood at that time as a place "where deer sported in groups unnumbered...where Robin Hood and his gay followers performed their many and long renowned exploits... Here the spreading oak stood for ages a grand monument of embellished nature, a shade and covert for the birds and beasts that inhabited this", before going on to say, "all is now divided and subdivided by stumpy fences... On the forest I observed many capital farmhouses, and the adjoining fields, rich in a plentiful crop of corn". This reference indicates that people have always valued the area's woodland, as well as informing us of how the landscape changed during those centuries.

Sanderson's Map of 1835 illustrates the habitat mosaic that formed Sherwood Forest as an area much greater than the present day NCA boundaries. The Forest was gradually eroded and by the 16th century only the core woods of the surviving royal estates and parks remained. Some attempts at the wider improvement of commons were made during the 16th century but the forest remained largely heath.

The dissolution of the monasteries was a particularly significant stage in the evolution of the landscape, as the transfer of the monastic estates was limited to a few powerful and influential families. Their wealth underpinned the establishment of a number of great country houses and their associated parklands and estates in the 'The Dukeries'. This chain of parks continues to contribute to the sense of place in Sherwood today. Architecturally distinct estate farms are striking features in these areas. Other less fertile areas were taken in to the estates, providing shooting cover, timber and managed fuel supplies for local industry. Together with the enclosure of arable land, the physical framework of this landscape was established by the early 19th century and has been largely maintained to the present.

Formal enclosure arrived in the 18th and 19th centuries, primarily to allow for improved crop rotation and closer stock management. Regular and irregular geometric field patterns, the products of Georgian and early Victorian planned enclosure, were widespread across the Sherwood area, and remain a significant historical characteristic. Medieval open field patterns rarely existed in Sherwood except around the northern fringes of Mansfield, and to the north and north-west of Worksop, and there are some rare surviving areas of ridge and furrow such as at Blidworth.

The porous and nutrient poor sandy soils continued to be a constraint to viable agricultural production and within the last century there have been periods of decline. However, modern farming methods have facilitated improvement and the soil is now able to support extensive areas of arable land with cropping throughout the year.

The coal mining industry has also had a major effect on the Sherwood landscape. The sinking of deep mines in the late 19th and early 20th centuries resulted in the establishment of colliery sites, pit heads, spoil heaps and the adjacent mining settlements, many absorbing smaller existing settlements. The network of railways and roads also added to the transformation of a once simple wood pasture and agrarian landscape to one with an industrial focus. Although the coal mining industry has declined, the legacy of this period is still evident. Some industrial relics in the landscape have now become landmark features including The Winding Engine House and Dynamo House at Bestwood.

Change continues to shape the landscape and the decline of the coal mining industry has lead to the closure of the majority of sites and their subsequent restoration to farmland. The artificial mounds now formed with spoil from the pit heaps are starting to become better integrated into the rolling, well-wooded landscape.

The regular field pattern of flailed thorn hedgerows associated with the enclosure period has since been altered, in places, by more intensive farming practises during the late 20th century. However, the uptake of agri-environment schemes by farmers in recent years has made a significant contribution to the restoration of the landscape, also bringing benefits to wildlife into the future. Field boundary management has generally lead to thicker and taller hedgerows, new areas of woodland have been planted and the general shift from coniferous to broadleaved woodland has continued. Areas of new heathland have also been created and heathland vegetation and acid grassland is becoming established across previously restored land on some of the old colliery sites. In places, plantations of short rotation coppice, established to supply a source of renewable energy, are beginning to be established in the landscape. Recent trends of urban expansion provide both challenges and opportunities.

Ecosystem services

The following section seeks to identify the services offered by the landscape. A more expansive list of ecosystem services associated with this NCA are included in the Analysis section.

The Sherwood NCA provides a wide range of benefits to society. Each is derived from the attributes and processes (both natural and cultural features) within the area. These benefits are known collectively as 'ecosystem services'. The predominant services are summarised below (under the constituent headings). Further information on ecosystem services provided in the Sherwood NCA is contained in the 'Analysis' section of this document.

Provisioning services (food, fibre and water supply)

- **Food provision:** The Sherwood area provides medium grade (3) light free-draining soils that support the production of root crops. The heavier soils also support pasture and dairying. This is chiefly limited to the area of small estates north of Worksop.

- **Timber provision:** Sections of low grade soils of the NCA (generally of marginal agricultural use) support commercial forestry. The Forestry Commission Estate is managed for commercial timber production and covers approx 3,100 ha.

- **Water availability**: The Sherwood NCA contains the highly significant East Midlands Triassic Sherwood Sandstone aquifer; this provides 10 per cent of all water supplies in the Environment Agency's Midlands region. Abstracted water provides benefits to agriculture in Sherwood (through irrigation) and to the whole of the east midlands as a public water supply.

Regulating services (water purification, air quality maintenance and climate regulation)

- **Regulating soil erosion:** Regulation of soil erosion is currently low, due to low levels of vegetation/cover and high levels of compaction (caused of machinery) in at risk areas. These lighter textured soils have an enhanced risk of soil erosion on moderately or steeply sloping land, where cultivated or bare soil is exposed, including that under outdoor pig rearing. Regulation benefits could be increased significantly by vegetating key risk areas and changes to land management practices.

- **Regulating water quality:** Natural regulating processes provide services that ensure the high quality of the water supply from the regionally important aquifer (mentioned above). This service is supported by the Nitrate Vulnerable Zone which restricts chemical use in the area (and prevents overburdening of the natural system). In addition this water is sometimes mixed with other water sources to improve overall water quality, offering an additional benefit.

Cultural services (inspiration, education and wellbeing)

- **Sense of place/inspiration:** The unique and internationally renowned sense of place and history is most strongly shaped by the area's association with the legend of Robin Hood. This association is highly significant for tourism and attracting visitors to the area. The area has also provided inspiration for Byron and other notable poets and artists.

- **Sense of history:** The wood pasture and ancient oaks are a reminder of the once vast royal hunting forests, as is King John's hunting lodge, which is also a significant historical feature. In addition the castles, ducal houses and industrial remains provide cultural services and are highly visited.

- **Recreation:** The historic parks and woodlands and caves, in Nottingham, offer significant recreational and potential health benefits. It is estimated around 130 schools involve over 6,000 children to undertake activities at the Sherwood Forest NNR each year. In the wider landscape the density and distribution of public rights of way is variable with a notably lower level of provision in areas traditionally managed as part of the ducal estates. Recreation is supported by a network of rights of way totalling 390 km with a density of 0.73 km per km^2, and a small proportion of open access land at 223 ha or approximately 0.5 per cent of the area of the NCA.

- **Biodiversity:** 3 per cent of the Sherwood NCA receives statutory protection due to its wildlife value. This is focussed mainly around Sherwood Forest National Nature Reserve and Birklands and Bilhough Special Area of Conservation.

Nottingham's man-made sandstone caves attract many visitors each year.

Statements of Environmental Opportunity

SEO1: Protect, enhance and promote Sherwood as a landscape of international environmental and cultural significance by securing and expanding the iconic mosaic of woods, heaths and parklands, and enhancing sustainable recreation and cultural opportunities.

For example, by:

- Maintaining the woodland with a special focus on the ancient oak wood pasture and the veteran oaks as well as for world renowned heritage associations.
- Maintaining the condition of the SSSI and continue to conserve and protect the valuable habitats and species in the Birklands and Bilhaugh Special Area of Conservation (SAC) and Sherwood Forest National Nature Reserve (NNR).
- Conserving and enhancing key species within the habitats such as internationally important invertebrate assemblages, including the rare lesser stag beetle and four banded longhorn beetle.
- Maintaining and extending the lowland heath / acid grassland mosaic, enhancing populations of key species found predominantly in landscapes designated for nature conservation, but also in areas of marginal land.
- Securing the potential for a successor generation of veteran trees by the identification, protection and recording of candidate specimens.
- Creating a mosaic of linked areas of lowland heathland, taking into account the location of suitable soils and coniferous plantation, to strengthen the ecological linkages and visual value of these areas.
- Exploring potential for new woodland types, including species more resilient to potential climate change.
- Encouraging the dispersal of visitor pressures by investment in high quality infrastructure designed to meet the different needs and levels of use of a range of visitors, including local communities, recreational day visitors and tourists, without being the cause of damage or degradation of these unique assets.
- Ensuring that the access to the iconic ancient oak woodland, veteran trees and other environmentally sensitive sites provides equality of opportunity and a connection.
- Investigating ways of securing better management of designated heritage assets, including conserving and enhancing the historical estates of the Dukeries, and other estate landscapes.

SEO2: Promote sustainable agricultural practices to help protect the major underlying aquifer, manage issues with soil erosion in Sherwood and increase farmland birds.

For example, by:

- Promoting minimum tillage cultivation techniques to protect soil and encourage planting of crops less reliant upon irrigation.
- Creating new areas of woodland, tree belts and hedgerows to provide wind breaks across open farmland.
- Protecting the sandstone aquifer and its present good water quality by ensuring pollutants and excess nitrate do not enter the ground water,
- Promoting water conservation measures.
- Promoting management of arable land to deliver habitat for farmland birds.
- Enhancing the rectilinear hedgerow pattern weakened by the loss of some field boundaries, by replanting lost hedgerows and using traditional hedge-laying techniques.
- Strengthening the existing hedgerow pattern through less regular and severe trimming, allowing hedgerows to become denser and taller, thus increasing their use to reduce soil erosion and to contribute to the ecological network.
- Increasing the number of native hedgerow trees throughout this area, which are currently predominantly English or sessile oak and create/ restore species rich hedgerows where appropriate.

SEO3: Integrate new green infrastructure and conservation of historic features into the redevelopment of derelict land to establish high quality characteristic local environments.

For example, by:

- Promoting the appropriate restoration and interpretation of the conspicuous reminders of the coal mining industry.
- Creating new landscapes, including woodland, heathland and amenity land, which is open to the public, on previous derelict land and spoil heaps.
- Promoting the industrial heritage of the area by retaining some heritage features, including old mining buildings and mining machinery, to offer educational and cultural history resources.
- Promoting geodiversity in key sites.

Additional opportunities

1. Enhance Sherwood's few, but significant, hydrological and riparian assets.

For example, by:

- Managing over–abstraction of the aquifer and some of the area's rivers, through careful use of water and the use of other, environmentally sustainable, sources of water supply where possible.
- Creating and extending natural buffer strips of riparian vegetation and wetland habitat along the length of the rivers.
- Maintaining and/or restoring the rare wet heaths in this area which have been damaged by drainage and over-abstraction.

2. Consider the location and design of new development to retain local distinctiveness.

For example, by:

- Ensuring cultural heritage, protection of local vernacular, and sense of place are considered in the process of planning for likely settlement expansion.
- Conserving the character of historic Sherwood settlements such as medieval village cores, estate villages and planned colliery villages by following guidance in Conservation Area Appraisals.
- Ensuring new development enhances settlement character and integrates into the landscape / townscape by ensuring it is sensitively located and designed, using local materials such as sandstone, red brick and pantiles and limestone.
- Protecting islands of solitude found where there is little settlement intrusion, for example in the agricultural land to the north of the area, which is remote and encompassed by wooded horizons.
- Ensuring high quality design and implementation of infrastructure, which complements and contributes to the strategic network of green spaces and routes and avoids route severance.

3. Conserve the characteristic geodiversity of the area, including surface expression (for example, caves and sandstone outcrops).

- Identifying and protecting the characteristic geodiversity of the NCA, within and outside designated sites, including surface expressions of the underlying geology, such as the caves and the sandstone outcrops. Provide access to and interpretation about geodiversity assets at appropriate locations.

4. Promote, where appropriate, opportunities for renewable energy and timber supply.

- Supporting sustainable timber production, and increase the potential for biomass as a by-product of coniferous plantations and in presently unmanaged mixed woodlands; and support other energy crop provision where appropriate

Supporting document 1: Key facts and data

Total area: 53,456 ha.

1. Landscape and nature conservation designations

There are no National Parks or Areas of Outstanding Natural Beauty in this NCA.

Source: Natural England (2011)

1.1 Designated nature conservation sites

The NCA includes the following statutory nature conservation designations:

Tier	Designation	Name	Area (ha)	Percentage of NCA
European	Special Protection Area (SPA)	n/a	0	0
	Special Area of Conservation (SAC)	Birklands and Bilhaugh SAC	270	<1
National	National Nature Reserve (NNR)	Sherwood Forest NNR	424	<1
National	Site of Special Scientific Interest (SSSI)	A total of 14 sites wholly or partly within the NCA	1,757	3

Source: Natural England (2011)

Please note: (i) Designated areas may overlap (ii) all figures are cut to Mean High Water Line, designations that span coastal areas/views below this line will not be included.

There are 221 Local sites in Sherwood NCA covering 7,133 ha which is 13 per cent of the NCA.

Source: Natural England (2011)

- Details of individual Sites of Special Scientific Interest can be searched at: http://www.sssi.naturalengland.org.uk/Special/sssi/search.cfm
- Details of Local Nature Reserves (LNR) can be searched http://www.lnr.naturalengland.org.uk/Special/lnr/lnr_search.asp
- Maps showing locations of statutory sites can be found at: http://magic.defra.gov.uk – select 'Designations/Land-Based Designations/Statutory'

1.2 Condition of designated sites

A breakdown of SSSI condition as of March 2011 is as follows:

SSSI condition category	Area (ha)	Percentage of SSSI in category condition
Unfavourable declining	2	0
Favourable	191	11
Unfavourable no change	63	4
Unfavourable recovering	1,493	85

Source: Natural England (March 2011)

- Details of SSSI condition can be searched at: http://www.sssi.naturalengland.org.uk/Special/sssi/reportIndex.cfm

2. Landform, geology and soils

2.1 Elevation

The rolling landform varies from 12m above sea level at its lowest point to 191m above sea level at its highest point. The average elevation of the landscape is 69 m above sea level.

2.2 Landform and process

This is a gently rolling landform of low rounded sandstone hills, which coincide with an outcrop of the Permo-Triassic Sherwood Sandstone Group. The sandstone gives rise to well drained, acidic, sandy soils.

Source: Countryside Commission Countryside Character description.

2.3 Bedrock geology

- The area principally coincides with the outcrop of Triassic Sherwood Sandstone Group and Permian Lenton Sandstone Formation, which forms a belt of low hills.
- The Lenton Sandstone comprises bright red fine-grained sandstone, above which is the much thicker and more extensive outcrop of the brownish red coarse grained Nottingham Castle Sandstone Formation, which also contains quartzite pebbles.
- Permian Marl underlies the sandstone forming the base of a major aquifer.
- Under lying Coal Measures.
- A breakdown of solid geology as a proportion of total land area is as follows:
  - 72 per cent pebbly sandstone.
  - 10 per cent sandstone.
  - 6 per cent siltstone and sandstone.
  - 2 per cent mudstone and sandstone.

Source:East Midlands Regional Landscape Character Assessment

2.4 Superficial deposits

The superficial deposits are comprised of clay, silt, sand and gravel.

Source: East Midlands Regional Landscape Character Assessment

2.5 Designated geological sites

Tier	Designation	Number
National	Geological Site of Special Scientific Interest (SSSI)	0
National	Mixed Interest SSSIs	0
Local	Local Geological Sites	41

Source: Natural England (2011)

- Details of individual Sites of Special Scientific Interest can be searched at http://www.sssi.naturalengland.org.uk/Special/sssi/search.cfm

2.6 Soils and Agricultural Land Classification

The soils derived from the sandstone are largely acidic and nutrient poor. These soils lack podzol-forming conditions that help soils retain water and so are free-draining, allowing the aquifer to maintain high water levels. Traditionally, the nutrient poor soils, particularly where they were susceptible to wind erosion, discouraged arable farming in the area, but modern farming methods such as the use of lime, artificial fertilizers and irrigation have increased soil productivity.

Source: Natural England Natural Area Profile.

The main grades of agricultural land in the NCA are broken down as follows (as a proportion of total land area*):*

Agricultural Land Classification	Area (ha)	Percentage of NCA
Grade 1	0	0
Grade 2	4,209	8
Grade 3	30,415	57
Grade 4	1	<1
Grade 5	0	0
Non-agricultural	10,036	19
Urban	8,796	16

Source: Natural England (2010)

Maps showing locations of sites can be found at:
http://magic.defra.gov.uk – select 'Landscape' (shows ALC and 27 types of soils).

3. Key waterbodies and catchments

3.1 Major rivers/canals

The following major rivers/canals (by length) have been identified in this NCA.

Name	Length in NCA (km)
Chesterfield Canal	17
Dover Beck	1
River Leen	6
River Idle	7
River Poulter	12
River Meden	17
River Ryton	19
River Maun	31

Source: Natural England (2010)

The River Ryton drains the northern part of the area, flowing north-eastwards to join the River Idle. The central area is drained north-eastwards by a series of small rivers, including the Poulter, Meden, Maun and Rainworth Water, all of which also join the Idle along the eastern edge of the area. The southern part of the area is drained by the River Leen which flows southwards to join the River Trent.

Please note: other significant rivers (by volume) may also occur. These are not listed where the length within the NCA is short.

3.2 Water quality

The total area of Nitrate Vulnerable Zones covers 100 per cent of the NCA.

Source: Natural England (2010)

3.3 Water Framework Directive

Maps are available from the Environment Agency showing current and projected future status of water bodies: http://maps.environment-agency.gov.uk/wiyby/wiybyController?ep=maptopics&lang=_e

4. Trees and woodlands

4.1 Total woodland cover

This NCA contains 11,583 ha of woodland (22 per cent of the total area), of which 875 ha is ancient woodland (2 per cent of the total area). The Greenwood Community Forest, one of twelve Community Forests established to demonstrate the contribution of environmental improvement to economic and social regeneration, covers 17,809 ha of this NCA, which is 33 per cent.

Source: Natural England (2010)

4.2 Distribution and size of woodland and trees in the landscape

Woodland cover in the Sherwood Natural Area is very high, covering approximately 22 per cent of its area. Of considerable conservation interest, and arguably Sherwood's most important feature, are the ancient wood-pasture and ancient semi-natural broadleaved woodlands that have been wooded since at least 1600, and support a great diversity of wildlife, particularly deadwood beetles and other invertebrates. Internationally important wood pasture containing veteran stag-headed oaks is also found in the parklands of the Dukeries. Woodland cover in the north is generally rather less than elsewhere in the area and tends to have a greater diversity including species such as ash, oak, birch, sweet chestnut, wych elm, beech, alder and willows. Wet woodlands, characterised by alder and willow, line several streams.

Source:Natural England, Countryside Quality Counts.

4.3 Woodland types

A statistical breakdown of the area and type of woodland found across the NCA is detailed below.

Area and proportion of different woodland types in the NCA (over 2 ha).

Woodland type	Area (ha)	Percentage of NCA
Broadleaved	5,087	10
Coniferous	5,110	10
Mixed	387	1
Other	999	2

Source: Forestry Commission (2011)

Area and proportion of ancient woodland and planted ancient woodland (PAWS) within the NCA.

Woodland type	Area (ha)	Percentage of NCA
Ancient semi-natural woodland	424	<1
Ancient re-planted woodland (PAWS)	451	<1

Source: Forestry Commission (2011)

5. Boundary features and patterns

5.1 Boundary features

Low, heavily managed hawthorn hedges are common in this NCA, although agricultural stewardship programmes are beginning to reverse this trend. In Sherwood the hedgerows and roadside verges can be healthy and contain gorse, broom and bracken.

Source: Countryside Character Area description; Countryside Quality Counts (2003)

5.2 Field patterns

Post enclosure field patterns remain the framework of the agricultural landscape. Medium to large fields of rectilinear pattern, divided by low hawthorn hedges, which are often treeless.

Source: Countryside Character Area description; Countryside Quality Counts (2003)

6. Agriculture

The following data has been taken from the Agricultural Census linked to this NCA.

6.1 Farm type

The landscape's mixed farming character is supported by figures on farm type: 63 general cropping farms (29 per cent) and 48 cereal holdings (22 per cent).Survey data from 2000 to 2009 show a 37 per cent rise in the number of cereal farms, while general cropping farms have decreased by 23 per cent (a reduction of 19 holdings). This is predominantly an arable farming NCA and is characteristically a vegetable growing area. Outdoor pigs feature on general cropping farms.

Source: Agricultural Census, Defra (2010)

6.2 Farm size

Farms over 100 ha are the most common farm size, accounting for 75 units, covering more than 84 per cent of the total farmed area. Holdings between 5 -20 ha are the second most common farm size with 49 units, but cover less than 2 per cent of the farmed area. Trends show a reduction in the number of farms above 100 ha between 2000 to 2009 (10 fewer). The number of holdings in both 20 – 50 ha and 50-100 ha size have increased by 3 and 8 holdings respectively.

Source: Agricultural Census, Defra (2010)

6.3 Farm ownership

Nearly 63 per cent of the agricultural land (17,292 ha) is farmed by the owner.

Source: Agricultural Census, Defra (2010)

6.4 Land use

39 per cent of the farmed area is used cereal crops (10,849 ha). Grassland covers 5,486 ha (20 per cent) – the second most prevalent land use. Between 2000 and 2009 there was a 21 per cent (1,056 ha) decrease in the area farmed for cash root crops. The areas farmed for oilseeds increased by 53 per cent (802 ha) up to 2,313 ha and for vegetables increased by 64 per cent (809 ha) up to 2,075 ha.

Source: Agricultural Census, Defra (2010)

6.5 Livestock numbers

Pigs are the most numerous livestock within this landscape (a total of 43,120 animals) compared to a total of 11,177 sheep and 4,730 cattle. The area of grassland, between 2000 and 2009, declined by 740 ha or 12 per cent.There was an overall decline in the number of sheep (5,937 or 35 per cent) and cattle (1,333 or 22 per cent). The number of pigs increased by 5,486 (15 per cent).

Source: Agricultural Census, Defra (2010)

6.6 Farm labour

The figures suggest that the largest number of holdings are managed by owner farmers (318), followed by those with a full-time manager/farmer (51). Family members will often make up the number of farmers. Trends over the last decade show a small decrease in part-time farmers/managers and farm workers, and a decrease in full-time categories (79 less, 22 per cent). Numbers of casual labour also increased during the 2000-2009 period.

Source: Agricultural Census, Defra (2010)

Please Note: (i) Some of the Census data is estimated by Defra so will not be accurate for every holding (ii) Data refers to Commercial Holdings only (iii) Data includes land outside of the NCA belonging to holdings whose centre point is within the NCA listed.

7. Key habitats and species

7.1 Habitat distribution/coverage

Internationally important wood pasture and parkland, containing veteran stag-headed oaks, are found in the Dukeries. They support internationally important populations of invertebrates, as well as a massive array of birds. Important species also include bats, including noctule and Natterer's. Some of the landscaped Dukery Estates also contain reed beds and marsh, providing important habitats for biodiversity, particularly breeding and wintering wildfowl.

Wet woodlands are characteristic features along many of the rivers and streams. They are dominated by species of alder and willow, interspersed with a number of small ash holts.

Extensive lowland heathland was once a characteristic of Sherwood, and the remaining mosaic of heathers and acid grassland is floristically distinct from the heathlands of Hampshire and Dorset. Locally rare shrubs include petty whin, dwarf gorse and bilberry. Nationally rare birds include nightjar and woodlark. The rich and important invertebrate community includes green tiger beetle. Concentrations of heathland can be found around Rainworth, Kirkby-in-Ashfield, Clipstone Forest, Budby and Clumber Park.

Source: Sherwood Natural Area Profile

7.2 Priority habitats

The Government's new strategy for biodiversity in England, Biodiversity 2020, replaces the previous Biodiversity Action Plan (BAP) led approach. Priority habitats and species are identified in Biodiversity 2020, but references to BAP priority habitats and species, and previous national targets have been removed. Biodiversity Action Plans remain a useful source of guidance and information. More information about Biodiversity 2020 can be found at; www.naturalengland.org.uk/ourwork/conservation/biodiversity/protectandmanage/englandsbiodiversitystrategy2011.aspx.

The NCA contains the following areas of mapped priority habitats (as mapped by National Inventories). This will be used to inform future national inventory updates.

Priority habitat	Area (ha)	Percentage of NCA
Broadleaved mixed & yew woodland (Broad Habitat)	3,767	7
Lowland heathland	993	2
Lowland calcareous grassland	37	<1
Coastal & floodplain grazing marsh	167	<1
Reedbeds	59	<1
Lowland meadows	22	<1
Fens	24	<1

Source: Natural England (2011)

Note that the boundary of the NCA is the mean high water mark and thus open water and marine areas are not included.

Maps showing locations of priority habitats are available at:

- http://magic.defra.gov.uk – Select 'Habitats and Species/Habitats'

7.3 Key species and assemblages of species

- These are listed in Annex 1 (full document only)
- Maps showing locations of some key species are available at: http://magic.defra.gov.uk – Select 'Habitats and Species/Habitats'
- Maps showing locations of S41 species are available at: http://data.nbn.org.uk/

8. Settlement and development patterns

8.1 Settlement pattern

In the north there is a dispersed pattern of scattered villages, hamlets and isolated farmsteads. Settlement on the Sherwood heaths takes the form of scattered villages and farmsteads. These were originally small farming settlements but many have expanded this century to become mining villages. Extensive colliery settlements occur around villages such as Calverton, Bilsthorpe, Edwinstowe and Rainworth. There is evidence of expansion of the urban fringe around Mansfield Rainworth and Calverton.

Source: Countryside Character Area description; Countryside Quality Counts (2003)

8.2 Main settlements

The main settlements within Sherwood are: Nottingham (population 666,358 - although the whole settlement does not lie in the NCA); Mansfield and Worksop.

Source:2001 Census, ONS; Countryside Character Area description; Countryside Quality Counts (2003)

8.3 Local vernacular and building materials

Red brick and pantiles are frequent in the east, limestone in the west and sandstone elsewhere. Red sandstone is characteristic to Sherwood.

Source:Countryside Character Area description; Countryside Quality Counts (2003)

9. Key historic sites and features

9.1 Origin of historic features

Heathland and tree cover make it difficult to identify features from the air hence Sherwood has potentially a significant undiscovered historical resource. There is some evidence of Roman camps and villas such as the Roman Villa at Oldcoates. Rufford Abbey Cistercian Monastery includes a monastic precinct, water management works, openfield system and a post medieval building. The large estate houses and gardens of the Dukeries and the man-made sandstone caves in Castle Rock under Nottingham Castle are contrasting historic features. Coal mining industrial relics, infrastructure and pit heaps remain in the landscape as a reminder of the impact the coal mining industry had on this landscape.

Source: Countryside Quality Counts Draft Historic Profile, Countryside Character Area description

9.2 Designated historic assets

This NCA has the following historic designations:

- 16 Registered Parks and Gardens covering 4,571 ha.
- 0 Registered Battlefield/s covering 0 ha.
- 42 Scheduled Monuments.
- 1,463 Listed Buildings.

Source: Natural England (2010)

- More information is available at the following address: https://www.english-heritage.org.uk/caring/listing/

10. Recreation and access

10.1 Public access

- 18 per cent of the NCA, 10,337 ha is classified as being publically accessible.
- There are 393 km of Public Rights of Way at a density of per 0.7 km/ km2.
- There are 0 National Trails within Sherwood NCA.

Sources: Natural England (2010)

The table below shows the breakdown of land which is publically accessible in perpetuity:

Access designation	Area (ha)	Percentage of NCA
National Trust (Accessible all year)	0	0
Common Land	2	<1
Country Parks	1,696	3
CROW Access Land (Section 4 and 16)	-	-
CROW Section 15	1,736	3
Village Greens	36	<1
Doorstep Greens	5	<1
Forestry Commission Walkers Welcome Grants	525	<1
Local Nature Reserves (LNR)	177	<1
Millennium Greens	3	<1
Accessible National Nature Reserves (NNR)	423	<1
Agri-environment Scheme Access	9	<1
Woods for People	5,725	11

Sources: Natural England (2011)

Please note: Common Land refers to land included in the 1965 commons register; CROW = Countryside and Rights of Way Act 2000; OC and RCL = Open Country and Registered Common Land.

11. Experiential qualities

11.1 Tranquillity

Based on the CPRE map of tranquillity (2006) it appears to be most tranquil in the core areas of the NCA and to the north where the settlement pattern is sparse. The western periphery, around Nottingham and along the A roads through the area, have a low rating. The mean average for the area is -12 per cent, which suggests the area is not as tranquil as some neighbouring NCAs.

A breakdown of tranquillity values for this NCA are detailed in the table below:

Tranquillity	Score
Highest Value within NCA	40
Lowest Value within NCA	-86
Mean Value within NCA	-12

Sources: CPRE (2006)

- More information is available at the following address: http://www.cpre.org.uk/resources/countryside/tranquil-places

11.2 Intrusion

The 2007 Intrusion Map (CPRE) shows the extent to which rural landscapes are 'intruded on' from urban development, noise (primarily traffic noise), and other sources of visual and auditory intrusion. A breakdown of intrusion values for this NCA are detailed in the following table.

Intrusion category	1960s (%)	1990s (%)	2007 (%)	Percentage change (1960s-2007)
Disturbed	42	63	68	26
Undisturbed	46	24	13	-33
Urban	12	13	19	7

Sources: CPRE (2007)

Notable trends from the 1960s to 2007 are a significant increase in the area of disturbed land, and an even stronger decrease in the amount of land considered being undisturbed. The area has become over 50 per cent more urban than level in the 1960s.

- More information is available at the following address: http://www.cpre.org.uk/resources/countryside/tranquil-places

12 Data sources

- British Geological Survey (2006)
- Natural Area Profiles, Natural England (published by English Nature 1993-1998)
- Countryside Character Descriptions, Natural England (regional volumes published by Countryside Commission/Countryside Agency 1998/1999)
- Joint Character Area GIS boundaries, Natural England (data created 2001)
- National Parks and AONBs GIS boundaries, Natural England (2006)
- Heritage Coast Boundaries, Natural England (2006)
- Agricultural Census June Survey, Defra (2000,2009)
- National Inventory of Woodland & Trees, Forestry Commission (2003)
- Countryside Quality Counts Draft Historic Profiles, English Heritage (2004)*
- Ancient Woodland Inventory, Natural England (2003)
- Priority Habitats GIS data, Natural England (March 2011)
- Special Areas of Conservation data, Natural England (data accessed in March 2011)
- Special Protection Areas data, Natural England (data accessed in March 2011)
- Ramsar sites data, Natural England (data accessed in March 2011)
- Sites of Special Scientific Interest, Natural England (data accessed in March 2011)
- Detailed River Network, Environment Agency (2008)
- Source protection zones, Environment Agency (2005)
- Registered Common Land GIS data, Natural England (2004)
- Open Country GIS data, Natural England (2004)
- Public Rights of Way Density, Defra (2011)
- National Trails, Natural England (2006)
- National Tranquillity Mapping data, CPRE (2007)
- Intrusion map data, CPRE (2007)
- Registered Battlefields, English Heritage (2005)
- Record of Scheduled Monuments, English Heritage (2006)
- Registered Parks and Gardens, English Heritage (2006)
- World Heritage Sites, English Heritage (2006)
- Incorporates Historic Landscape Characterisation and work for preliminary Historic Farmstead Character Statements (English Heritage/Countryside Agency 2006)

Please note all figures contained within the report have been rounded to the nearest unit. For this reason proportion figures will not (in all) cases add up to 100 per cent. The convention <1 has been used to denote values less than a whole unit.

Supporting document 2: Landscape change

Recent changes and trends

Trees and woodlands

- Woodland is a significant feature in the landscape, with 22 per cent coniferous and broadleaved woodland cover forming strong patterns. The area of woodland covered by Woodland Grant Schemes went up from 8 per cent to 13 per cent between 1990 to 2003. Only 875 ha is ancient woodland, and the proportion of these sites covered by WGS has gone down, from 37 per cent to 23 per cent. Some planting has occurred within the Community Forest area around Hucknall, Blidworth and Mansfield, which is of local significance as the blocks of planting are large.

Boundary features

- With previous agricultural expansion, some hedgerow patterns have been lost, and the remaining hedges are often low and over-clipped, in particular on the more intensive arable land. Between 1999-2003 Countryside Stewardship capital agreements for linear features included fencing (6 km), hedge management (14 km), hedge planting and restoration (45 km), restored boundary protection (18 km). The estimated boundary length for Sherwood is about 2,670 km meaning only about 3 per cent of field boundaries (hedges) were covered by agreements between 1999 and 2003. The length of hedgerows in Environmental Stewardship boundary management in 2011 is 689 km, with 36 km of woodland and 14 km of ditch in environmental stewardship boundary management schemes.

Agriculture

- Agriculture is dominated by cropping, but the increase in grassland area up to 2003 (as shown in the Countryside Quality Counts work) has since turned into a 12 per cent decrease, according to the agricultural census data. This data also shows a decrease in sheep and cattle, although the number of pigs increased by 15 per cent. There has also been an increase in the area farmed for oilseeds and vegetables, but a decrease in the area of cash root crops.

Settlement and development

- There is evidence of expansion of the urban fringe around Mansfield, Rainworth and Calverton, and development pressures continue to transform many parts of the area. There is marked dispersed development between Ollerton, East Retford and Worksop, while the A1 upgrading has had an impact in the north of the area.

Semi-natural habitat

- Semi-natural habitats are limited in extent within this NCA. Some 1,768 ha (just over 3 per cent) is designated for nature conservation, and of this approximately 11 per cent is in favourable, and 82 per cent in unfavourable recovering condition (Feb 2010). Up to 2003 the most extensive agri-environment agreements were for maintaining heath and lowland pastures on neutral / acid soils, and re-creating heath.

Historic features

- There are extensive historic estates and parklands in the Dukeries to the south-west of Worksop, but there are also pockets of estate land amidst the arable fields. Just over half of the parkland is covered by agreements. It is estimated that about 80 per cent of historic farm buildings remain unconverted.

Rivers

- The Sherwood aquifer underlies much of the area, and abstraction levels are above those needed to achieve 'good status' in line with the Water Framework Directive. In particular the River Idle is over-abstracted. So while biological and chemical water quality is generally very good, there are issues with possible deterioration through over-abstraction and nutrient inputs.

Drivers of change

Climate change

- Climate trends suggesting increased rainfall, periods of drought, and more frequent storm events.
- Over-abstraction of the aquifer is already an issue and may become a greater problem with hotter and drier summers.
- A changing climate, in particular summer droughts, is likely to increase the vulnerability of the iconic ancient oak woodland and heathland, with veteran trees increasingly vulnerable to damage, pests and disease. Heathland will become more vulnerable to bracken incursion, drought and fire.
- Sandy acid soils may be more vulnerable to damage such as increased erosion through wind-blow and run-off, along with nutrient loss and decreased soil microbial activity.

Other key drivers

- Development pressures around the urban areas and commuter villages are likely to continue. New developments provide opportunities to ensure a high standard of design and a contribution to green infrastructure.
- The area is likely to remain attractive for recreation, with good access to nature along with opportunities for environmental education and understanding our heritage; this is both a challenge and an opportunity.
- The need for food security will result in continued agricultural production, along with changing farming practices, which may impact on ecological habitats, networks and species, as well as landscape character. Agri-environment schemes provide opportunities to work with land managers to incorporate farmland habitats, develop networks of linked habitats and enhance the rural character of the landscape.
- Increased agricultural production may impact on the quality of the soils and will need careful management.
- Restoration of sites affected by the industrial past will provide opportunities to enhance biodiversity and the landscape, whilst ensuring that the legacy of the industrial heritage remains legible within the landscape.
- Sherwood NCA contains many rare species and valuable habitats, including an internationally significant collection of veteran oaks and one of the few UK populations of the Hazel Pot Beetle. Conserving these features, along with the overall landscape character and historic legacy, from the pressures of climate change, recreation and changing land management processes will remain key concerns within Sherwood.

Supporting document 3: Analysis supporting Statements of Environmental Opportunity

The following analysis section focuses on a selection of the key provisioning, regulating and cultural ecosystem goods and services for this NCA. These are underpinned by supporting services such as photosynthesis, nutrient cycling, soil formation and evapo-transpiration. Supporting services perform an essential role in ensuring the availability of all ecosystem services.

Biodiversity and geodiversity are crucial in supporting the full range of ecosystem services provided by this landscape. Wildlife and geologically-rich landscapes are also of cultural value and are included in this section of the analysis. This analysis shows the projected impact of Statements of Environmental Opportunity on the value of nominated ecosystem services within this landscape.

Unenclosed lowland heathland and a mosaic of broadleaved, mixed and coniferous woodland are defining features of Sherwood.

Statement of Environmental Opportunity	Ecosystem service																	
	Food provision	Timber provision	Water availability	Genetic diversity	Biomass energy	Climate regulation	Regulating water quality	Regulating water flow	Regulating soil quality	Regulating soil erosion	Pollination	Pest regulation	Regulating coastal erosion	Sense of place / inspiration	Sense of history	Tranquillity	Recreation	Biodiversity	Geodiversity
SEO 1: Protect, enhance and promote Sherwood as a landscape of international environmental and cultural significance by securing and expanding the iconic mosaic of woods, heaths and parklands, and enhancing recreation and education opportunities.	O	↗	↗ **	O	O	↗ **	↗ *	↗ *	↗ *	↗ **	↗ **	↗ *	n/a	↑ ***	↑ ***	↗ **	↑ ***	↑ ***	O
SEO 2: Promote sustainable agricultural practices to help protect the major under lying aquifer, manage issues with soil erosion in Sherwood and increase farmland birds.	O	↔	↗ **	O	↗ *	O	↗ **	↗ *	↗ **	↑ ***	↗ **	↗ *	n/a	↗ *	↗ *	↗ **	↗ *	↗ **	↗ *
SEO3: Integrate new Green infrastructure and conservation of historic features into the redevelopment of derelict land to establish high quality characteristic local environments	↔	↗ *	O	O	O	↗ *	↗ *	↗ *	↗ *	↗ *	↗ *	O	n/a	↑ ***	↑ ***	↗ *	↑ ***	↑ **	↑ **

Note: Arrows shown in the table above indicate anticipated effect on service delivery ↑ = Increase ↗ = Slight Increase ↔ = No change ↘ = Slight Decrease ↓ = Decrease.
Asterisks denote confidence in projection (*low **medium ***high) O = symbol denotes where insufficient information on the likely effect is available .

Dark plum = national importance; mid plum = regional importance; light plum = local importance

Landscape attributes

Landscape attributes	Justification for selection
The free draining geology and acidic soils support a rare and valuable lowland heath/acid grassland mosaic, often found within the wood pasture of the managed country parks, but also found on areas of marginal land.	■ Dry sandy heathland, dominated by heather, gorse and bracken, was once widespread but now mainly remains in managed areas such as Sherwood National Nature Reserve (NNR) and Birklands and Bilhaugh Special Area of Conservation (SAC). ■ It is a rare and important priority habitat, characteristic of this NCA because of the surface sandstone, but not common in neighbouring areas. ■ The heathland is important for a range of characteristic breeding birds such as the tree pipit and woodlark.
Woodland is a distinctive feature of the area with broadleaved, mixed and coniferous woodlands, ranging from ancient oak wood pasture to pine plantations.	■ Views throughout the area, even long distance ones, are often bounded by woodland on all sides, giving a sense of enclosure and tranquillity. ■ The habitats are home to a wide variety of species; for example, great-spotted woodpecker, green woodpecker, tawny owl, woodlark, redstart and nightjar, and approximately 1,000 beetle species. The area also supports a number of bat species, including noctule and Leisler's. ■ Sherwood NNR contains more than 1,000 ancient oaks, most of which are known to be over 500 years old. It is rare to have such a high density of ancient oaks and Sherwood possibly provides one of the highest concentrations of ancient oaks in Western Europe. ■ The Forestry Commission and private landowners manage estates in Sherwood for timber. The use of rotational felling and restocking in the pine plantations provides much habitat for nightjars. The mixed coniferous and broadleaved woodland provide a range of woodland habitats. Welsh Clearwing Moth and the Hazel Pot Beetle are rare species found here. ■ The high amount of woodland cover provides a carbon sink and there is potential for woodland planting which would increase the carbon storage. ■ The woodland areas are well-used recreation sites.

Landscape attributes	Justification for selection
Occasional narrow river valleys with their marshy flats and flood meadows are important features.	■ These river valleys contain permanent grasslands and flood meadows, often with fringing alders, willows and scrub, which provide important habitat and landscape features. ■ Arable land sometimes extends right to the water's edge, and reducing the areas where this occurs would bring landscape and biodiversity benefits. ■ Characteristic bankside woodland occurs extensively in some sections, often along steep flanking slopes, and ash holts are a particular feature of the River Ryton.
Large country house estates with their parkland and narrow artificial lakes are distinctive.	■ These are particularly distinctive in the area known as the Dukeries. There are a few associated nucleated estate villages, such as Perlethorpe and Hardwick, and some isolated farmsteads, but the large ducal houses such as Welbeck Abbey, Thoresby Hall, Rufford Abbey and Newstead Abbey, help to define the area. ■ The associated lakes are important artificial historic features created in the landscape to enhance the visual appearance of the Dukeries, which now provides rare and valuable habitats including reedbeds and fen. ■ The large houses are important historic features and some have important cultural associations, for example, Newstead Abbey was the family home of the poet Lord Byron.
The sandstone geology is a defining feature in this NCA. Outcrops of sandstone are a key feature, as are the caves which have formed, or been created, in the rock. Local sandstone is a distinct building material of the local vernacular.	■ The Lenton Sandstone is a bright red fine-grained sandstone which is distinctive as a local building material. ■ Outcrops of sandstone are distinctive features, the most famous being Castle Rock beneath Nottingham Castle. ■ Caves have formed naturally in the sandstone, or have been created by man, forming unusual features in the NCA.
Industrial heritage originating from the extensive coal mining industrial which operated in Sherwood is evident in the legacy of spoil heaps, old mining equipment and mining villages.	■ Deep coal mines were sunk in the late 19th and early 20th centuries, with a number of pits being established near existing villages away from the main centres of population. These villages have a distinct mining heritage but are now mostly commuter settlements and include Clipstone, Annesley and Ollerton. ■ It is necessary to protect the industrial heritage and cultural history of this legacy, while also restoring the degraded landscape, for example to woodland or amenity land. Some mining relics are now landmark features; however, some intrusive un-reclaimed sites still exist. ■ Opportunities should be taken to restore the derelict mining landscapes to heathland, which is far more difficult and costly to restore on agricultural land.

Landscape attributes	Justification for selection
Some parts of Sherwood, especially in the north, retain a high level of tranquillity and a low level of intrusion from urban influences and light pollution.	■ Based on the 2006 CPRE map of tranquillity, Sherwood is most tranquil in the core areas of the NCA and to the north where the settlement pattern is sparse. This is a valuable and shrinking feature and should be protected. ■ Tranquillity and intrusion are an issue around the peripheries of the NCA where the settlement pattern is much denser. The popular recreational areas of Sherwood Forest and the Dukeries require careful management to retain tranquillity and a low level of intrusion.
Parliamentary enclosure field patterns form the framework of the agricultural landscape and medium to large fields of rectilinear pattern, divided by low treeless hawthorn hedges are characteristic, especially to the north.	■ The field pattern contributes to the cultural history formed as a result of historic land uses, although formal enclosure did not occur until the 18th and 19th centuries. The previous field pattern has almost been totally removed from the Sherwood landscape. ■ Agricultural intensification and the move to arable farming have resulted in the loss of some field boundaries. Other field boundaries are low and treeless and whilst this may be a characteristic, increasing the trees and hedgerow density would bring ecological and landscape benefits, so would not alter the landscape character negatively. ■ There is an absence of hedgerow trees in this area and, as a well-wooded NCA, new native hedgerow tree planting would be appropriate and in character.

Landscape opportunities

- Protect, manage and expand the lowland heath / acidic grassland mosaic found in areas of marginal land, which provide valuable habitat to many rare species (including club-mosses, petty whin, dwarf gorse and bilberry) and provide an interesting and educational feature for the many visitors to Sherwood.

- Protect the character and historic resource of the large country houses and parklands found in the Dukeries, and elsewhere in the area. Conserve their valuable parkland and lakeside habitats, protect the condition of the large houses, and conserve the historic estates for the cultural history they contribute to the landscape character.

- Protect the unique features of the sandstone geology such as the caves under Nottingham Castle.

- Manage the oak-birch broadleaved woodland, ancient wood pasture and coniferous plantations throughout the area for their contribution to the wooded landscape character, their wildlife value, high recreational value and their contribution to retention of greenhouse gases.

- Manage the narrow river valleys to conserve and enhance their riparian habitats. These habitats are rare in this character area, but can form an important component of the landscape character which is of high wildlife value.

- Manage development to reduce its impact on tranquillity, and where appropriate plant native tree species in keeping with the area, to screen the impacts of development. Protect identified existing rural areas where tranquillity and intrusion, including light pollution, are low to ensure this valued resource is maintained.

- Conserve the character of the settlements by using traditional building materials and patterns in any new development.

- Restore derelict landscapes (including previous colliery spoil heaps) to heathland, woodland, amenity land or agricultural land as appropriate, whilst ensuring the industrial heritage of the area is conserved and promoted.

- Strengthen the network of hedgerows, which is presently low and overly managed, to enhance the historic landscape pattern and ecological networks. Plan to increase the number of native hedgerow trees, which should be predominantly English and/ or sessile oak, and which are lacking in this otherwise wooded character.

Ecosystem service analysis

The following section shows the analysis used to determine key Ecosystem Service opportunities within the area. These opportunities have been combined with the analysis of landscape opportunities to create Statements of Environmental Opportunity.

Please note that the following analysis is based upon available data and current understanding of ecosystem services. It does not represent a comprehensive local assessment. Quality and quantity of data for each service is variable locally and many of the services listed are not yet fully researched or understood. Therefore analysis and opportunities may change upon publication of further evidence and better understanding of the inter-relationship between services at a local level.

Service	Assets/ attributes: main contributors to service	Main beneficiary	State	Analysis	Opportunities	Principal services offered by opportunities
Food provision	Soils – sandy soils which are predominantly grade 3 agricultural, supporting arable farming	National	The Sherwood area supports commercial scale, mainly arable farming. The sandy soils are mostly Grade 3 although irrigation and fertiliser inputs allow them to be used flexibly. The freely draining, slightly acid sandy soil does not become waterlogged in the winter, allowing good year round growing and lifting conditions. Root crops predominate and carrots from this area supply many UK supermarkets. Outdoor pig and poultry systems can also be seen. Pasture and dairying is concentrated in the small area north of Worksop, though English Longhorn cattle are used to graze the ecologically sensitive wood pasture of the Sherwood NNR.	Food provision is an important service, and the root crops grown here make a significant contribution to local, regional, and national food resources. Farming activity can have a significant impact on other services particularly those relating to water and soils. Irrigation is very important on the sandy soil, and has to be carefully managed so as not to lead to increased shortfalls in water resource. 100 per cent of the Sherwood NCA is designated as a Nitrate Vulnerable Zone to prevent excess nitrate entering the aquifer. Some farming practices can lead to increased rates of soil erosion, which have a detrimental effect on agricultural productivity over the long term. Maintaining vegetation cover, avoiding soil compaction and creating wind breaks through hedgerows and tree belts are important measures within this NCA.	There is an opportunity to ensure agriculture is managed sustainably and does not have a significant detrimental effect on the value of other ecosystem services or assets such as water availability, water quality and soil quality. This will in turn bring benefits to agricultural land and assist with future provision of food.	**Food provision** **Water availability** **Regulating water quality** **Regulating soil erosion**

Service	Assets/ attributes: main contributors to service	Main beneficiary	State	Analysis	Opportunities	Principal services offered by opportunities
Timber provision	Sherwood Forest Pines estate approximately 3,100 ha managed for timber alongside other interests Soils – poor grade soils	Regional	The Forestry Commission and several private landowners have a large estate in the Sherwood area managed for productive timber. Sherwood Forest Pines estate is approx 3,100 ha, which includes multiple use areas for recreation, wildlife conservation and timber production. Predicted softwood availability from all Forestry Commission estates for 2007-2011 across the whole of Central England region was forecast at 258,000 cubic metres in 2005.	The timber woodland sites are associated with many of the NCA's most important wildlife resources and provide valuable recreational opportunities, although the plantation woodlands are not in character with the traditional oak/ birch wooded nature of the area. An increase in timber production could increase climate change regulation through increased carbon sequestration and bring local benefits to renewable energy through local heating energy sources. An increase in timber provision would require new land presently not wooded to be planted and this land would need to be appropriately sourced so as not to affect habitats, food provision or areas of archaeological resource. There may be potential for new woodland sites on some of the derelict land associated with the mining industry, on marginal agricultural land and land bordering existing woodland.	There is an opportunity to ensure timber-producing commercially managed forests are managed for multiple benefits (for example, recreation, biodiversity, timber). There may be opportunities to increase timber production within appropriate settings.	**Timber provision** **Biodiversity** **Recreation**

Service	Assets/ attributes: main contributors to service	Main beneficiary	State	Analysis	Opportunities	Principal services offered by opportunities
Biomass energy	Woodlands cover 20 per cent of area Stands of short rotation coppice, for example, along the A614	Local	The existing very high woodland cover (22 per cent) offers an increased potential for the provision of biomass as a by-product of commercial timber production, as well as through bringing unmanaged woodland under management. There are currently prominent stands of short rotation coppice (SRC) beside the A614 in the NCA. For information on the potential landscape impacts of biomass plantings within the NCA, refer to the tables on the Natural England website.	Although a recent study suggested the NCA has medium potential for SRC but with some small areas of high potential, new sites for biomass would need to be carefully considered first. (Biomass production in the area is currently low; however the area has medium potential for SRC. Increased provision of SRC for fuel has the potential to sequest carbon and provide renewable supplies of energy, but could decrease provision of future food if placed on farmed areas. Major expansion could also affect sense of place if SRC becomes a major component of the landscape. There may be potential for new sites on previously derelict land from the mining industry, on marginal agricultural land and land bordering existing woodland.	There is an opportunity to increase production of biomass as a bi-product of existing commercial timber production and through introducing management in currently unmanaged woodlands. There is also an opportunity for small-scale biomass production through planting on sites including small parcels of land isolated by development and are not suitable for agriculture, spoil heaps and closed landfill sites.	**Biomass energy** **Biodiversity** **Regulating soil erosion**

Service	Assets/ attributes: main contributors to service	Main beneficiary	State	Analysis	Opportunities	Principal services offered by opportunities
Water availability	Aquifer – supplies 10 per cent of Environment Agency Midlands region Rivers Surface waters	Regional	The majority of the NCA overlays the East Midlands Sherwood Sandstone aquifer. The aquifer provides a strategically important groundwater resource, the source of significant public water supply (about 10 per cent of all water supplies in the Environment Agency's Midlands region. Over-abstraction is a continuing issue for the aquifer, with abstraction levels greatly above those needed to obtain "good status" in line with the Water Framework Directive (Environment Agency, 2009). Rivers in the NCA generally have an integrated 'no water available' Catchment Abstraction Management (CAMs) status, with the exception of the River Idle to the north which has been classified as 'over abstracted.' The closing of many of the collieries has also seen a marked reduction in watercourse levels, as it is no longer pumped from the mines for safety reasons.	Significant volumes of abstracted water are used for agricultural irrigation in Sherwood, and as a public water supply to the growing population of the East Midlands. This abstraction results in low groundwater levels and low base-flows in the relatively small number of rivers on the surface of this landscape. Water levels in the lakes of the Ducal estates, some of which are Sites of Special Scientific Interest (SSSI) are also low, and this is having an overall negative effect on the ecology of these waterbodies. Increasing water availability (through greater capture/infiltration) and continuing to carefully manage abstraction is likely to reduce biodiversity loss in the wetland habitats and improve water quality, whilst maintaining water availability. This could also increase agricultural outputs during periods when water for irrigation is limited.	There is an opportunity to manage water within the NCA to slow runoff rates and increase infiltration rates into the aquifer. There is also an opportunity to manage over-abstraction from the aquifer and river systems through implementing careful and efficient use of water, and through development of alternative more sustainable sources of water supply where possible. Managing crop types and cultivation methods also has potential to provide benefits (although it is recognised that many land managers already operate using environmentally sensitive practices).	**Water availability** **Regulating water quality** **Regulating soil erosion**

Service	Assets/ attributes: main contributors to service	Main beneficiary	State	Analysis	Opportunities	Principal services offered by opportunities
Climate regulation	Woodland Soils (limited contribution)	Regional	The high woodland cover in the area, both deciduous and coniferous plantation woodland, brings benefits for carbon sequestration. The sandy soils over most of the NCA have a low carbon content (0-5 per cent) but there may be potential to increase carbon sequestration and storage by increasing organic matter inputs within agricultural systems.	Carbon storage in the woodland is currently relatively high (woodland cover 22 per cent), but may be increased by the planting of additional woodland, on appropriate sites, and through management. There is limited potential for increasing the carbon sequestration and storage capacity of the soils by increasing organic matter inputs and reducing the frequency / area of cultivation. If planted with native trees there is also potential to increase biodiversity services and recreation (if access is provided). Planting may also increase the sense of place by enhancing the woodland character of Sherwood.	There is an opportunity to increase the carbon storage potential of the area through the planting of new woodland (as referenced above in timber and biomass service provision). This would need to result in a net increase of the woodland cover and would only be appropriate if suitable sites could be found (see above).	**Climate regulation** **Timber provision** **Biodiversity**

Service	Assets/ attributes: main contributors to service	Main beneficiary	State	Analysis	Opportunities	Principal services offered by opportunities
Regulating soil erosion	Semi-natural vegetation cover Hedgerows and tree belts (windbreaks) Woodland, copses, scrub	Regional/ Local	The well-drained, acidic, sandy soils found in this NCA are at risk of wind and water based soil erosion, especially if the impact of climate change brings about drier summers, more intense rainfall events and higher wind speeds. These lighter textured soils have an enhanced risk of soil erosion on moderately or steeply sloping land where cultivated or bare soil is exposed, including that under outdoor pig rearing (a characteristic of this NCA). The intense use of the agricultural land for root crops could also increase the risk of soil erosion where it is not properly managed. The slightly acid loam and clay soils with impeded drainage are prone to capping/slaking, leading to increased risk of erosion. These soils are easily compacted by machinery or livestock if accessed when wet, increasing the risks of soil erosion by surface water run-off, especially on steeper slopes.	The current rate of soil erosion is a significant issue in this NCA. Increasing regulation of soil erosion by careful management of agricultural practices and by planting more permanent vegetation would help to reduce compaction, trap sediment and improve soil health. This approach would offer benefits to biodiversity, climate regulation and agriculture in the long run, by helping bind the soil, reducing sedimentation in rivers and by storing limited amounts of carbon in the soil. This could help maintain fertility in the longer term.	There is potential to increase the semi-natural vegetation cover by restoring heathland and planting small areas of woodland /short rotation coppice. This may also help increase organic matter content of the freely draining slightly acid sandy soils that dominate this NCA. These management measures will improve soil structure, help increase water infiltration (aiding aquifer recharge) and reduce the risk of water and wind based erosion. There are also opportunities to sustainably manage agricultural land management practices to reduce the impact on soil erosion, for example through types of crop rotations, use of machinery and timing of cropping.	**Regulating soil erosion** **Regulating soil quality** **Regulating water quality** **Water availability**

Service	Assets/ attributes: main contributors to service	Main beneficiary	State	Analysis	Opportunities	Principal services offered by opportunities
Regulating water flow	Woodland Wetlands Rivers Surface waters	Local	The main catchment within the NCA is the River Trent. The Environment Agency flood risk map indicates that for much of the NCA flooding is not generally a major issue. Rainfall tends to soak quickly into the sandstone. However, flooding has caused significant localised damage in severe weather events, for example in Worksop in summer 2007 the River Idle flooded affecting 200 properties. The River Erewash in the south-east of the NCA and the River Meden and River Maun also experienced flooding at this time. Many of the areas alongside the rivers in the NCA offer informal flood storage. The River Idle Washlands SSSI, located downstream of Bawtry, is the principal area of floodplain wet grassland in the catchment.	Flooding has not been a major issue in this NCA within the recent past The high woodland cover, as well as the porous nature of the soils and geology, help to ensure rainwater is intercepted and infiltrated effectively. However, actions in this NCA can impact flooding downstream in the Humberhead Levels and elsewhere within in the River Trent basin. Careful water management can help to reduce the severity of flooding events downstream.	There is an opportunity to increase vegetation cover and including wet woodland to create water storage areas, in accordance with sustainable urban drainage systems. There are opportunities to create and extend semi-natural floodplain habitats such as flood meadows, wet woodland and reedbed to mitigate the severity of downstream flood events.	**Regulating water flow** **Regulating water quality** **Regulating soil erosion** **Regulating soil quality**

Service	Assets/ attributes: main contributors to service	Main beneficiary	State	Analysis	Opportunities	Principal services offered by opportunities
Pollination	Areas of semi-natural habitat, hedgerows, grass margins	Local	The habitats in the area support a variety of pollinators, which are essential to maintaining the habitats and to agricultural production. It is possible that the population of pollinators has fallen, with some species becoming isolated in pockets, due to the increase of commercial scale farming, the changing climate or use of chemicals, but the causes are unclear.	The hedgerows, heathland, acid grassland, wood pasture habitats found in Sherwood provide good habitats for pollinators and should be managed in good condition and expanded where possible to ensure this service continues effectively. A good network of semi-natural habitat should be developed throughout the NCA to ensure this service performs to maximum effect.	Pollination is not currently a service required by the predominant agricultural crop, however, there are pockets of agricultural land which do benefit from it and an increase in local populations of pollinating invertebrates may aid in affording a greater diversity of crop types to be grown in the future. A strong and wider network of semi natural habitats would bring significant benefit for biodiversity too.	**Pollination** **Biodiversity**
Pest regulation	Areas of semi-natural habitat/ hedgerows/ grass margins	Local	The habitats in the area support a variety of species, such as beetles, which can regulate the populations of pests such as aphids.	The hedgerows, heathland, acid grassland, wood pasture habitats found in Sherwood provide good habitats for species which regulate pests and should be managed to afford a wide variety of niches and expanded where possible to ensure this service continues effectively.	A stronger and wider network of semi-natural habitats would bring benefit for pest regulation, as well as pollination and biodiversity services.	**Pest regulation** **Pollination** **Biodiversity**

Service	Assets/ attributes: main contributors to service	Main beneficiary	State	Analysis	Opportunities	Principal services offered by opportunities
Sense of place/ inspiration	Sherwood Forest NNR, containing the Major Oak and its fellow ancient oaks, and Sherwood Pines The Ducal Estates The mining heritage	National / International	The sense of place is most strongly shaped by the international legend of Robin Hood, which is intrinsically linked with Sherwood Forest and the City of Nottingham. A sense of place is provided by the varied but distinctive patchwork enclosed arable land, large pine plantations, lowland woodland and heaths of the former medieval Sherwood Forest and wastes. The historic parklands and estates of the Dukeries and the built relicts of the former coal industry add to the sense of place. Feelings of inspiration and escapism are associated with the varying views of wooded skylines and open heaths creating a strong sense of enclosure in an otherwise urbanised landscape. This landscape offers opportunities to escape into the past, or into a world of myths and legends. Sherwood Forest NNR, containing the Major Oak and its fellow ancient oaks, and Sherwood Pines, actively promotes this experiential quality, particularly for children's activities associated with the legend of Robin Hood.	Increasing sense of place has the potential to increase tourism. Management to enforce sense of place is also likely to increase sense of history. Conserving and enhancing the distinct patchwork of landscape features is also likely to benefit biodiversity by enhancing or expanding available habitat.	There is an opportunity to maintain a sense of place, valued by local people and tourists, by conserving the patchwork and variety of landscape features which give the NCA its distinctive sense of place. Most prominently there are opportunities to conserve and promote the cultural association with Robin Hood, as it re-enforces the sense of place Sherwood has on an international scale. There are also opportunities to strengthen the landscape pattern through increasing the hedgerow networks, and to expand areas of woodland and heathland as appropriate. This would bring benefits for other regulating services	**Sense of place/ inspiration** **Recreation** **Biodiversity** **Regulating soil erosion**

Service	Assets/ attributes: main contributors to service	Main beneficiary	State	Analysis	Opportunities	Principal services offered by opportunities
Sense of history	The Dukeries Sherwood Forest ancient oaks Nottingham Castle and caves The mining heritage	National	A significant sense of history is engendered by the tracts of ancient woodlands: remnants of Sherwood Forest and their strong associations with Robin Hood. A sense of history is associated with the Dukeries, an extensive area of historic estates, parklands and ornamental gardens, and the northern sandstone estates. Notable estates include Clumber Park, Welbeck Abbey, Thoresby and Babworth Parks. This historic character is reinforced by the nucleated pattern of estate villages related to country houses within the Dukeries, such as Perlethorpe, and the dispersed pattern of villages, hamlets and farmsteads unaffected by coal mining elsewhere. Other emblems of the area's varied past are the conspicuous relics of the coal mining industry including pit heaps, mineral lines, the Chesterfield Canal, Nottingham as the centre of lace making from the 17th to 20th centuries, as well as cultural links to the Pilgrim Fathers. Nottingham Castle and the caves beneath it, have a long history and form a much visited tourist attraction.	Maintaining, conserving and enhancing the sense of history, through increased interpretation and opportunities to interact with the history, may have potential to increase the service. This may lead to increased recreation and tourism in the area, although management would be needed to ensure this is sustainable and does not have a negative impact on the assets themselves. The reinforced sense of history could contribute strongly to sense of place in the landscape.	Sherwood Forest NNR and the surrounding area should continue to be managed for biodiversity and the sense of history they provide to ensure the area remains in suitable condition and provides a valuable recreational and tourism asset. There is an opportunity to increase sense of history by protecting the character and historic resource of the large country houses and parklands found in the Dukeries, and elsewhere in the area; conserve their valuable parkland and lakeside habitats, protect the condition of the large houses, and conserve the historic estates for the cultural history they contribute to the landscape character.	**Sense of history** **Sense of place/ inspiration** **Recreation**

Service	Assets/ attributes: main contributors to service	Main beneficiary	State	Analysis	Opportunities	Principal services offered by opportunities
Tranquillity	High wooded nature of the area Pockets of undeveloped rural land away from settlements and major tourist attractions	Local	The NCA has experienced a continued decline in tranquillity: areas of intrusion have increased from 42 per cent in the 1960s to 68 per cent in 2007, largely resulting from an increase in urbanisation. Characteristics of the landscape that are particularly important in conveying a sense of tranquillity are the narrow river corridors and pockets of deciduous woodland, contrasting strongly with the expansive arable fields and relics of a mining past. Tranquillity is reduced in other areas because of their proximity to Nottingham and other towns and large mining villages. The popularity of the area for tourism also has an impact on tranquillity levels.	Preventing the decline of areas of tranquillity by screening new development with new planting and managing tourism sustainably would bring benefits for people's enjoyment of Sherwood as a tranquil landscape. Increasing tranquillity through expanding areas of deciduous woodland could also increase biodiversity/natural beauty, sense of place.	There is an opportunity to protect areas, such as the core and northern areas of the NCA, where tranquillity and intrusion are presently low. This will allow people to feel connected to nature and contribute to wellbeing and health. Reduce where possible the impact of settlement in the urban western areas and along roads by planting woodland shelter belts, strengthening the hedgerow pattern and ensuring new development on settlement fringes is sensitively designed.	**Tranquillity** **Sense of place/ inspiration** **Biodiversity**

Service	Assets/ attributes: main contributors to service	Main beneficiary	State	Analysis	Opportunities	Principal services offered by opportunities
Recreation	Sherwood NNR Country Parks and Ducal Estates Historic sites such as Nottingham Castle Foot paths Open Access Land	National	The historical interest and the numerous recreational and access facilities means this is a landscape popular for recreational and education purposes. Clumber Park, Sherwood Forest NNR, Sherwood Pines, Bestwood and Newstead, as well as the caves in Nottingham, are all significant attractions. Many schools bring children to undertake ranger and self guided activities at the Sherwood Forest NNR. The area has a number of significant commercial visitor destinations including Center Parcs and the ducal estates which are now registered parks and gardens. Nottingham Castle, sitting on top of its outcrop of sandstone, offers long views over the city and is a well-visited attraction. In the wider landscape the density and distribution of public rights of way is variable with a notably lower level of provision in areas traditionally managed as part of the ducal estates. Recreation is supported by a network of rights of way totalling 390 km with a density of 0.73 km per km^2, and a small proportion of open access land at 223 ha or approximately 0.5 per cent of the area of the NCA.	Recreation is already a very significant service in this NCA. It is likely that recreational opportunity could be increased without significant effects on other services, so long as the assets were well managed for both biodiversity and recreation, especially those in the Sherwood Forest NNR and surroundings. Supporting proposals in the Nottinghamshire Rights of Way Improvement Plan would lead to increased recreation opportunity away from the major visitor attractions, which would benefit local residents.	There is an opportunity to conserve and enhance the many recreational opportunities offered in this NCA around Sherwood Forest NNR, Clumber Park, Rufford Country Park and Sherwood Pines Forest Park each year, while managing the impacts from tourism and recreation on the natural landscape. In addition there are opportunities to promote the recreational and education opportunities offered by the public access to the large houses and ducal estates in the area. Expanding the public rights of way network in areas traditionally managed as part of the ducal estates where the network is not as strong as in other areas would bring recreational benefits to the local population. Increasing green infrastructure links from urban areas out to the recreational areas in the centre of the NCA would help make recreation "greener" and provide more assets.	**Recreation**

Service	Assets/ attributes: main contributors to service	Main beneficiary	State	Analysis	Opportunities	Principal services offered by opportunities
Biodiversity	Semi-natural /habitats (species-rich grasslands, heathlands wetlands, deciduous woodlands) Arable margins Fallow areas	Local	3 per cent of the NCA has been designated for its biodiversity and this includes Birklands and Bilhaugh SAC, Sherwood Forest NNR and 1,757 ha of SSSI. Approximately twice this area is covered by priority habitats. Semi natural habitats such as lowland heathland and acid grassland are under pressure from commercial scale farming, which is an important land use in this area. The loss of meadows is particularly evident along river corridors, which would have traditionally defined the river channels and distinguished them from the surrounding farmland.	There is scope to improve biodiversity by working with land managers through conservation and environmental stewardship schemes.	Ensure areas of designated land remain in favourable condition and improve the condition in these designated areas where possible. Work with land owners to extend the area of land in Environmental Stewardship.	**Biodiversity**

Service	Assets/ attributes: main contributors to service	Main beneficiary	State	Analysis	Opportunities	Principal services offered by opportunities
Geodiversity	Geology Exposed rock formations Designated geological sites Sandstone buildings	local	There are no nationally designated geological sites in Sherwood but there are 41 local sites (non-statutory designation) which are mostly quarries and river section sites. There are outcrops of Triassic Sandstone throughout the NCA, the most famous of which is Castle Rock in the centre of Nottingham. The network of caves under the castle is an important feature in the sandstone geology, although the caves are man-made. The Coal Measures found in the area lead to significant mining activity, which has now left a distinct mining heritage. Local sandstone is a distinct building material of the local vernacular.	The sandstone geology of Sherwood gives it a sense of place clearly distinctive from surrounding NCAs. The assets, such as the caves and the rocky outcrops, provide opportunities for interpretation and access to the public. These features make a significant contribution to the sense of place and sense of history of the area.	There are opportunities to continue the access to the Nottingham caves, and other geological exposures, as tourist destinations to help increase understanding and enjoyment in the resource, and the history of the area. There are also opportunities to ensure new development is in keeping with the character of the area by using traditional building materials where possible.	**Geodiversity** **Sense of history** **Recreation**

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