National Character Area profile:

105. Forest of Dean and Lower Wye

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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.

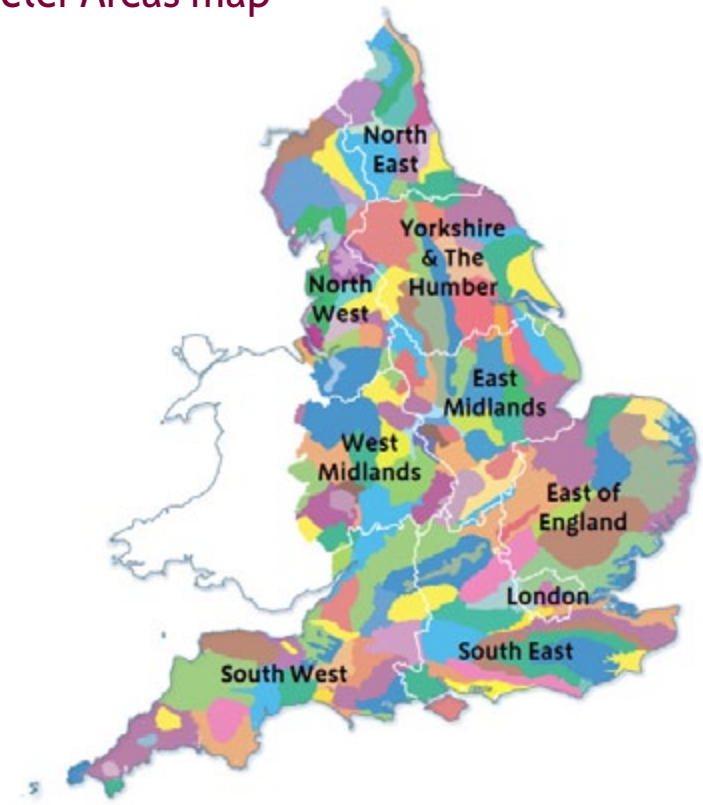
NCA profiles are guidance documents which can help communities to inform theirdecision-making about the places that they live in and care for. The informationthey contain will support the planning of conservation initiatives at a landscape scale, inform the delivery of Nature Improvement Areas and encourage 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 Forest of Dean and Lower Wye National Character Area (NCA) is bounded by the Wye Gorge, largely forming the Welsh border, to the west, the plain of South Herefordshire to the north, and the wide valley of the River Severn and Estuary to the south and east. The area is triangular in shape, tapering to a point in the south where the Wye opens into the low-lying Severn vale at Chepstow. The central plateau, lying between 150 m and 250 m, dominated by the statutory forest, opens out into an undulating landscape of arable and pasture to the south and the west.

The landscape is a mosaic of woodland and open ground, a characteristic of medieval hunting forests. The extent of the woodland in the NCA (41 per cent of the area) makes an important national contribution to climate regulation and timber provision. The area is nationally important for woodland birds and butterflies. There are three designated Special Areas of Conservation (SACs) within the NCA: the River Wye; the Wye Valley Woodlands, containing an important range of woodland stand types and rare species including three species of whitebeam; and the Forest of Dean and Lower Wye Valley Bat SAC, which is internationally important for its population of lesser and greater horseshoe bats.

Approximately 26 per cent of the NCA lies within the Wye Valley Area of Outstanding Natural Beauty (AONB). Settlements are small, with less than 6 per cent of the NCA being urban; Coleford and Cinderford are the two larger towns. Settlements form a ring around the forest on the central plateau, their placement influenced by the boundaries of the Royal Forest and the historic use of the land for mining mineral wealth from the Coal Measures and surrounding iron-rich limestone. Other small settlements are scattered around the farmland.

The area is also important for heritage, with extensive archaeological remains, historic structures and local culture. Publicly accessible land accounts for 35 per cent of the area. Future challenges and opportunities include changes in agricultural practice impacting grazing management, changes to forestry practices and increased pressures from recreational use.

Click map to enlarge; click again to reduce.

Statements of Environmental Opportunity

- **SEO1:** Protect and manage the extensive internationally important woodland for its biodiversity, landscape, and ability to store and sequester carbon. Provide a sustainable timber resource while recognising the woodland's recreational value and heritage, and its contribution to a sense of place and tranquillity.

- **SEO 2:** Protect, manage and enhance the pastoral character of the farmland, with its ancient species-rich hedgerows, drystone walls and traditional orchards. Retain traditional management techniques on the network of small, neutral lowland meadows with its characteristic small-field structure and narrow winding lanes.

- **SEO 3:** Maintain and enhance the distinctive settlement pattern of small villages using local characteristic materials, ensuring that future development recognises and retains the value of the area's landscape, biodiversity, geodiversity, access and heritage. Encourage the traditional practices intrinsically associated with shaping the physical environment and culture of the area, including commoning, small-scale freemining and Forest Law.

- **SEO 4:** Protect and enhance assemblages of internationally important species associated with the River Wye Special Area of Conservation (SAC) and River Severn estuarine SAC, employing good land management practice throughout the Forest of Dean and Lower Wye Valley to improve water quality, reduce soil erosion and regulate water flow.

Sheep grazing in the statutory forest.

Description

Physical and functional links to other National Character Areas

The northern boundary of the Forest of Dean and Lower Wye National Character Area (NCA) merges into the undulating farmland of the South Herefordshire NCA. To the east, the edge of the central plateau falls away more steeply into the Severn flood plain, the estuary of the Severn, and the Severn and Avon Vales NCA. From clear, unwooded higher ground along this eastern edge, the Cotswold scarp can be seen rising out of the flat vale. The western edge is defined by the abrupt Lower Wye Valley Gorge forming much of the border with Wales in this NCA; however, beyond the river, the Trelleck Plateau of Monmouthshire is of similar character and would be a natural extension of the NCA if the concept were applied in Wales. Views across to the Black Mountains of Wales are possible in places.

The water quality of the River Wye through this NCA is significantly influenced by discharges from the City of Hereford and intensive agricultural land use further upstream in the Herefordshire NCAs. Small watercourses in the NCA drain directly into the Wye and the Severn.

Being surrounded on two of three sides by important rivers, major access to the Dean is restricted to the A4136 and the encircling A40 to the north; the A48 to the south-east, which largely follows the path of the Roman road between Caerwent (Monmouthshire) to the south and Gloucester to the north-east; and the A466 along the Wye Valley. This creates a sense of isolation, with road crossings being available only at Chepstow, St Briavels and Bigsweir across the Wye, or Chepstow and Gloucester across the Severn. Historically, the rivers – and then the railways – were the main trade and communication corridors. The southern tip of the NCA is now well connected with the M4 and other motorway links, while the rest of the Dean is criss-crossed by relatively small roads and narrow lanes, continuing the relative isolation of some of its communities.

Distinct areas

- Forest of Dean (statutory forest)
- Lower Wye Valley

View of the River Wye from Yat Rock.

Heathland restoration at Tidenham Chase.

Key characteristics

- Centred around a well wooded, undulating plateau of ridges and valleys sitting over shallow Coal Measures, contained by an outer rim of more open landscape on Carboniferous Limestone and Devonian Old Red Sandstone, providing examples of active and past geological processes, with the River Wye cutting dramatic gorges with steep, wooded slopes.
- Picturesque inward views as well as extensive views outwards in places: westwards across the Wye Gorge to the Black Mountains of Wales, or eastwards across the Severn Estuary to the Cotswold Hills, providing attractiveness for tourism and recreation.
- Extensive woodland, with particular concentrations within the statutory forest of the central plateau and Wye Valley. This ranges from managed coniferous plantations to broadleaved woodlands, many of which are ancient (ancient woodland is defined as being continuously wooded since 1600; the statutory forest is an ancient forest, parts of which have been heavily exploited for timber, but the majority is considered as ancient woodland) or semi-natural, and designated as Sites of Special Scientific Interest (SSSIs). These form one of the largest remaining areas of broadleaf semi-natural woodland in the country.
- A diversity of field size and shape, ranging from small, irregular enclosures to medium-sized, rectilinear fields. Fields are either bounded by hedgerows (many of which are several hundred years old) or drystone walls. Fewer hedgerow trees are seen in the more fertile arable districts.
- The pastoral landscape outside of the woodland is used primarily for livestock rearing, with some dairying along the edge of the Severn and Avon Vale. In addition, there are smallholdings of small- to medium-sized fields, supporting market gardening, orchards, livestock rearing and horse grazing. Commons and the statutory forest are used extensively for unrestricted sheep grazing. In addition, there are a notable number of traditional orchards – particularly to the north and east.
- Several small rivers drain most of the plateau to the south and south-east, while other small rivers feed into the Wye to the north and west. The River Wye Special Area of Conservation (SAC)[4] is recognised for its international importance for species including white-clawed crayfish, otter, salmon, twait and allis shad. Tidal influence on the Wye occurs as far as Bigsweir. Brooks drain eastwards to the Severn.
- The NCA features rich wildlife habitats including grassland, heathland, traditional orchards and woodland; nationally important assemblages of woodland birds and butterflies; internationally important woodland, river and bat sites; and a range of other rare flora and fauna.
- There is a rich historic environment, including prehistoric settlements and field systems (such as the hill forts on Welshbury Hill and Symonds Yat); Roman sites (such as Lydney Park and the Anglo-Saxon earthwork known as Offa's Dyke that formerly marked the border between England and Wales); medieval castles (such as St Briavels and Ruardean); and an industrial landscape of iron and coal extraction, quarries, and associated tramways – many of which have been subsumed by the woodland canopy.

[4] jncc.defra.gov.uk/protectedsites/sacselection/sac.asp?EUCode=UK0012642

Key characteristics continued

- Surrounding the edge of the statutory forest is a ring of settlements associated with iron ore and coal deposits, often sprawling and linear in nature, where buildings are interspersed with industry and open grazing land. Wholly within the woodland of the statutory forest, Parkend and Brierley are the only substantial settlements. Other earlier settlements, of medieval origin (such as St Briavels, Lydney, Mitcheldean, Newnham and Ruardean), lie outside this ring.
- Traditional building materials include local sandstone toned from dull pinkish-greys to warm pink-browns, limestone, brick, pebbledash, slate and tiles. More recent buildings are of white render, with Welsh slate or dark pantile roofs.
- Main access routes are the A4136 through the Dean and the encircling A40 to the north; the A48 to the south-east; and the A466 along the Wye Valley, linking with the M48, M4, M5 and M50. The mainline railway links Gloucester to Chepstow through the Dean's only mainline station, at Lydney.

The now tranquil Cannop Ponds at one time supplied power to industrial machinery.

Forest of Dean and Lower Wye today

Triangular in shape, being bordered to the south and east by the River Severn and Estuary, to the west by the stunning gorges of the River Wye and to the north by the undulating farmland of the South Herefordshire NCA, the Forest of Dean and Lower Wye NCA tapers to a point at Chepstow, where the River Wye meets the Severn. These two large rivers, with their limited crossing points, create a feeling of remoteness which is increased within the enclosed surroundings of the woodland and has resulted in a strong sense of history and cultural identity.

The introversion of the central plateau contrasts with the occasional extensive and impressive views outwards; from Tidenham Chase/Poor's Allotment, for example, one can glimpse a panoramic view over the wide vale of the Severn to the ridge of the Cotswolds in the far distance. Views to the north, from Yat Rock and Ruardean, look over the lowlands of South Herefordshire to the Shropshire border. Cinderford affords views right across the forest to the distant peaks of Blorenge and Sugarloaf, in the Black Mountains in Wales.

The Wye Valley, along the western and south-western edge of the NCA, provides the most dramatic scenery in the area – nationally recognised through the designation of the Wye Valley Area of Outstanding Natural Beauty (AONB). Thickly wooded slopes drop steeply down to the winding river, forming vertical cliffs and gorges of up to 200 m at Symonds Yat. Here the broad river makes a series of meanders through the rocks, and then flows south down through a narrow, twisting and steep-sided valley, the slopes covered with broadleaved, ancient semi-natural woodland. These are some of the most diverse woodlands in Britain, and many have a long history of active traditional management, including extensive historical coppicing to supply charcoal for the blast furnaces of the local iron industry. (Recent abandonment of traditional practices, however, has resulted in a large proportion of the resource being unmanaged for the last 50 to 100 years.) Rare ancient woodland ground flora such as narrow-leaved helleborine, ghost orchid, Tintern spurge and spreading bellflower occur. The River Wye is itself of international importance, and is designated a SAC for species such as native crayfish, otter, salmon, shad and lamprey.

Together, the Wye Valley and Forest of Dean woodlands (statutory forest) form one of the largest remaining areas of broadleaf semi-natural woodland in the country, and support important populations of deadwood invertebrates, woodland butterflies and moths; a wide range of breeding woodland birds; breeding populations of dormouse; woodland plants; and an outstanding bat fauna. Woodland (and the surrounding farmland) forms part of the essential feeding area for internationally significant populations of lesser and greater horseshoe bats. Hedgerows provide flight lines, and old caves or mines and large buildings with suitable roof spaces provide the bats with suitable hibernation and breeding sites respectively.

The statutory forest at the centre of the NCA contains a mixture of semi-natural woodland, native broadleaf and conifer plantation. Ancient hollies and oaks at Speech House, in the heart of the forest, are designated for the rare lichens they support. Stands of old beech plantation are underlain with fantastic spring displays of bluebells. Ground flora characteristic of ancient woodland, such as wood anemone and herb Paris, can be found. Ancient hedgerows, important for many species, connect the woodlands to the more open countryside. A number of sizeable manmade ponds are scattered through the forest. For example, Cannop Pond, created in 1826 as reservoir for Parkend Ironworks, is a particularly popular picnic site, while Soudley Ponds, also created in the 19th century to provide water for local industry, are now designated as an SSSI for their native crayfish, freshwater invertebrates and outstanding dragonfly assemblage.

An abundance of features of historic and cultural significance are evident throughout the NCA, including prehistoric settlements and field systems, Roman sites, Norman castles and the 8th-century Offa's Dyke, which marks a former border between England and Wales. Relics of the nationally significant industrial past (for example iron ore and coal extraction, and paper milling) are evident in old cave systems, known locally as scowles, from which iron ore was extracted (probably from the Iron Age onwards), tips, quarry faces, disused railway lines and old mills, many of which have been subsumed by the woodland canopy. Old lime kilns are dotted around on the limestone areas. Stunning views of the remains of Tintern Abbey can be captured from the Devil's Pulpit on the Offa's Dyke trail, high above the Wye.

Scattered sprawling settlements are found in a ring around the edge of the forest on the central plateau. Developed to support the iron workings and past industries of the area, many of the buildings in these settlements are constructed of local warm-coloured sandstone, grey limestone, brick or pebbledash, with grey slate or pantiled roofs. Parkend and Brierley are the only substantial settlements wholly within the woodland. The forest wastes (areas of open, unfenced, grazing land within the statutory forest) are less well grazed now, although some retain characteristic species of lowland dry acid grassland. Sheep graze openly throughout the forest, and are often seen along roadsides, but there are many fewer than there were prior to the 2001 foot and mouth disease outbreak, and scrubbing up of many of these open areas is apparent.

To the south and west, the forested plateau opens out to a high, undulating agricultural landscape of both arable and pasture. Fields are medium-sized, and boundaries are of hedges, with only a few hedgerow trees, and discrete coniferous plantations. In places along the edge of the plateau, networks of sunken lanes, with steep banks and trees towering above, contrast markedly with the more open landscape of this part of the plateau.

Ashwell Grove lime kiln.

A scarp slope of sandstone, incised by small river valleys, defines and contains the plateau from the expansive estuarine landscape of the Severn in the south-east. Pasture and woodland occur on the steep slopes, with pockets of remnant heathland, and the richer colours of the Old Red Sandstone are evident in local buildings.

South of Ross-on-Wye are a group of abrupt steep-sided hills, including Penyard Park and Howle Hill, which separate small valleys. The hillsides are covered with

[5] 0.7 per cent of the population of Great Britain, [6] 19 per cent of the population of Great Britain
[7] 2.4 per cent of the population of Great Britain

dark conifers, which contrast in colours and textures with the arable land within the small valleys. Much of this stretch is less overtly affected by past industrial activity, and is quiet and largely unspoilt. Views out to the west, to the Welsh hills, are particularly noticeable. Further east towards Mitcheldean, and south towards Ruardean, this area merges into a small-scale but dramatic landscape of alternating wooded ridges and farmed valleys, with strong field boundaries and intimate valley views contained by woodland.

In the far south, around St Briavels and Hewelsfield Commons, narrow lanes wind their way between tiny fields, bounded by distinctive local drystone walls or dense hedgerows with hedgerow trees. This area supports notable amounts of species-rich neutral grassland and priority lowland meadow. Lowland calcareous grassland tends to be found in a ring around the central plateaux overlaying the Carboniferous Limestone. The influence of the underlying geology, historic land uses and industry is reflected in the mosaic of heathland, and acid, calcareous and neutral grassland which can be found in places. Only fragments of the once-widespread heathlands of the Dean plateau survive today, many having been lost to agricultural improvement and afforestation. Remnants of heath supporting bilberry, ling and cross-leaved heath are still found within parts of the forested areas of the Forest of Dean and Tidenham Chase.

Smallholdings retaining traditional orchards – or, in some cases, just a few remnant trees – are found across the agricultural areas of this NCA, although they are more concentrated on the fringe of the NCA to the north, around Cinderford (Flaxley and Blaisdon), and in the east (around Blakeney and Woolaston), where they form a continuation of the larger resource in the adjacent South Herefordshire NCA and Severn and Avon Vales NCA.

With the decline of local industry, tourism increasingly provides a significant economic resource to the area, and recreation sites and facilities are provided. The statutory forest is open access land, and increasing numbers of cycle trails for all abilities are available, together with walking routes such as the Offa's Dyke Path National Trail, Gloucestershire Way and bridleways. Access to the Wye for watersports is permitted only in places, however a public right of navigation exists all the way to Hay-on-Wye. The dramatic setting of the forest and of the scowles at Puzzlewood near Coleford, has been used as a backdrop for film and television, and have provided inspiration to local writers such as J K Rowling and Dennis Potter.

Access to the area is limited by the few crossing points across the Wye and Severn rivers. The main routes are via the A48 between Chepstow and Gloucester, or the A40 between Ross-on-Wye and Gloucester. There is only one railway station within the area, at Lydney.

The landscape through time

The nature of the underlying rock has had a direct impact on the landscape through the geomorphological processes brought to bear on it, the resulting land uses and exploitation of its minerals. The Forest of Dean is formed from a bowl-shaped fold (syncline) with its long axis oriented north–south. This structure is further complicated by a number of subsidiary north–south folds and faults, but generally the youngest rocks of the Coal Measures (mainly Pennant Sandstones), interspersed with coal seams, crop out on the central plateau. Surrounding and beneath the Coal Measures is the older Carboniferous Limestone which, as part of the central plateau, extends south and west around Bream and St Briavels. Devonian Old Red Sandstone lies beyond the limestone. In the north, the sandstones of the Lower Devonian occur in ridges running north to south from Littledean down through Blakeney and Lydney.2 The extraordinary course of the River Wye, meandering through gorges cut into the Carboniferous Limestone, is thought to have arisen when a larger river, in its mature form, meandered across a flood plain of soft sediments and then cut down through successive layers of rock as land levels rose. The underlying geology, together with the land use, has influenced the mix of woodland types, heathland, and acid, calcareous and neutral grassland found in the area.

Ruins of Dark Hill iron works built by Robert Mushet in 1818.

From the Iron Age onwards, the deposits of coal and iron ore from within the dolomitic limestones of the Forest of Dean have been an important economic resource. During Roman domination, the deposits of iron ore and the abundant local supplies of charcoal were exploited to produce iron. In the areas of the 'Crease' Carboniferous Limestone are the extensive old cave systems from which the iron ore was extracted. These survive as pits, hollows and deep irregular crevices (scowles).. A higher proportion of prehistoric and Roman earthwork features may survive in this NCA than in more intensively cultivated areas, although forestry and industrial activity may have caused some damage to archaeological remains. Evidence remains of prehistoric field systems, settlements and burial mounds, and former industrial sites, settlements and villas of the Roman period.

In the 8th century, King Offa consolidated the kingdom of Mercia and defended it against the Welsh tribes, building the dyke that runs north–south through the west of the area. The Normans continued this line of defence,

building castles at Goodrich, Monmouth and Chepstow, continuing the exploitation of the iron. In 1292, St Briavels Castle was built as a Royal Armoury, housing a crossbow bolt factory which exploited local iron. In the 12th century, the Cistercians established abbeys at Tintern, Flaxley and Abbey Dore.

However, the main influence on the majority of the area was the creation of a Royal Forest by the Saxon kings. After 1066, the Forest was taken over and expanded by the Norman kings, who continued to use it as a royal hunting reserve, setting out a Forest Law to control use and exploitation. This established the basis of the current land use pattern, with woodland cover retained in the central areas, and settlements restricted to the margins. The Verderers' Court (consisting of four Verderers) was established to oversee the Forest Law of the Royal Forest in the early 13th century to protect the deer and their habitat, and dealt with offences including the taking of venison, the illegal removal of wood, and encroachment through unauthorised enclosures and buildings. It also oversaw the right of estover (collection of firewood). The Verderers continue to this day, still considering issues relating to the statutory forest and the deer.

Unique to the Forest of Dean, freemining rights were granted by royal charter by Edward I in 1296 and consolidated in law in the 1836 Freemining Act, granting that any man born in the Hundred of St Briavels who had worked a mine within the Hundred for a year and a day was entitled to his own gale (mineral area to be worked).

Industry rapidly expanded in the 16th century, and as exploitation of the coal and iron ore continued into the 17th and 18th centuries, settlements further concentrated around the edge of the statutory forest on the limestone where the iron ore deposits occurred. Most of the Wye Valley woodlands were managed as coppice to provide charcoal for the important iron industries

Lancaut medieval church showing the River Wye and the cliffs of Wintour's leap behind.

of the area, as well as bark, which was exported for tanning. At the peak of iron production in the 17th century, large quantities of pig iron were shipped up the Severn to supply forges in the West Midlands. The Forest's ironworks increasingly smelted iron ore from outside the area, though – particularly from north-western England – and some industries, such as wire-making, relied heavily on imported iron, which was more suitable for their needs than that produced locally.

Mine entrance within the statutory forest.

The iron industry declined towards the end of the 19th century, as coke replaced charcoal for smelting. The Dean coal not being good for this process, iron processing moved nearer to better coalfields in South Wales and the Midlands. Coal, however, continued to be worked by freeminers throughout this period, typically on a small scale, by simply opening up a shallow tunnel or adit. Thus a profusion of small pits arose, worked by one man or one family, who settled in the Forest, built a dwelling and cleared a patch of land for their own needs. Improvements in technology led to deeper pits during the latter part of the 19th century, but this expansion was short-lived due to the scattered nature and poor quality of the coal, and the last pit closed in 1965. The commons and the Forest were, and still are, used extensively for unrestricted sheep grazing.

Much of the encroachment by squatters onto areas of former forest common occurred during the late 18th and early 19th centuries. Some of these settlements, such as Cinderford and Berry Hill, with their terraces of miners' houses, have more of the feel of a Welsh mining village about them. Away from the woodland, the dispersed settlements of St Briavels and Hewelsfield Commons are of particular note: with their complex field pattern and widely scattered dwellings, they are linked by a network of tiny lanes. This land was also enclosed by squatters towards the end of the 18th century, each enclosing with banks, hedges or walls a small irregular field. These fields now support market gardening, livestock rearing and horse grazing, often on a part-time basis. Some, still traditionally managed, support important, species-rich grasslands. Elsewhere on the plateau south of Coleford, on better-draining soils, arable has been and is the main land use, and the fields are medium-sized and bounded by trimmed hedges.

The valuable timber resource was felled indiscriminately until 1668, when the Dean Forest (Reafforestation) Act resulted in the enclosure of 11,000 acres to exclude grazing animals and regenerate the dwindling woodland cover.

Sessile oak and beech were favoured for planting. There was continued conflict between forestry interests, the miners and the commoners, with further afforestation Acts passed in the early 19th century. Timber was used for charcoal, fuel, building and pit props. Oak was particularly valuable for ship building, which was carried out on the Severn and Wye. Conflicts of interest only diminished when freeholds were granted in 1838.

Stone quarrying from the Dean has occurred for many centuries and continues to this day, with large limestone quarries being linked to the construction industry. Sandstones were quarried – and in some cases mined (for example Blakeney Hill and Viney Hill stone mines) – for building, and Pennant Sandstones, in particular, supplied millstones. Limestone was quarried and burnt in small kilns to produce lime for soil improvement. The conjunction of all these resources led to associated industries – including tin plate, machine engineering, brick making, wire works and tanning – locating themselves in the Forest. Larger settlements, such as Cinderford, Coleford, Parkend and Mitcheldean, comprised mines, various industries, housing and commons against the backdrop of the extensive woodlands.

Extensive areas of oak were planted in the late 19th century (mainly by the Navy, for future shipbuilding), and the first forestry school in the country was set up in 1904. In 1924 the Forestry Commission took over the management of the forest areas and a further spate of replanting followed. All of the publicly owned woodlands in the NCA were included in the National Forest Park designation of 1938. During the 20th century, planting was mostly of conifers to the better-drained ridgetops.

Early tourism in the Wye Valley started with the development of the Picturesque Movement and interest in the area in the late 18th and early 19th centuries: Tintern Abbey and Symonds Yat were a major focus for this movement in Britain. Recognition of the Wye Valley as an AONB occurred with the designation of the area in 1971, and tourism continues to make a significant contribution to the economy of the area.

More recently, the 2001 outbreak of foot and mouth disease saw the complete removal of sheep from the forest. The reduced numbers that have been returned has impacted on the grazing levels and maintenance of the forest wastes, which are tending to scrub over. Additionally, wild boar have been illegally released and the impact of these is continuing to be assessed. Pressure on woodland regeneration from deer grazing continues to be a problem, particularly in the Wye Valley. The increased accessibility of the forest due to modern lifestyles has led to additional pressures from recreation, but has also provided an important economic input to the area. Pressure from development is restricted to the larger settlements.

Ecosystem services

The Forest of Dean and Lower Wye Valley 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. Further information on ecosystem services provided in the Forest of Dean and Lower Wye Valley NCA is contained in the 'Analysis' section of this document.

Provisioning services (food, fibre and water supply)

- **Timber provision:** Forty per cent of the area (12,918 ha) is woodland, of which 10,642 ha is ancient woodland, and much of the central plateau is managed for timber production.

- **Biomass energy:** Good potential for the production of biomass as a by-product of commercial timber operations, and by bringing unmanaged and under-managed woodland back into appropriate management (for example through coppicing).

- **Genetic diversity:** This NCA (and the surrounding NCAs of the major fruit-producing counties of Gloucestershire, Herefordshire and Worcestershire) retains a wide range of local varieties of orchard fruit, cultivated over hundreds of years (for example Evans' Kernel – a general purpose apple variety from Ruardean).

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

- **Regulating climate change:** The high amount of woodland cover (12,918 ha) plays an important role in carbon sequestration and storage.

Cultural services (inspiration, education and wellbeing)

- **Sense of place/Inspiration:** The area is edged by the Severn escarpment to the east and the steep-sided gorge of the Wye Valley to the west, creating a strong sense of remoteness. This is further enhanced by the sense of seclusion created by the heavily wooded nature of the area. For over 250 years, tourists, artists, writers and poets have visited the area as part of the Wye Tour. Both Dennis Potter and J K Rowling were brought up in the NCA, the Forest inspiring their works.

- **Sense of history:** The history of the landscape is seen in the rich historic environment, including prehistoric settlements and field systems (such as the hill forts on Welshbury Hill and Symonds Yat); Roman sites such as Lydney Park; the Anglo-Saxon earthwork known as Offa's Dyke; the former royal hunting forest; farming; woodland management; and mineral extraction and its associated industries. Iron and coal have been exploited since pre-Roman times, with a wealth of tips; shallow, small-scale iron workings or scowles; quarry faces; horse-drawn tram roads; and disused railway lines. The area boasts 12th-century Cistercian Abbeys (for example Tintern) and associations with the Picturesque Movement.

View from Cinderford across the forest to Sugerloaf Mountain far distance.

- **Tranquillity:** A strong sense of tranquillity remains associated with the extensive areas of semi-natural woodland largely located within the Wye Valley and statutory forest, the small-scale pastoral landscape around St Briavels and Hewelsfield Commons, and the intricate network of small lanes.

- **Recreation:** Recreation is supported by the Offa's Dyke National Trail (28 km of which lies in this NCA), the Wye Valley Walk, the Gloucestershire Way, the Wysis Way, Forestry Commission access trails, the National Cycle Network and a network of 730 km of rights of way with a density of 2.34 km per km^2. Some 35 per cent of the NCA (11,112 ha) is classified as being publicly accessible. There is a public right of navigation along the Wye, although access to the river for watersports is limited.

- **Biodiversity:** Woodlands dominate the area, covering 34 per cent (10,640 ha) of the NCA, including over 10,000 ha of woodland (lowland mixed deciduous, upland oakwoods and wet woodland). There are some smaller priority habitat areas, such as flood plain grazing marsh (123 ha) and lowland meadows (112 ha). Some 1,200 ha of the NCA (4 per cent of its total area) are designated as an SSSI, and there are three SACs.

- **Geodiversity**: There are 12 geological SSSIs in this NCA, consisting of quarries, cuttings and mines associated with the historical extraction of mineral wealth and building materials. There are also 62 Local Geological Sites.

Recreation in the forest: the giants chair, part of the sculpture trail at Beechenhurst lodge.

Statements of Environmental Opportunity

SEO 1 - Protect and manage the extensive internationally important woodland for its biodiversity, landscape, and ability to store and sequester carbon. Provide a sustainable timber resource while recognising the woodland's recreational value and heritage, and its contribution to a sense of place and tranquillity.

For example, by:

- Maintaining the NCA as one of the key timber producing areas in the country, by continuing to preserve the area covered with forest, supporting the change in focus from softwood to native hardwood production – with the benefits this brings for the landscape, biodiversity, soil quality and long-term carbon storage.
- Maintaining an appropriate balance of well-structured woodland (moving towards a greater proportion of native broadleaves), and transitional and permanent open habitats (heathland and acid, calcareous or neutral grassland) within the woodland. This will produce a mixed structure of tree species and stand age structures that can adapt to any effects that climate change or disease might have on the growth of a particular species.
- Ensuring that populations of deer and boar are managed to reduce the damage caused to the natural regeneration of the woodland when their numbers are too high.
- Encouraging the traditional practice of commoning that has historically maintained the open areas within the forest.
- Maintaining or restoring links between woodland and other woody habitats (such as hedgerows, traditional orchards and parkland), and species-rich grasslands and heathland outside the main woodland. This will create a robust network of woody and open semi-natural habitats that will benefit the internationally important populations of bats, as well as other species.
- Ensuring that appropriate time is invested by key stakeholders in drafting Forest of Dean Forest Design Plans, so that these integrate the needs of timber production, landscape design, biodiversity, geodiversity, heritage and the local communities at a landscape scale.
- Creating transitional woodland habitats, which were previously created by the early stages of regeneration following tree felling, but may now be lacking due to a shift to continuous cover management. This will benefit important assemblages of birds and butterflies, through coppicing in appropriate areas (within both the central forest and the steep gorge woodlands from which historical coppice management has been largely lost), producing a sustainable source of wood fuel and biomass.
- Conserving ancient and veteran trees in the woodland for the benefit of fauna (such as assemblages of saproxylic invertebrates dependant on dead or decaying wood) and flora that depend upon them; and for their heritage value and contribution to a sense of place. Planning for the provision of veteran trees of the future.
- Maintaining, managing and protecting the network of roosts, hibernacula, flight lines and feeding grounds associated with the internationally important populations of lesser and greater horseshoe bats.

SEO 1 continued - Protect and manage the extensive internationally important woodland for its biodiversity, landscape, and ability to store and sequester carbon. Provide a sustainable timber resource while recognising the woodland's recreational value and heritage, and its contribution to a sense of place and tranquillity.

- Protecting the long historical legacy of the area's use as a royal and productive forest, including its medieval forest lodges and other features, as well as its industrial past, by securing the management of sites (for example through grazing, particularly within the forest) to produce integrated outcomes for biodiversity, and geological and historical features.
- Maintaining the Wye Valley broadleaved woodlands (of oak, beech, small-leaf lime, cherry, ash and elm with hazel understory), many of which are designated SSSIs, for biodiversity as well as for the prevention of soil erosion.
- Reinstating coppice management of the Wye Valley woodlands where appropriate, to benefit biodiversity and also to help reduce tree fall and land slippage caused by mature uncoppiced trees, which results in the blockage of roads.
- Managing, monitoring and, where appropriate, controlling diseases, pests and other threats, which may cause substantial mortality in tree species and woodland habitats. Seeking to mitigate the landscape impact of any loss.
- Conserving and promoting access to, and appreciation and understanding of, the statutory forest's and Wye Valley's industrial, mining and cultural heritage, as it enforces a sense of place.
- Sustainably managing the access, recreation and educational opportunities – particularly in the more actively used areas of the Forest of Dean and the Wye Valley.

SEO 2 - Protect, manage and enhance the pastoral character of the farmland, with its ancient species-rich hedgerows, drystone walls and traditional orchards. Retain traditional management techniques on the network of small, neutral lowland meadows with its characteristic small-field structure and narrow winding lanes.

For example, by:

- Maintaining a balance between pastoral and arable land use, and using field margins and well managed hedgerows to maintain ecological links across arable patches, reducing water flow and resultant soil erosion and providing benefits to water quality.
- Encouraging and supporting the appropriate management of lowland meadows by owners, including through local owners' groups, providing benefits for the local community, biodiversity, landscape and soil quality.
- Maintaining and restoring small meadows and traditional orchards through Environmental and Countryside Stewardship.
- Creating a coherent, functioning landscape-scale network of species-rich grassland (acid, calcareous and neutral) and heathland by restoring areas identified as most appropriate for this purpose.
- Conserving, restoring and managing traditional drystone walls (and associated features and techniques), and maintaining their function in the landscape.
- Encouraging hedge continuity by replanting gaps and increasing the number of hedgerow trees in areas where they have been lost.
- Encouraging the uptake of Environmental and Countryside Stewardship options such as hedgerow management and the informed use of pesticides or herbicides to benefit the flight lines and feeding areas of, in particular, the internationally important populations of lesser and greater horseshoe bats.
- Conserving, restoring and managing historic parkland, introducing replacement trees, reinstating traditional management techniques (for example pollarding), and sympathetically managing standing ancient and veteran trees (and their surroundings) for biodiversity and heritage value.
- Conserving, restoring and managing traditional orchards, restocking with traditional varieties, reinstating appropriate pruning techniques, and sympathetically managing the understory, deadwood and old trees for biodiversity and heritage value.
- Promoting, managing and restoring traditional orchards, with their associated biodiversity, local genetic varieties, historic buildings (such as cider houses), and associated cultural heritage, through local and community events. Creating new recreational and educational resources, and improving public access where appropriate.
- Retaining the genetic diversity of orchard trees, to allow adaptability to the effects of a changing climate.

SEO 3 - Maintain and enhance the distinctive settlement pattern of small villages using local characteristic materials, ensuring future development recognises and retains the value of the area's landscape, biodiversity, geodiversity, access and heritage. Encourage the traditional practices intrinsically associated with shaping the physical environment and culture of the area, including commoning, small-scale freemining and Forest Law.

For example, by:

- Ensuring that the repair, restoration or conversion of vernacular buildings is carried out with due regard to their historic interest, using local materials and appropriate styles and techniques to maintain local distinctiveness, construction techniques and traditions.
- Promoting the sustainable use of quarries and delves providing locally-sourced building materials, and advocating their value for expressing the local geodiversity.
- Providing scrub control on exposed rock faces and outcrops of geological importance.
- Ensuring that the repair, restoration or conversion of buildings mitigates for and provides additional opportunities for bat roosts, to further support the important bat populations of the area.
- Minimising the impact of wind turbines on vulnerable bat populations, landscape character, views, and the distinctive, uncluttered skylines.
- Retaining management and replanting traditional orchards (of apples and pears), once central to the character of the limestone and sandstone hills, ridges and valleys, and forest fringes.
- Maintaining and restoring parkland landscapes throughout the area. These are important for their heritage, ancient and veteran trees, invertebrates and lichen communities.
- Working with local communities to encourage the continuation of traditional land management practices and land uses (such as commoning, freemining and the maintenance of Forest Law) that are intrinsic to the shaping of the landscape and the sense of place in this area.
- Protecting and conserving the heritage of the NCA, providing interpretations (through a variety of media) for education and tourism, to increase understanding of the Forest of Dean and Lower Wye's place in the history of the country – particularly its place in industrial history, which is less well known.
- Improving sustainable public access, through the rights-of-way network, provision of visitor facilities, and access to and interpretation of key sites of importance for geodiversity, biodiversity or heritage. This will increase the understanding, enjoyment and appreciation of the landscape, and the history of use that has shaped the area. Conserving the cultural heritage of local authors, music and dialect, by maintaining the traditions that create the distinctive landscape and local sense of place.

SEO 4 - Protect and enhance assemblages of internationally important species associated with the River Wye Special Area of Conservation (SAC) and River Severn estuarine SAC, employing good land management practice throughout the Forest of Dean and Lower Wye Valley to improve water quality, reduce soil erosion and regulate water flow.

For example, by:

- Retaining, restoring and extending bankside vegetation and wet meadows on the floor of the Wye Valley, to reduce soil erosion and improve water quality.
- Creating grassland buffer strips and maintaining hedgerows on arable land running across slopes, to reduce soil erosion and nutrient run-off.
- Maintaining woodland cover – which provides integrated benefits to soil quality, water flow, soil erosion and water quality, and management of steep gorge woodland – for example through coppicing, to reduce land slippage and tree fall entering watercourses.
- Ensuring that good livestock husbandry prevails across the landscape, to minimise soil compaction and soil erosion, and to diffuse pollution.
- Adopting a co-ordinated approach to controlling non-native invasive species (especially Himalayan balsam), which result in exposed, un-vegetated riverbanks during the winter, exacerbating erosion – both in this NCA and in others further up the catchment.
- Providing educational and recreational opportunities that improve understanding and appreciation of the special qualities of the River Wye's habitats and geology.
- Managing and monitoring the impact of watersports and other recreational activities on the river environment.

Additional opportunity

1. Manage the relationship between access to the natural environment and conservation of the qualities of this popular forest landscape and wildlife habitat that people enjoy, to ensure that protection of the natural environment is integrated with tourism and visitor needs.

For example, by:

- Maintaining and enhancing the high level of permanent and permissive access, with clear signposting and interpretation to improve the quality of understanding and enjoyment of the distinctive landscape and natural environment.
- Developing multi-purpose routes that prevent undue erosion, characterised by good-quality surfacing, gradients and signage that all enable more people to enjoy the natural environment together.
- Providing interpretation (through a range of media) of the many biodiversity and geodiversity features of the area, to improve understanding and enjoyment of the distinctive landscape and natural environment.
- Ensuring that any interpretation of the area's heritage brings out its role in the development of the landscape over time, and continues to provide inspiration through a sense of place, highlighting the literary associations that the area provides.
- Enhancing the many recreational and tourism opportunities offered, for rural economic benefit. Ensuring that sufficient infrastructure is in place and visitor demand managed so that it is consistent with retaining the landscape character.

Supporting document 1: Key facts and data

Total area: 31,389 ha.

1. Landscape and nature conservation designations

The Forest of Dean NCA contains 8,041 ha of the Wye Valley Area of Outstanding Natural Beauty (AONB), covering 26 per cent of the total NCA area.

Source: Natural England (2011)

A management plan for the protected landscape can be found at:

- www.wyevalleyaonb.org.uk

1.1 Designated nature conservation sites

The NCA includes the following statutory nature conservation designations:

Tier	Designation	Name	Area (ha)	Percentage of NCA
International	n/a	n/a	0	0
European	Special Protection Area (SPA)	n/a	0	0
	Special Area of Conservation (SAC)	Wye Valley Woodlands SAC; River Wye SAC; Wye Valley and Forest of Dean Bat Sites SAC	883	3
National	National Nature Reserve (NNR)	Highbury Wood NNR; The Hudnalls NNR; Lady Park Wood NNR	84	<1
National	Site of Special Scientific Interest (SSSI)	A total of 40 sites wholly or partly within the NCA	1,197	4

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.

The River Wye and Wye Valley Woodlands SACs lie within the Wye Valley AONB.

There are 137 Local sites in Forest of Dean NCA covering 2,940 ha which is 9 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	84	7
Favourable	867	72
Unfavourable no change	125	10
Unfavourable recovering	120	10

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

Elevation ranges from a minimum of 3 m to a maximum of 288 m.

Source:Natural England (2010)

2.2 Landform and process

The underlying geology has a major influence on the landscape and landforms in the area while the varied soils associated with them lead to a wide range of habitats with their characteristic flora and fauna. The geomorphological features are a response of the different rock types to erosion.

Source: Forest of Dean Natural Area Profile, Forest of Dean Countryside Character Area description

2.3 Bedrock geology

The local geology consists of a raised basin of Palaeozoic rocks, folded in the Variscan Orogeny. This folding is responsible for the hilly scenery of the area. The basin is "lined" with very thick Old Red Sandstones from the Devonian – this geology is responsible for the area's characteristic red soils. It is filled with Carboniferous rocks – sandstones, mudstones and limestones – which give the area its characteristic fine scenery. Extensive coal measures have been a major part of the area's economy. Major iron ores are also present. Silurian and Triassic mudstones are found along the eastern margin of the Forest of Dean.

Source: Forest of Dean Countryside Character area description, Forest of Dean Natural Area Profile, British Geological Survey Maps

2.4 Superficial deposits

There are no glacial deposits in the area; superficial deposits are limited to sands, gravels and alluvium along river courses.

Source: Forest of Dean Countryside Character area description, Forest of Dean Natural Area Profile, British Geological Survey Maps

2.5 Designated geological sites

Designation	Number of Sites
Geological Site of Special Scientific Interest (SSSI)	11
Mixed Interest SSSI	1
Local Geological Sites	62

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

There are a variety of soils within the NCA, reflecting the underlying geology. There are 5 main soilscape types in this NCA: Freely draining slightly acid loamy soils (42 per cent); Freely draining slightly acid but base-rich soils (18 per cent); Slowly permeable seasonally wet slightly acid but base-rich loamy and clayey soils (16 per cent); Freely draining acid loamy soils over rock (13 per cent); and Slightly acid loamy and clayey soils with impeded drainage (10 per cent).

Source:National Soils Research Institute

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	34	<1
Grade 2	2,083	7
Grade 3	11,590	37
Grade 4	3,666	12
Grade 5	0	0
Non-agricultural	12,515	40
Urban	1,347	4

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)
River Wye	35

Source: Natural England (2010)

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

There are a number of rivers draining in the area in a pattern reflecting the underlying geology. Many of them flow northwest to southeast draining into the River Severn. The remainder flow east to the Wye

3.2 Water quality

The total area of Nitrate Vulnerable Zone is 4,952 ha, 16 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

The NCA contains 12,918 ha of woodland, 41 per cent of the total area, of which 10,642 ha is ancient woodland.

Source: Natural England (2010) and Forestry Commission (2011)

4.2 Distribution and size of woodland and trees in the landscape

Much of the central plateau is wooded and managed for the production of timber. Along the Wye valley there is more ravine woodland. There is variation due to the long history of woodland management, with a great variety of ages, species and densities.

Source: Forest of Dean Countryside Character Area description

4.3 Woodland types

A statistical breakdown of the area and type of woodland found across the NCA is detailed below. The total area of woodland in the NCA is 12,918 ha covering 40 per cent of the area.

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

Woodland type	Area (ha)	Percentage of NCA
Broadleaved	6,652	21
Coniferous	4,835	15
Mixed	703	2
Other	728	2

Source: Forestry Commission (2011)

Area and proportion of ancient semi-natural woodland and planted ancient woodland sites (PAWS) within the NCA as recorded in the ancient woodland inventory. Ancient woodland is defined as being continuously wooded since 1600; the Forest of Dean statutory forest is an Ancient Forest, parts of which have been heavily exploited for timber but the majority is considered as ancient woodland.

Woodland type	Area (ha)	Percentage of NCA
Ancient semi-natural woodland	2,462	8
Ancient re-planted woodland (PAWS)	8,178	26

Source: Natural England (2004)

5. Boundary features and patterns

5.1 Boundary features

Fields are either bounded by hedgerows, many of which are several hundred years old, or stone walls, fewer hedgerow trees are seen in the more fertile arable districts.

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

5.2 Field patterns

Holdings are generally small and field sizes variable, from small to medium, of medieval to 19th century date. Larger fields developed on arable-based plateau where farms were typically larger.

Source: Forest of Dean 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

Overall, there were 42 fewer farms (282 as opposed to 324) in 2009 than there were in 2000. Grazing livestock accounted for the largest numerical decrease (28) during this period but the highest percentage drop (46 per cent) was in dairy farming. The area's farming is dominated by 162 farms grazing livestock. There are 20 dairy farms, 30 mixed farms and 41 cereal or general cropping farms in the NCA. There were 28 cereal farms in the NCA in 2009, about double the number that there were in 2000 (13 farms).

Source: Agricultural Census, Defra (2010)

6.2 Farm size

Units of more than 100 ha account for 36 of all holdings, units of 5 ha or less account for 62 of all holdings.

Source: Agricultural Census, Defra (2010)

6.3 Farm ownership

From 2000 to 2009 the total farmed area increased slightly from 13,999 to 14,878 ha, while the number of holdings decreased from 413 to 378, a drop of 8 per cent.

2009: Total farm area = 14,878 ha; owned land = 10,306 ha
2000: Total farm area = 13,999 ha; owned land = 10,595 ha

Source: Agricultural Census, Defra (2010)

6.4 Land use

There has been a decrease in livestock numbers (cattle/sheep/pigs) during the years 2000 to 2009 (from 83,000 to 58,000) and decreases in the areas of cereal and cash root crops; the area of land used for oilseeds has more than doubled.

Source: Agricultural Census, Defra (2010)

6.5 Livestock numbers

There are 13,000 cattle in the NCA, which represents a drop in numbers from the 14,000 in 2000. The number of sheep has dropped by over a third from 60,000 in 2000 to 44,000 in 2009.

Source: Agricultural Census, Defra (2010)

6.6 Farm labour

The numbers of salaried farm managers and part-time workers have increased (by 64 per cent and 13 per cent respectively) while the numbers of holders (-13 per cent), full-time (-22 per cent) and casual/gang workers (-27 per cent) have decreased.

Source: Agricultural Census, Defra (2010)

Please note: (i) Some of the Census data are estimated by Defra so may not present a precise assessment of agriculture within this area (ii) Data refers to commercial holdings only (iii) Data includes land outside of the NCA where it belongs to holdings whose centre point is recorded as being within the NCA.

7. Key habitats and species

7.1 Habitat distribution/coverage

By definition, the main priority habitats in the Forest of Dean are woodlands: upland oakwoods, lowland mixed deciduous woodland, and wet woodland, all prominent in the forest proper, with some small areas of lowland grassland and coastal and floodplain grazing marsh in the NCA. The Gloucestershire Nature Map – a localisation of the South West Nature Map – identifies Strategic Nature Areas which provide the highest priority opportunity for restoration of priority habitat in Gloucestershire.

Source: Dean Plateau & Wye Valley 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). Footnotes denote local/expert interpretation. This will be used to inform future national inventory updates.

Priority habitat	Area 9ha)	Percentage of NCA
Broadleaved mixed & yew woodland (Broad habitat)	5,482	11
Traditional orchard	218	<1
Coastal floodplain and grazing marsh	123	<1
Lowland meadows	111	<1
Lowland dry acid grassland	80	<1
Lowland calcareous grassland	43	<1
Mudflats	40	<1
Lowland heathland	13	<1
Purple moor grass & rush pastures	11	<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 UK BAP Priority Habitats are available at:

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

7.3 Key species and assemblages of species

- 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

Predominant dispersed settlement pattern clearly evident by late 11th century, but in contrast to areas to north the levels of dispersal are low. Industrialisation drove the continued rate of dispersal both in the medieval period and later – notably in the clusters of probably subsidiary common-edge settlement – and the formation of market centres, notably Coleford and Lydney, and other settlements. Creation of a Royal Forest in the 13th century forced settlements to be restricted to margins and around iron ore deposits. Much of the encroachment onto areas of former Forest common by squatters occurred during the late 18th and early 19th centuries, for example around Cinderford and Berry, and the networks of lanes linking complex fields and dwellings in dispersed settlements of St Briavels and Hewelsfield Commons. Some of these settlements have become small towns.

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

8.2 Main settlements

The area is characterised by small towns, for example Cinderford, around the edge of the Forest rather than large town or cities. The total estimated population for this NCA, derived from ONS 2001 Census data, is 65,364.

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

8.3 Local vernacular & building materials

Generally large-scale loose courtyard and dispersed plan farmsteads, late 17th to early 19th century threshing barns and shelter sheds to cattle yards being strongly characteristic. Split-level combination barns, with very small areas for storing and processing the corn crop, were most commonly associated with both dispersed/unplanned and courtyard groups of the mid- and later 19th

century. Cider houses, distinguished by wide doors, and either built as separate buildings or incorporated into combination ranges, date from 18th century. Small-scale steadings are also a characteristic feature.

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

9. Key historic sites and features

9.1 Origin of historic features

During Roman domination, the deposits of iron ore and the abundant local supplies of charcoal were exploited to produce iron. The remains of shallow workings are still visible at Scowles. The main influence on the majority of the area was the creation of a Royal Forest in the 13th century.

Source: Draft Historic Profile, Forest of Dean, Forest of Dean Countryside Character Area description

9.2 Designated historic assets

This NCA has the following historic designations:

- 2 Registered Parks and Gardens covering 73 ha.
- 0 Registered Battlefield/s covering 0 ha.
- 85 Scheduled Monuments.
- 667 Listed Buildings.

Source: Natural England (2010)

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

http://www.english-heritage.org.uk/professional/protection/process/national-heritage-list-for-england/

10. Recreation and access

10.1 Public access

- 35 per cent of the NCA 11,112 ha is classified as being publically accessible.
- The majority of the publically accessible land within this Character Area lies within the Wye Valley AONB and the statutory forest.
- There are 743 km of public rights of way at a density of 2.3 km per km2.
- There is 1 National Trail, Offa's Dyke, covering 28 km within the 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	n/a
Common Land	188	<1
Country Parks	0	n/a
CROW Access Land (Section 4 and 16)	8,518	27
CROW Section 15	18	<1
Village Greens	4	<1
Doorstep Greens	0	n/a
Forestry Commission Walkers Welcome Grants	177	<1
Local Nature Reserves (LNR)	96	<1
Millennium Greens	<1	<1
Accessible National Nature Reserves (NNR)	84	<1
Agri-environment Scheme Access	27	<1
Woods for People	10,881	35

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) areas of the NCA, outside "haloes" around towns and major roads, are still tranquil.

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

Tranquillity	Score
Highest Value within NCA	42
Lowest Value within NCA	-52
Mean Value within NCA	3

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. This shows large areas of the NCA, outside "haloes" around towns and major roads, are still undisturbed. A breakdown of intrusion values for this NCA is detailed in the table opposite.

Intrusion category	1960s (%)	1990s (%)	2007 (%)	Percentage change (1960s-2007)
Disturbed	14	24	46	31
Undisturbed	85	74	51	-34
Urban	n/a	n/a	3	n/a

Sources: CPRE (2007)

Notable trends from the 1960s to 2007 are the gradual increase in disturbance since the 1960's.

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)
- BAP 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)Detailed River Network, Environment Agency (2008)

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%. The convention <1 has been used to denote values less than a whole unit.

The old sawmill at Parkend.

Supporting document 2: Landscape change

Recent changes and trends

Trees and woodlands

- Much of the woodland in this area is contained in the Forest Estate so is not eligible under Woodland Grant Schemes. Species composition is approximately 37 per cent conifer and 51 per cent broadleaved woodland. The planned increase in planting of broadleaved trees has begun in line with the Forestry Commission plan for the period 2009 to 2028.

- A small amount of restoration of traditional orchards has been carried out through agri-environment agreements (2.36 ha since 2010). Interest in planting community orchards has also increased.

Boundary features

- Drystone walls are of particular local character in the St Briavels and Hewelsfield Commons area. Growth of pony and horse paddocks associated with areas of small holding in the Forest fringes and settlements have resulted in a loss of hedgerows and increase in post and rail fencing. The estimated boundary length for the NCA is about 2,777 km. Research reported the total length of stewardship agreements between 1999 and 2003 was equivalent to about 3 per cent of this total, suggesting the resource had probably been neglected. This proportion has remained largely unchanged up to 2011, the total length of boundary features under agri-environment options being just over 80 km. Hedgerows have been lost from the flatter areas merging into the Severn and Avon Vales NCA, resulting in reduced connectivity for wildlife.

Agriculture

- Agriculture is predominantly livestock rearing with some dairying, although the number of holdings for both types was lower in 2009 compared with 2000 (Agricultural Census June Survey, Defra, 2000, 2009). In addition, there are small holdings of small to medium-sized fields supporting market gardening, orchards, livestock rearing and horse grazing. Overall the total number of holdings of all types has fallen over this period. Only a small amount of this is through consolidation, the number of holdings over 50 ha having risen slightly.

- The 2001 outbreak of foot and mouth disease saw a significant drop in the number of sheep openly grazing the Forest Estate, falling from around 6,000, to 1,000 animals. Lack of grazing is now having a knock on effect on management of the open habitats within the main Forest.

- Most extensive annual agreements in 2003 were for lowland pastures on neutral/acid soils (395 ha) and regeneration of grassland/semi-natural vegetation (140 ha). In 2012 the most popular option overall was Entry Level Stewardship low input on permanent grassland (559 ha). Within Higher Level Stewardship, options for the maintenance and restoration of grassland for target features and options for restoration of lowland heathland covered the greatest area at 59, 61 and 65 ha respectively.

Settlement and development

- On average, development pressure remains low; however there are areas of expansion particularly around the towns of Cinderford, Coleford and

Lydney. While these may be locally significant, overall character has probably been maintained.

- The increase in numbers of day visitors and tourists has resulted in the provision of more recreational opportunities, particularly for active sports, such as mountain biking, canoeing, abseiling and horse riding and the provision of more high-quality facilities that include campsites, luxury forest cabin sites, heritage centres and well signed trails with interpretation.

Semi-natural habitat

- There are approximately 11,600 ha of semi-natural priority habitat in the NCA (the majority of this being the Forestry Commission woodland). An area of 1,196 ha is designated as Sites of Special Scientific Interest (SSSI), of which, 72.5 per cent is considered in favourable condition, 10 per cent unfavourable recovering, 10.5 per cent unfavourable no change and 7 per cent unfavourable declining (mostly the River Wye and Upper Wye gorge due to run off from more intensively managed land upstream).

- The condition of open habitat within the Forest has been impacted by reduced sheep numbers since the foot and mouth disease outbreak in 2001. Changes to forest management from clear-felling to continuous cover will have an effect on future transitional habitat and management practices are being looked at to compensate for these changes.

Historic features

- The area is rich in archaeological sites and historic landscape features of all periods, and the recent application of new survey techniques such as Lidar has shown that evidence of early settlement and land use is far more extensive than previously thought. Archaeological sites and the historic landscape can be adversely affected by development, land use change, erosion, lack of vegetation management, neglect and lack of investment.

- Areas of development around some settlements have had a significant impact on the resource. Many important monuments are in urgent need of active management. Within the woodland areas trees and scrub cause damage to earthworks and below ground sites; the reduction in sheep numbers since the foot and mouth disease outbreak in 2001 has had a negative impact. An increase in grazing in these areas would make a positive improvement.

Coast and rivers

- In 1995, biological and chemical water quality in this NCA was largely classified as excellent (81 per cent) there was no change in 2000.

- Currently the Lower Wye is classified as poor ecological status under the Water Framework Directive criteria due to diffuse nitrogen and phosphate pollution from intensive land management further upstream, the Cinderford Brook is also of poor ecological status and all other water courses within the area remain at moderate or good ecological status.

Minerals

- The large limestone quarries are strongly linked to the construction industry and as a result of low demand due to the economic downturn in recent years their activity has been static. There are also small building stone quarries (predominantly sandstone) in the forest which form a distinct part of the forest character; there has been no major change in these.

- The Forest of Dean coalfield covers a significant proportion of the Forest and is unusual in that it is almost completely exposed at the surface. Coal mining and other associated workings such as iron ore extraction and brick and fireclay workings have played an important role in the forest's industrial heritage. Coal is still extracted on a very small scale under Freemining rights unique to the Forest. There are also still two working brick manufacturers in the Forest.

Drivers of change

Climate change

Climate change is likely to result in:

- More frequent periods of heavy rain and localised flooding, largely surface flooding in this NCA.
- Heavy rain may result in soil erosion higher up the Wye resulting in pollution of the water course downstream.
- Increase in storm events may result in greater tree fall and land slip, particularly in the steep Wye Valley woodlands resulting in damage to and blocking of roads.
- Changes to seasonal temperature and rainfall may result in changes to tree productivity. For broadleaved species, although a drop in productivity is likely in the south-east of England, productivity elsewhere may increase resulting in increased timber production from the forest.
- Vulnerability of tree crops to pests and diseases is already being seen with the removal of Corsican pine due to infection with red band needle blight which affects tree grown. Phytophthora has also reached the forest and is likely to result in the removal of up to 2,000 ha of larch.
- Opportunities may arise for increasing novel crops to the NCA for example vineyards. Grapes are already successfully grown on the slopes overlooking Tintern on the Welsh side of the Wye.
- Native species distributions may change as they migrate northwards with increases in temperature.

Other key drivers

- Changes in forestry policy from clear felling to continuous cover will reduce the amount of transitional habitat available to species such as nightjar; however, there are opportunities to introduce alternative management such as coppicing which will provide suitable habitat while contributing to the increasing demand for wood fuel.
- For the period from 2009 to 2028 the proportion of broadleaved trees in Forestry Commission managed woodlands is planned to increase by 1,000 ha through planted ancient woodland site (PAWS) restoration and the replacement of conifers by broadleaved trees.
- Changes to agriculture such as the reduction in sheep numbers grazing the forest, following foot and mouth in 2001, have resulted in undergrazing of Forest Wastes (open areas of forestry land). There are opportunities to work in partnership with a wide range of organisations, interest groups and local communities to encourage grazing in appropriate areas.
- Appropriate grazing of semi-natural grassla nds outside of the central forest is being supported by community partnerships such as the well established Hewelsfield and St Briavels Parish Grasslands project and Monmouthshire meadows group (on the Welsh side of the Wye). A Forest of Dean meadows group has recently been established.

- The lower River Wye is of poor ecological status under the Water Framework Directive, largely due to diffuse inputs from agriculture further upstream. The area upstream has been identified as a Catchment Sensitive Farming (CSF) Priority catchment, providing opportunities to work with landowners to reduce agricultural inputs reaching the river. The Wye Valley NIA partnership is also looking to build on the CSF work.

- The area is open to ongoing pressure from development both for industry and housing; in addition wind turbine applications are increasing in number. The impact of development, particularly on the bat SACs should avoid harm and realise opportunities for enhancing networks and corridors in the landscape. Development is largely limited to the three towns (Coleford, Cinderford and Lydney). Areas of new development can provide opportunities for quality design to enhance local distinctiveness and biodiversity.

- Use of the area for access and tourism is becoming increasingly significant, tourism supporting 8 per cent of the employment in the Forest of Dean district in 2008. While facilities for outdoor sports, particularly mountain biking have increased, there is potential for expansion of other areas such as increased educational opportunities for understanding the industrial heritage, geology and species rich natural environment.

- The drive for renewable energy means that the tidal range of the Severn may one day be exploited for renewable energy. Any energy generation scheme that altered the tidal nature of the estuary would impact heavily on the tidal reaches of the Wye SAC. The fast flowing brooks of the area may also provide opportunities for micro-hydro power generation.

Findles Chimney at Old Staples Edge, ventilation chimney for Perseverance Iron Mine.

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.

A scowel, natural cave in the 'Crease Limestone' from which iron ore was extracted.

Statement of Environmental Opportunity	Ecosystem Service: Food Provision	Timber Provision	Water Availability	Genetic Diversity	Biomass Energy	Climate Regulation	Regultating Water Quality	Regulating Water Flow	Regulating Soil Quality	Regulating Soil Erosion	Pollination	Pest Regulation	Regulating Coastal Erosion	Sense of Place / Inspiration	Sense of Hisotry	Tranquility	Recreational Opporunity	Biodiversitsity	Geodiversity
SEO 1: Protect and manage the extensive internationally important woodland for its biodiversity, landscape, and ability to store and sequester carbon. Provide a sustainable timber resource while recognising the woodland's recreational value and heritage, and its contribution to a sense of place and tranquillity.	↑ **	o	o	↗ **	↗ **	↗ *	↗ **	↗ **	↑ **	↑ **	↗ **	↗ **	o	↑ ***	↑ ***	↗ **	↑ ***	↑ ***	↗ **
SEO 2: Protect, manage and enhance the pastoral character of the farmland, with its ancient species-rich hedgerows, drystone walls and traditional orchards. Retain traditional management techniques on the network of small, neutral lowland meadows with its characteristic small-field structure and narrow winding lanes.	↗ *	↔ ***	↗ *	↗ **	o	↗ *	↗ **	↗ *	↑ **	↑ **	↑ ***	↑ ***	o	↑ ***	↗ **	↗ **	↗ *	↑ ***	↔ **
SEO 3: Maintain and enhance the distinctive settlement pattern of small villages using local characteristic materials, ensuring future development recognises and retains the value of the areas landscape, biodiversity, geodiversity, access and heritage. Encourage the traditional practices intrinsically associated with shaping the physical environment and culture of the area, including commoning, small scale freemining and Forest Law.	↗ **	↗ *	o	o	↗ **	↗ **	↗ *	o	↗ *	↗ *	↗ *	o	o	↑ ***	↑ ***	↗ **	↗ *	↗ *	↗ **
SEO 4: Protect and enhance assemblages of internationally important species associated with the River Wye SAC and River Severn estuarine SAC, employing good land management practice throughout the Forest of Dean and Lower Wye Valley to improve water quality, reduce soil erosion and regulate water flow.	o	o	o	o	↑ **	↗ *	↑ **	↑ *	↗ **	↑ **	↗ *	o	o	↗ *	↗ **	↔ **	↗ *	↑ ***	o

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

Dark plum =National Importance; Mid plum =Regional Importance; Light plum =Local Importance

Landscape attributes

Landscape attribute	Justification for selection
A landscape, creating a feeling of remoteness, formed by the undulating plateaux of Coal Measures surrounded by an iron rich limestone ring and Devonian sandstone.	■ A sense of remoteness created by the steep limestone gorge of the Wye, the wide tidal Severn and the seclusion of extensive woodland. ■ The contribution of underlying geology to historical industrial land use, still visible through geological exposures and industrial heritage features. ■ A ring of settlements around the central core defined by the forest and historic exploitation of mineral wealth (coal and iron). ■ Cultural heritage based on exploitation of minerals still maintained through freeminers' rights.
Extensive woodland particularly the central forest and the Wye Valley woodlands.	■ 40 per cent of the NCA is woodland of which 10,640 ha is ancient woodland; the steep Wye Valley woodlands being some of the most diverse in Britain and are recognised as internationally important through a SAC designation. ■ Wye Valley and Forest of Dean woodlands support important populations of dead wood invertebrates, and are nationally important for woodland butterflies, and woodland birds. They also support breeding populations of dormouse, rare woodland plants and an outstanding bat fauna. ■ Long history of wooded land use, the centrally forested area is a remnant of the creation of a Royal Forest in the 13th century which established the basis of the current land use pattern and cultural influence of Forest Law. Much of the broadleaf woodland, 17th and 19th century beech and oak plantation, following the Reafforestation Act. ■ The abundance of old mines, buildings, hedgerows, woodland under-grazed by sheep and surrounding farmland provide conditions that support one of the largest UK populations of lesser and greater horseshoe bats, protected under the Wye Valley and Forest of Dean Bat SAC designation. ■ Woodland supplying charcoal and timber has historically driven the industrial outputs of the area, together with stone and mineral resources. ■ The enclosed feel of the woodland creates a strong sense of place. ■ Many opportunities for recreation provided by an extensive area of open access land and the crown owned forest..

Landscape attribute	Justification for selection
Distinctive field pattern of small irregular enclosures surrounded by ancient hedgerows or stone walls particularly in the south. Larger rectilinear fields in the more arable districts.	■ A pattern of small fields enclosing priority lowland meadow habitat particularly at St Briavels and Hewelsfield Commons, criss-crossed by narrow winding lanes and bounded by ancient hedgerows. ■ Ancient hedgerows connecting the woodland to the open countryside and providing important flight lines for lesser and greater horseshoe bats. ■ Grazed, sheltered fields surrounding the forest provide feeding areas for lesser and greater horseshoe bats which feed on invertebrates from animal dung. ■ Traditional orchards, particularly to the north and east, together with orchards from the neighbouring Severn and Avon Vales NCA are a surviving feature from the Gloucestershire/Worcestershire/ Herefordshire heyday as a fruit growing centre, dating from the late 17th century. The orchards are a priority habitat and host important lichen communities and invertebrate populations; for example, noble chafer beetle, a priority species which is virtually confined to old orchards.
Distinct settlement pattern particularly the ring around the central forest.	■ Influence of minerals exploitation on settlement pattern, encroachment by squatters on to areas of former forest common in a ring around the central forest occurred during the late 18th and early 19th centuries. Some of these settlements such as Cinderford and Berry Hill, with their terraces of miners' houses, have more of the feel of a Welsh mining village about them. ■ In the dispersed settlements of St Briavels and Hewelsfield Commons, land was enclosed by squatters towards the end of the 18th century. Each enclosing a small irregular field with banks, hedges or walls, creating a complex field pattern and widely scattered dwellings, linked by a network of tiny lanes. These fields now support an important lowland meadow resource. ■ Vernacular building style uses a mix of local stone; warm coloured sandstone, grey limestone, brick or pebbledash with grey slate or pantiled roofs

Landscape attribute	Justification for selection
Sometimes complex mosaic of semi-natural habitat reflecting the influence of the underlying geology.	■ Acid, calcareous and neutral grassland found in some cases in an intricate mosaic due to a mixture of underlying acidic and calcareous geology. ■ A few surviving fragments of the once widespread heathlands of the Dean plateau supporting bilberry, ling and cross-leaved heath are still found within parts of the statutory forest and Tidenham Chase. Poor's Allotment SSSI supports a range of locally restricted plants including meadow thistle and bog asphodel. Wigpool Common has damp heathland habitats and acid bogs and pools with plants such as marsh pennywort, lesser spearwort and marsh bedstraw. ■ River Wye (Lower Wye) SAC internationally designated for species such as twait and allis shad, lamprey and salmon and its extensive Ranunculus (water crowfoot) flora. ■ Stunning limestone gorge supporting nesting peregrine and raven and providing outstanding views. ■ Ancient woodland. ■ Soudley Ponds SSSI is designated for its native crayfish, freshwater invertebrates and outstanding dragonfly assemblage. ■ Underlying the Forest are major natural cave systems such as Slaughter Stream Cave.
Wealth of historic features ranging from the influence of the Romans and medieval hunting forests through to the birth of the industrial revolution and exploitation of minerals.	■ Norman castles. ■ Offa's Dyke National Trail. ■ Remnants of royal hunting forests and plantations that supported the ship building industry for many centuries. Reafforestation primarily using sessile oak and beech following the Civil War, which provided timber during the great ship building period of the Napoleonic wars during late 18th century followed by replanting to restore the forest for future needs following this period. ■ Roman villa and temple sites and scowles (early iron workings). ■ Industrial heritage: mines, tramways, railways, quarries and monuments, mills and works, villages and towns. ■ Tintern and other abbey sites.

Landscape attribute	Justification for selection
Strong sense of place and cultural history/ tradition created by remote and secluded nature of the landscape and a unique combination of resources.	■ The Verderers have existed since Norman times to administer Forest Law including dealing with illegal taking of the Forest beasts, illegal removal of trees and granting the inhabitants of the Forest estovers (the right to collect firewood). ■ Commoners association and sheep grazing which additionally helps to maintain the open habitats within the Forest. ■ Freeminers – anyone born within the 'Hundred of St Briavels' who has worked a year and a day in a coal or iron mine has the right to set up their own mine within the Hundred. ■ Own dialect, language and music. ■ Literary associations of national and international renown. ■ Wassailing, linked to seasonal traditions and particularly associated with traditional orchards. ■ The Picturesque movement began in this landscape, with Dr John Egerton, then Gilpin offering tours and guides to the area. The combination of a dramatic landscape, ruins and other historic landmarks, industry and a bucolic and pastoral land use stimulating a new way of observing the landscape.
Extensive public rights of way network and areas of access land.	■ 35 per cent of the NCA is public access land including the whole statutory forest. ■ There are 743 km or rights of way including the Offa's Dyke National Trail and Gloucestershire Way long distance trail. ■ There is a good provision of bridleways suitable for cyclists and horse riders. ■ The disused ironstone mines used by bats are also a great caving recreational resource. Access is managed by the Deputy Gaveller and Forestry Commission via the Caving, Conservation and Access Group (CCAG).

Landscape opportunities

- Protect the extensive woodland of the central Forest and Wye Valley, conserving and restoring links between woodland and other wooded habitat such as traditional orchards and the Parkland at Lydney Park, creating a continuous woodland network.
- Conserve ancient and veteran trees in the landscape for the benefit of fauna and flora that depend upon them and their heritage value, plan for the provision of veteran trees of the future.
- Conserve and restore the open areas of the forest (forest wastes) to create a network of open habitat throughout the woodland benefitting the wide variety of species that rely on woodland edge and open habitat and also to the benefit of local communities who use the forest wastes for recreation.
- Protect and manage the agricultural landscape, maintaining hedgerows as flight lines and feeding grounds grazed by pesticide-ree animals to support the internationally important populations of lesser and greater horseshoe bats.
- Protect and enhance the River Wye and Wye Valley Woodlands SACs for their assemblages of internationally important species and outstanding geology.
- Protect the long historical legacy of the areas industrial past, particularly within the Forest, to produce integrated outcomes for landscape, biodiversity, geological, historical and recreational features by maintaining the open areas and features of the forest through well managed grazing.
- Protect the historical features of the area that reflect the continuity of human occupation, such as Norman castles, Offa's Dyke, remnants of Roman activity and monuments.
- Protect the cultural traditions such as commoning, the Verderers and freemining that have shaped and still shape the landscape and the community, maintaining the link between the local community and direct management of their environment.
- Conserve the cultural heritage of music and dialect that are linked with the historical remoteness of the area so that it is recorded for future generations.
- Extend through restoration and creation, lowland meadow habitat to extend the current resources particularly concentrated at Hewelsfield and St Briavels Commons, and around Blakeney and the calcareous and acid grassland reflecting the mixed geology, to create functional grassland networks for species which rely on a particular grassland type and an overall grassland network for more general grassland species.
- Extend through restoration the heathland and dry acid grassland resource (that was once widespread across the Dean plateaux), enabling it to contribute to the network of semi-natural open habitat (heathland and grassland) across the area, supporting threatened species such as small pearl bordered fritillary.
- Manage the woodland to provide a good structure with a range of tree ages, species, standards and coppice that will provide a range of habitats within the woodland network and plan new methods of woodland management to compensate for the loss of transitional habitat due to the move from clear felling to continuous cover.

- Manage the woodland for the aesthetic beauty, setting and sense of place it creates, through continued good forest design.
- Plan to remove conifer from plantation on ancient woodland sites (PAWS) and restore to native broadleaf woodland.
- Plan for the increase in demand for wood fuel and the growth of renewable energy and its subsequent impact on the landscape and potential impact on ecosystem services.
- Manage traditional orchards to ensure a continuity of deadwood and rot holes and increase the variability of age structure of orchard trees, improve the condition of the underlying grassland to enhance the lowland meadow resource. Restore or maintain traditional orchard buildings such as cider houses which contribute to the history and cultural associations of orchards across this area.
- Conserve the vernacular building styles and plan for sympathetic future development.

Sheep grazing the Statutory Forest, grazing animals are particularly important for maintaining the forest waste areas as open habitat.

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	State	Main beneficiary	Analysis	Opportunities	Principal services offered by opportunities
Food provision	Agri environment schemes Naturally fertile soils Water availability	The Forest of Dean and Lower Wye Valley supports a small amount of mixed farming, sheep dominate the livestock, there is just under 10,500 ha of grass or uncropped land and a small area, 2,000 ha, laid to cereal. The area also provides a range of market gardening and produce from traditional orchards. The central forest also supplies an amount of venison and more recently, wild boar.	Local	The statutory forest is currently under -grazed so there is scope to increase the livestock numbers in the area which would also benefit the biodiversity and some heritage features by maintaining open areas. Traditional orchards are in decline, trees often not being replaced potentially resulting in the loss of local varieties. The sensitive restoration of traditional orchards could benefit local food production, biodiversity, culture and tourism.	Opportunity to work with local graziers to increase livestock numbers within the statutory forest. Traditional orchards provide opportunity for high quality local produce, which could link in with tourism initiatives such as orchard history, tasting events, seasonal celebrations and walking routes.	**Food provision** **Culture** **Biodiversity** **Sense of place/ inspiration** **Sense of history**

Service	Assets/ attributes: main contributors to service	State	Main beneficiary	Analysis	Opportunities	Principal services offered by opportunities
Timber provision	Area of existing woodland	40 per cent of the area (12,918 ha) is woodland, much of the central plateaux is managed for timber production. Annual timber production from the Statutory Forest of Dean and Forestry Commission woodlands to the south of the Dean totals approximately 50,000 m^3. Approximately 40,000 m^3 conifer production split equally between felling & thinning with the remaining 10,000 m^3 coming from broadleaved thinning. There is also in the region of an additional 20,000 m^3 of timber production from private woodland[8].	National	Due to the already extensive woodland cover there is little opportunity for expansion due to the impact it would have on valued open habitats and agricultural land, however the emphasis on the type of timber production could be altered. Species composition is approximately 37 per cent conifer, 51 per cent broadleaves, but for the period 2009 - 2028 the proportion of broadleaves in Forestry Commision managed woodlands is planned to increase by 1,000 ha through plantations on ancient woodland sites (PAWS) restoration and the replacement of conifers by broadleaves. Overall tree cover has a positive impact on alleviating flooding as it slows the rate of water reaching the ground, enables water to permeate the soil and slows the flow of water across the land. Changes in management practice from clear fell to continuous cover should reduce runoff having a positive effect on reducing flooding and soil erosion. **Continued over...**	Increase the area of managed broadleaf woodland on Forestry Commission land through PAWS restoration and the replacement of conifers by broadleaves, planning and managing the woodland and open habitat network at a landscape scale.	**Timber provision** **Biomass energy** **Regulating soil erosion** **Climate regulation** **Regulating water flow** **Biodiversity** **Sense of place/ inspiration**

[8] Figures supplied by the Forestry Commission.

Service	Assets/ attributes: main contributors to service	State	Main beneficiary	Analysis	Opportunities	Principal services offered by opportunities
Timber provision continued				**Continued from previous...** However, the incidence of diseases such as red band needle blight affecting Corsican pine and Phytophthora which is now affecting larch in the Dean will result in an increase in felling that could adversely impact the incidence of flooding. Phytophthora also affects other species such as oak and sweet chestnut and together with other fungal diseases which thrive in the current damp summers may have a future impact on the species structure of the woodland. Grey squirrel are a problem in the Forest of Dean where they have a detrimental effect on tree growth through bark stripping and impact the commercial value of the wood.		

Service	Assets/ attributes: main contributors to service	State	Main beneficiary	Analysis	Opportunities	Principal services offered by opportunities
Water availability	Abstraction The River Wye receives a high volume of fresh water from the extensive catchment including Welsh uplands High rainfall area	The main rivers in this NCA are the River Wye and the River Lyd while the Severn Estuary lies immediately to the east of the NCA, with east flowing streams flowing into the estuary. The NCA overlies an outcrop of sandstone, although around the central basin and under the central plateau are older rocks including limestones.[9] Groundwater within all bedrock strata and drift deposits provides important baseflow support to surface water features especially during dry periods.[10]	Regional	Overall, most of the NCA is classed as having either 'no water available' for further abstraction or as 'over licensed'. Groundwater within the area is classified as having 'no water available'[11] as are the waters of the Wye which is a main source of water for public water supply and agriculture. The area is subject to a 'hands-off flow condition' when water is scarce. [12] The Wye is of international importance as a SAC and maintenance of high spate flows and high base flows are essential to maintain its ecological importance, valued for its largely unmodified physical and undisturbed physical character[13]. The rivers support resident brown trout and coarse fish populations, migratory eels and salmon and low flows are thought to be adversely affecting these fish populations, particularly spawning and nursery areas.[14] Measures to reduce abstraction by retaining more water on the land, both in this NCA and throughout the Wye catchment, through water storage reservoirs and semi-natural wetland habitat and better soil quality (increased permeability) can potentially alleviate dips in river flow.	Maintain ecological flow levels in water courses by managing abstraction so as to avoid over abstraction resulting in low flow levels. Well designed winter water storage reservoirs on farms both within the NCA and across the Wye catchment could help alleviate the levels of abstraction for water used on farmland. Slow the flow of water across the landscape to maintain more constant river levels through ponds, scrapes and more naturalised drainage within the NCA and across the Wye catchment. Hedgerows across steeper slopes will also help to slow the flow of water from the land. Support measures to maintain and improve soil structure to increase permeability and water retention by the soil.	**Water availability** **Food provision** **Biomass energy** **Regulating water flow** **Regulating water quality** **Regulating soil erosion** **Regulating soil quality** **Climate regulation** **Recreation** **Geodiversity**

[9] Forest of Dean Character Area profile
www.naturalengland.org.uk/Images/jca105_tcm6-5456.pdf
[10] The Wye Catchment Abstraction Management Strategy
publications.environment-agency.gov.uk/pdf/GEWA1207BNJW-E-E.pdf
[11] The Wye Catchment Abstraction Management Strategy
publications.environment-agency.gov.uk/pdf/GEWA1207BNJW-E-E.pdf
[12] Severn Vale Catchment Abstraction Management Strategy
publications.environment-agency.gov.uk/pdf/GEMI0108BNMP-E-E.pdf
[13] CCW (2008) River Wye Core Management Plan (Special Area of Conservation)
[14] Severn Vale Catchment Abstraction Management Strategy
publications.environment-agency.gov.uk/pdf/GEMI0108BNMP-E-E.pdf

Service	Assets/ attributes: main contributors to service	State	Main beneficiary	Analysis	Opportunities	Principal services offered by opportunities
Genetic diversity	Orchard fruit varieties	This and the surrounding NCAs of the major fruit producing counties of Gloucestershire Herefordshire and Worcestershire retain a wide range of local varieties of orchard fruit cultivated over hundreds of years.	National	Genetic diversity of orchard fruit varieties are important to maintain in order to safeguard food provision, and afford increased resilience to climate change and disease. Examples of local varieties from this NCA include Evans' Kernel, a general purpose apple variety from Ruardean; Blaisdon Red Plum which originated in the village of Blaisdon and was used for jam-making until the jam factories made use of freezing; Merrylegs pear, a variety found on the eastern fringe of the Forest of Dean, producing sweet tasting fruits.	Maintain county orchard variety collections such as the Perry pear collection at Hartpury, Gloucestershire. Raise awareness of local varieties and link owners with suppliers. Encourage regeneration and planting of local varieties.	**Genetic diversity** **Climate regulation** **Pollination** **Biodiversity** **Sense of place/ Inspiration** **Sense of history**
Biomass energy	Coppiced woodland	This NCA has one of the highest woodland covers of any NCA, with woodland covering 40 per cent of the area (of which 15 per cent is coniferous).	Regional	Currently the woodland is largely managed for timber production. Large areas of woodland were historically coppiced for charcoal production during the areas industrial past, much of this management has ceased but could be reinstated providing wood fuel and improved biodiversity habitat.	Significant opportunity for the production of biomass as a by-product of commercial timber operations and by bringing unmanaged and under managed woodland back into appropriate management. Reintroduction of coppicing may be appropriate in some sections.	**Biomass energy** **Biodiversity** **Sense of place/ inspiration** **Sense of history**

Service	Assets/ attributes: main contributors to service	State	Main beneficiary	Analysis	Opportunities	Principal services offered by opportunities
Climate regulation	Extensive semi-natural and conifer woodland Extensive ancient hedgerows networks and traditional orchards Soil carbon and stable microbial community under unimproved permanent pasture	The high amount of woodland cover (12,918 ha) plays an important role in carbon sequestration and storage. Orchard trees, ancient hedgerows and the small amount of parkland present in this NCA also contribute. The surface layers of the soils in the centre of the NCA generally have a carbon content of 5 -10 per cent, while around the fringes of the NCA and in the east the carbon content is low at 0-5 per cent. These are predominantly mineral soils which can be low in organic matter where under continuous arable cultivation, although carbon sequestration can be increased by increasing organic matter inputs and by reducing the frequency / area of cultivation. There are small pockets of peaty soils where the carbon content rises to 20- 50 per cent, likely to be associated with the freely draining acid loamy soils over rock (13 per cent), which include some organic top soils that are a store of carbon, making it important to conserve them.	National	High concentrations of permanent pasture also retain carbon, an increased proportion of which would be released through microbial action if the soil was ploughed and exposed to air. Production of inorganic fertilizer is particularly energy intensive and large volumes of greenhouse gases emitted during production, soil testing enables farmers to calculate the optimal fertilise application rates, so reducing excess use of fertiliser, saving energy, money and benefiting water quality. Increasing organic inputs into cultivated mineral soils would increase the overall carbon content of these soils, contributing slightly to carbon storage, soil condition, water retention and infiltration.	Maintain levels of carbon sequestration through sustainably managing the extensive woodland. Prevent CO2 release by maintaining permanent pasture and ensuring it is managed within a sustainable regime. Encourage incorporation of organic matter into cultivated mineral soils. Maintaining the hedgerow network, traditional orchards and wood pasture and parkland, which store carbon both through the trees themselves and the permanent grassland beneath. Work with the farming community to ensure they have adequate access to soil analysis to enable the calculation of appropriate levels of fertilizer inputs to reduce energy wastage and benefit water quality.	**Climate regulation** **Regulating water flow** **Regulating water quality** **Biodiversity**

Service	Assets/ attributes: main contributors to service	State	Main beneficiary	Analysis	Opportunities	Principal services offered by opportunities
Regulating water quality	Hedgerows and buffer strips across steeper slopes Permanent grassland particularly low input. Semi-natural habitats Extensive semi-natural and conifer woodland Appropriate tillage Good livestock management Buffer strips alongside water courses Diffuse and point source pollution prevention Sustainable urban drainage	As already noted the NCA falls within the River Wye priority catchment, which has problems associated with agricultural diffuse pollution and soil run-off. Where information is available ground water quality is good across the whole NCA whereas the ecological quality of rivers ranges from low, moderate to good, with rivers of poor ecological quality largely to the east. The River Lyd is of moderate ecological quality but the majority of streams running into the Severn are of poor ecological quality, for example Cannop Brook, due to heavily modified channels and poor fish age range structure. The Severn estuary itself is of poor ecological quality, while those streams running into the Wye are of good ecological quality.[15]	National	Priorities, under the Catchment Sensitive Farming initiative for the River Wye Priority Catchment are to: reduce the loss of sediment, nutrients and pesticides in the catchment and to reduce run-off from agricultural fields, the pathways that run-off takes through gates and down tracks and the poaching of river banks by livestock[16]. Although there is some scope for work within the NCA, much of the water quality issues rely on catchment sensitive farming upstream of the NCA.	Maintain ecological flow levels in water courses by managing abstraction to avoid over abstraction. Maintain and expand the network of semi-natural habitats adjacent to watercourses. Maintain and restore hedgerows across slopes within river catchments Work with farmers across the Wye catchment, to improve soil quality to reduce runoff, and fence water courses to prevent excessive poaching of the river bank by livestock. Create grassland buffer strips within arable farming systems and adjacent to water courses to intercept soil run off pesticides and nutrients and reduce the volumes entering directly into river systems.	**Regulating water quality** **Regulating soil erosion** **Biodiversity** **Climate regulation**

[15] The Environment Agency "Water for life and livelihoods" publications.environment-agency.gov.uk/pdf/GEMI0910BSSM-E-E.pdf

[16] Natural England, Capital Grant Scheme – Funding Priority Statement 2012/13, Catchment 23: The River Wye

Service	Assets/ attributes: main contributors to service	State	Main beneficiary	Analysis	Opportunities	Principal services offered by opportunities
Regulating water flow	High coverage of Existing semi-natural habitat Extensive semi-natural ad conifer woodland Sustainable urban drainage	While there is little or no risk of flooding across most of the NCA there is a risk of flooding in settlements on the fringes of the NCA, such as Lydney, and settlements immediately beside the Wye (beyond the boundary of the NCA), such as Chepstow[17] which, despite the construction of flood defence measures in 2001, has experienced further flooding as have Walford, Lydbrook, Symonds Yat, Redbrook and Brockweir.	Regional	Although currently the risk from flooding across the NCA is low, flood threats are likely to increase with climate change. The entire Forest of Dean is characterised by steep sided valleys with fast flowing streams. It has numerous groundwater springs which make a significant contribution to the flow in many streams. Man-made structures spanning rivers and streams are prone to being blocked by waterborne debris and here there is an above-average chance of fluvial flooding, largely because the rivers can be particularly fast flowing.[18] Overall though, the NCA offers opportunities to increase floodwater storage on the undeveloped floodplain to increase flood attenuation and so reduce flood risk to communities bringing benefit to communities locally and downstream.[19] The risk of surface water flooding may also increase with more frequent extreme weather events and more regular heavy downpours. Managing the soil quality to maintain or improve its porosity, and soft landscaping and sustainable urban drainage schemes (SUDS) incorporated into new developments or implementation of rural SUDS can help to alleviate surface water flooding. **Continued over...**	Seek to restore semi-natural habitats, thus utilising natural processes to regulate surface water flow across the landscape. Reduce the speed of water flow through river/stream channels through re-profiling and re-naturalising. Realise opportunities for flood water storage where they are identified. Seek opportunities to incorporate grass buffer strips and restore hedgerows across slopes within river catchments. Improve soil quality to increase water retention and reduce runoff.	**Regulating water flow** **Regulating water quality** **Biodiversity** **Regulating soil erosion** **Regulating soil quality** **Climate regulation**

[17] Forest of Dean District Council Flood Risk Assessment Sept 2008 www.fdean.gov.uk/nqcontent.cfm?a_id=6477
[18] Severn Tidal Tributaries Catchment Flood Management Plan publications.environment-agency.gov.uk/pdf/GEMI0909BQYN-e-e.pdf
[19] Ibid

Service	Assets/ attributes: main contributors to service	State	Main beneficiary	Analysis	Opportunities	Principal services offered by opportunities
Regulating water flow continued				**Continued form previous...** The large woodland area also helps to alleviate the effects of floods by slowing the rate water reaches the ground, increasing soil infiltration so reducing the amount of runoff, improving flood storage and slowing the overall rate of flood water movement.		

Service	Assets/ attributes: main contributors to service	State	Main beneficiary	Analysis	Opportunities	Principal services offered by opportunities
Regulating soil quality	Unimproved pastures Appropriate tillage Appropriate stocking levels Deciduous woodland cover Semi-natural habitats	There are 5 main soilscape types in this NCA: ■ Freely draining slightly acid loamy soils, covering 42 per cent. ■ Freely draining slightly acid but base-rich soils (18 per cent). ■ Slowly permeable seasonally wet slightly acid but base-rich loamy and clayey soils (16 per cent). ■ Freely draining acid loamy soils over rock (13 per cent). ■ Slightly acid loamy and clayey soils with impeded drainage (10 per cent).	National	The amount of semi-natural habitat and tree cover in this NCA means that much of the soil is maintained in good condition. However, where the soil under agricultural use, maintaining and improving the soil quality will safeguard and retain productive food provision in the long term and increase the soils resilience to climatic change and extreme weather events. The freely draining slightly acid loamy soils, which largely lie over the Devonian sandstone, may be valuable for aquifer recharge, requiring the maintenance of good structural conditions to aid water infiltration and requiring the matching of nutrients to needs to prevent pollution of the underlying aquifer. The freely draining slightly acid but base-rich soils, over the limestone areas, may have calcareous layers (horizons) near the surface that help provide some natural resilience and enhanced workability, although some component soils are at risk from topsoil compaction and poaching, while development of iron pans can also occur... **Continued over...**	Support measures which employ minimal tillage and organic matter incorporation to increase soil organic matter and also relieve soil compaction on a landscape scale. Work with the farming community to achieve appropriate stocking regimes which avoid poaching and reduce erosion. Support measures which increase the volume of organic matter within worked soil to improve soil structure and conditions for soil fauna, increasing water infiltration.	**Regulating soil quality** **Climate regulation** **Regulating water quality** **Biodiversity**

Service	Assets/ attributes: main contributors to service	State	Main beneficiary	Analysis	Opportunities	Principal services offered by opportunities
Regulating soil quality continued 1				**Continued from previous...** ...Careful management of weak topsoils can help to maintain a good soil structure, for example minimum tillage, such as direct drilling, working well on some of these soils. Soil condition in both of these soils could be improved through incorporation of organic matter to increase water retention and percolation. The slowly permeable seasonally wet slightly acid but base-rich loamy and clayey soils may suffer compaction and/or capping as they are easily damaged when wet. In turn this may lead to increasingly poor water infiltration and diffuse pollution as a result of surface water run-off. However, they are found in the central Coal Measures within the forested area of the NCA so are not under farming pressure. Recreational pressures and felling activity may cause localised issues. Management of the freely draining acid loamy soils over rock is difficult due to the steep, often very stony land. While these soils are generally at low risk of poaching, organic topsoils can poach when wet leading to a short grazing season. However, in this NCA these soils are largely found in the outer area of the Coal Measures and are not under intensive farming pressures. **Continued over...**		

Service	Assets/ attributes: main contributors to service	State	Main beneficiary	Analysis	Opportunities	Principal services offered by opportunities
Regulating soil quality continued 2				**Continued from previous...** The slightly acid loamy and clayey soils with impeded drainage along the eastern edge of the NCA are by contrast easily poached by livestock and compacted by machinery when the soil is wet, with weak topsoil structures easily damaged. These soils lie in the more agricultural landscape that blends into the Severn Vale; careful timing of activities is required to reduce the likelihood of soil compaction.		

Service	Assets/ attributes: main contributors to service	State	Main beneficiary	Analysis	Opportunities	Principal services offered by opportunities
Regulating soil erosion	Hedgerows and buffer strips across steeper slopes Permanent grassland Sustainable systems of arable cultivation well managed livestock systems	The majority of the NCA's soils (83 per cent) are at some risk of erosion. The freely draining slightly acid loamy soils (42 per cent) found largely over the sandstone areas, have enhanced risk of soil erosion on moderately or steeply sloping land where cultivated or bare soil is exposed, exacerbated where organic matter levels are low after continuous arable cultivation or where soils are compacted. There is also the potential for wind erosion on some coarse textured cultivated variants. The freely draining acid loamy soils over rock (13 per cent) covering the outer area of the Coal Measures are at inherent risk of erosion where they are found on steep land over which rainfall will flow. The freely draining slightly acid but base-rich soils (18 per cent) found over the limestone area and the slightly acid loamy and clayey soils with impeded drainage (10 per cent) down the eastern side of the NCA, may be susceptible to capping and slaking, increasing the risk of soil erosion. The latter 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. Soils need to be managed carefully to reduce risks with careful timing of cultivations and maintenance of vegetation cover. The slowly permeable seasonally wet slightly acid but base-rich loamy and clayey soils (16 per cent), concentrated in the central area of the Coal Measures, have a low risk of soil erosion.	International	The NCA falls within the Defra Priority Catchment of the River Wye and its lower catchment. Across the catchment, largely outside of this NCA, there are problems of soil runoff due to intensive land use causing siltation of watercourses.[20]	Work with the farming community within this NCA and further up the Wye catchment, to produce sustainable systems of arable cultivation and well managed livestock to reduce poaching and soil exposure, particularly on the widespread steep sloping ground of this NCA, using measures such as expanding areas of permanent grassland, dense hedgerows and buffer strips across steeper slopes. Maintain and restore areas of semi-natural habitat and permanent grasslands to minimise soil compaction to improve water retention and reduce soil run-off across the NCA.	**Regulating soil erosion** **Climate regulation** **Regulating water flow** **Regulating water quality** **Biodiversity**

[20] DEFRA catchment priorities identified under the England Catchment Sensitive Farming Delivery initiative www.defra.gov.uk/foodfarm/landmanage/water/csf/documents/catchment-priorities.pdf

Service	Assets/ attributes: main contributors to service	State	Main beneficiary	Analysis	Opportunities	Principal services offered by opportunities
Regulating coastal flooding and erosion	Limestone gorge Existing flood defences	The estuarine Wye extends to Bigsweir. High ground and the rocky nature of the gorge limit the flood risk along much of this stretch.	Local	The current coastal management plan suggests that there is very limited erosion and flood risk and that no active intervention is required as the existing defences are expected to remain in place and the natural high ground limits the flood risk.	There are no additional opportunities in this NCA.	**Regulating coastal flooding and erosion**
Pollination	Existing flower-rich semi-natural habitat Traditional orchards Flower-rich road verges	Pollination of crops in this NCA is required for some market gardening, orchard fruit and arable crops such as varieties of oilseed rape which require insect pollination. Semi-natural habitats supplying nectar provision for pollinators, including flower-rich hedgerows and road verges, are scattered throughout the agricultural area of the NCA. This is further enhanced by the significant number of traditional orchards to the north and east, and the scattering around the rest of the NCA, which act as important sources of nectar for pollinating insects. In spring, the woodland ground-flora also bolsters the nectar supply.	Local	Although there is a reasonable spread of flower-rich semi-natural habitat across the NCA there is scope to improve the condition of this habitat through appropriate management and to extend it where possible particularly to the north and north east of the NCA where priority grassland is currently limited, including through increasing the number of HLS agreements which are currently limited across this NCA. The area particularly around St Briavels and Hewelsfield Commons is associated with market gardening and also contains a large number of small species-rich priority lowland meadow habitats. Such meadows are at risk from inappropriate management, due to neglect or over-grazing through uses such as pony paddocks... **Continued over...**	Increase the area of semi-natural habitats, with particular emphasis on unimproved flower rich grasslands, heathland, traditional orchard and species rich hedgerows. In addition, through mechanisms such as agri-environment schemes, encourage the use of nectar and forage mixes in arable land, to increase the availability of nectar sources in close proximity to food crops requiring pollination. Support the local meadows groups at St Briavels/Hewelsfield Commons and the newly emerging Forest of Dean meadows group based around Westbury/Blakeney, to enable small landowners to manage their meadows appropriately, including through agri-environment schemes. **Continued over...**	**Pollination** **Food provision** **Biodiversity** **Sense of place/ inspiration**

Service	Assets/ attributes: main contributors to service	State	Main beneficiary	Analysis	Opportunities	Principal services offered by opportunities
Pollination continued				**Continued from previous...** ...Loss of lowland meadow would reduce the provision of large expanses of nectar-rich flowers which maintain pollinator populations who also pollinate food crops. Incorporation of flower rich headlands, hedgerows and buffer strips into agricultural systems maintains a network of nectar sources throughout the farmed landscape, sympathetic management of road verges can be a beneficial addition to this network and also are aesthetically pleasing instilling a sense of place in people. There are potentially opportunities to restore areas of heathland within the forest, currently under conifer plantation. Heathlands provides an important source of nectar from the late flowering heather.	**Continued from previous...** Work with, the local authority/ parishes to create multi-functional green spaces incorporating sympathetic management for pollination including appropriate management of road verges into cutting regimes, adding to the network of nectar sources close to pollinated food crops.	

Service	Assets/ attributes: main contributors to service	State	Main beneficiary	Analysis	Opportunities	Principal services offered by opportunities
Pest regulation	Existing semi-natural habitat Agricultural field margins Species-rich hedgerows Woodland	As described under pollination, there is a reasonable spread of semi -natural habitat throughout the agricultural area of this NCA which will support species that will aid pest regulation.	Local	As described under pollination, although there is a reasonable spread of rich semi-natural habitat across the NCA there is scope to improve the condition of this habitat through appropriate management and to extend it where possible.	Maintain and expand the area of semi-natural habitats, throughout the NCA to provide a range of niches to support pest regulating species including invertebrates, birds and mammals. In addition, through mechanisms such as agri-environment schemes, encourage the use of field margins, beetle banks and headlands in arable land, to encourage pest regulating species in close proximity to food crops requiring pollination.	**Pest regulation** **Pollination** **Biodiversity** **Food production**

Service	Assets/ attributes: main contributors to service	State	Main beneficiary	Analysis	Opportunities	Principal services offered by opportunities
Sense of place/ inspiration	Dramatic Wye gorge and valley Stunning views outwards Secluded/ remote feel created by woodland Sense of isolation/ remoteness created by the Severn and the Wye with their limited crossing points Long industrial/ mining history Local culture Wye Valley AONB	Sense of place is provided by the rich and varied woodland mosaic of the enclosed central forest core; a characteristic medieval hunting ground, surrounded by a ring of forest fringes and settlements and open ground of farmland interspersed with semi-natural habitat and smaller blocks of woodland. The area is edged by the Severn escarpment to the east and the steep sided gorge of the Wye valley to the west, creating a strong sense of remoteness, further enhanced by the sense of seclusion created by the heavily wooded nature of the area. Strong associations with past mining and the iron industry are often concealed beneath the wooded landscape. Beyond the woodland, the impact of these industries is evident in the settlement pattern and the rich diversity of building materials. Settlements are often interspersed between areas of open grazing, forest and small holdings with field patterns varying from small, irregular enclosures to rectilinear fields bounded by hedgerows or stone walls with few hedgerow trees. **Continued over...**	National	The Forest of Dean and Lower Wye Valley has a strong isolated secluded character due to the two main tidal rivers and the extensive woodland. Although it exhibits many attractive features, the area is not currently a strong tourist destination but it is widely used for outdoor recreation. Much of the industrial heritage is hidden, inaccessible both physically and intellectually and would benefit from improved physical management of sites and increased interpretation materials. Accessibility of biodiversity and geodiversity could also be improved through better interpretation.	Maintain the large wooded areas of the central forest and Wye Valley woodlands with their open access. Improve the management and accessibility of open habitat and heritage sites within the forest through appropriate grazing management. Work with partners to improve intellectual access to all aspects of the heritage of the NCA including culture, archaeology, biodiversity and geodiversity, through better interpretation at sites and through accessible media such as leaflets and the internet. Support the local meadows groups at St Briavels/Hewelsfield Commons and the newly emerging Forest of Dean meadows group based around Westbury/Blakeney, to enable small landowners to manage their meadows appropriately.	**Sense of place/ inspiration** **Sense of history** **Biodiversity** **Geodiversity** **Recreation**

Service	Assets/ attributes: main contributors to service	State	Main beneficiary	Analysis	Opportunities	Principal services offered by opportunities
Sense of place/ inspiration Continued		**Continued from previous...** There are many distinctive semi-natural habitats some of which are of international and national importance including ancient woodland largely on the steep valley sides of the Wye Valley and within the Forest core and scattered patches of heathland, calcareous and acidic grasslands, traditional orchards of apple and pear to the north and east where the blend into the frequent orchards of the Severn and Avon Vales NCA, and species-rich hedgerows and parkland. Senses of inspiration and escapism are likely to be most particularly associated with the central undulating plateau of ridges and valleys and the gorge of the River Wye, creating a strong sense of isolation. This is deepened further by the extensive broadleaved and coniferous woodland which in itself creates a strong air of secrecy and concealment with glimpses of an industrial past and picturesque views across the ridges to the River Wye and Severn, and out to the Welsh Hills. For over 250 years tourists, artists, writers and poets have visited the area as part of the Wye Tour. Both Dennis Potter and J K Rowling were brought up in the NCA, the Forest inspiring their works. The gnarled trees twisting round the mossy rocks of Puzzlewood have been used as a filming location for a number of dramas including Merlin and it is thought that it also inspired the forests in J R R Tolkien's Lord of the Rings.				

Service	Assets/ attributes: main contributors to service	State	Main beneficiary	Analysis	Opportunities	Principal services offered by opportunities
Sense of history	Abbeys Castles Offa's Dyke National Trail Historical forest Industrial heritage Culture	In addition to the 754 designated historic assets there are 8,151 undesignated sites and structures recorded in the Gloucestershire Historic Environment Record. The history of the landscape is linked to the former Royal hunting forest, farming, woodland management, mineral extraction and associated industries. Iron and coal have been exploited since Roman times with a wealth of tips, shallow small scale iron workings or scowles, quarry faces, horse drawn tram roads and disused railway lines. Some small adit coal mines are still worked by local freeminers and small sandstone quarries remain active. Coppice woodlands provided charcoal for smelting and fuel while the Forest was a major source of wood used in construction and shipbuilding. Other industries including tin plating, machine engineering, brick making, wire works and tanning are evident in remains visible in the numerous derelict industrial buildings and associated infrastructure. **Continued over...**	National	The rivers have historically isolated the area due to their limited crossing points and resulted in a strong local culture which has waned more recently as local industry has declined and the majority of workers commute out of the area to the surrounding cities of Cardiff, Newport, Bristol and Gloucester. The foot and mouth disease outbreak in 2001 resulted in the removal of sheep from the forest and since then they have been brought back in relatively low numbers (about 1,000 animals). This is impacting the management of the open areas of the forest including the maintenance of heritage sites. The Forest of Dean commoners association is also struggling to survive due to lack of interest in commoning by locals. Lack of interpretation limits the understanding of both local people and visitors of the contribution of the area to the industrial revolution, though some recent improvements have been made through projects in the Wye Valley.	Work with graziers to introduce better management of sites to protect the long historical legacy of the areas industrial past, particularly within the forest, and to produce integrated outcomes for biodiversity, geological and historical features. Work with the community to maintain the cultural traditions such as commoning, the Verderers and freemining that have shaped and still shape the landscape and the community, maintaining the link between the local community and direct management of their environment. Also conserve the cultural heritage of music and dialect that are linked with the historical remoteness of the area so that it is recorded for future generations. Provide high quality recreational and tourism opportunities such as circular trails and themed local and community events linked to the sensitive management and conservation of historic and cultural features to aid understanding, enjoyment and sense of well-being.	**Sense of history** **Biodiversity** **Geodiversity** **Sense of place/ inspiration** **Recreation**

Service	Assets/ attributes: main contributors to service	State	Main beneficiary	Analysis	Opportunities	Principal services offered by opportunities
A sense of history		**Continued from previous...** Settlement pattern is varied with scattered farmsteads and hamlets linked by narrow, winding roads as well as larger, former industrial settlements, mining villages and market towns. Settlements are either clustered or linear in form with building materials ranging from sandstone, limestone, brick, and slate to tiles; more recent buildings are of white render with slate or dark pantile roofs. Most settlements are confined to the margins of the forest core reflecting encroachment onto areas of former Royal Forest commons by squatters during the late 18th and early 19th centuries. Aspects of history likely to be most evident to the general public are iron age hill forts at Symonds Yat and Lydney Park; Norman Castles including Goodrich and St Briavels, medieval mottes and castles; Offa's Dyke; formerly marking the border between England and Wales, as well as, Flaxley and Abbey Dore abbeys, and Tintern on the Welsh bank of the Wye; reflecting the Cistercian's influence on the exploitation of ore resources. Cultural history is instilled in the varied traditions that still continue including commoning, freemining, the Verderers, and the recording of the local dialect language and music.				

Service	Assets/ attributes: main contributors to service	State	Main beneficiary	Analysis	Opportunities	Principal services offered by opportunities
Tranquillity	Isolated character Steep-sided valley Extensive woodland Small dispersed settlements and population size Extensive access	A sense of tranquillity has declined; undisturbed areas have decreased from 85% in the 1960s to 51% in 2007 with the main areas of disturbance associated with the major road corridors such as the A48 and the A4138 as well as around the main towns of Cinderford, Coleford and Lydney. Nevertheless a strong sense of tranquillity remains associated with the extensive areas of semi-natural woodland largely located within the Wye Valley and Forest Core, the small-scale pastoral landscape around St Briavels and Hewelsfield Commons and the intricate network of small lanes.	Regional	Development is largely concentrated around the larger towns of Cinderford, and Lydney, in the case of Cinderford the proposed local development area is adjacent to the forest and may have a greater affect on tranquillity than at Lydney. The visual impacts of development within the NCA are limited around the more undulating wooded central landscape but on the open sloping farmland even a small development can stand out. Other significant visual impacts may occur from large infrastructure development outside of the NCA along the flat Severn Vale overlooked from the Forest of Dean, for example any significant further development at Oldbury power station.	Retain the sense of remoteness and seclusion by protecting this area and the adjacent Severn Vale from inappropriate development.	**Tranquillity** **Sense of place/ inspiration** **Biodiversity**

Service	Assets/ attributes: main contributors to service	State	Main beneficiary	Analysis	Opportunities	Principal services offered by opportunities
Recreation	Offa's Dyke National trail Long distance trails National cycle network 730 km of public rights of way River Wye navigation Open access woodland Historical features and associations Tranquil landscape Natural cave and disused ironstone mines	Recreation is supported by Offa's Dyke National Trail (28km lies in this NCA), the Wye Valley Walk, the Gloucestershire Way, Wysis Way and Forestry Commission permissive access trails, the National Cycle Network and a network of 730 km of rights of way with a density of 2.34 km per km^2. 35 % of the NCA (11,112 ha) is classified as being publically accessible. There is a public right of navigation along the Wye although locations to access the river for watersports is limited. The natural caves and disused ironstone mines are used for recreational caving. Clearwell caves have been developed as a popular visitor attraction.	Regional	This NCA is quickly accessed by road (and to a lesser extent rail), to much of the south west, west midlands and south Wales. There is scope to increase recreation in a sensitive and sustainable way that recognises the need to mitigate for any significant impacts on other ecosystem services such as soil erosion, water quality, tranquillity and biodiversity, geological and historical features. As mentioned above, both the physical and intellectual access to enhance people's enjoyment and understanding of the history, landscape, geodiversity and biodiversity of the area is limited and could be improved.	Maintain and improve the public rights of way network through implementation of the Gloucestershire Rights of Way Improvement Plans, particularly to link small villages and settlements to the recreational opportunities and permissive routes offered by the Forestry Estate to widen economic benefit and encourage sustainable travel, ensuring access balances enjoyment of, with the protection of biodiversity, geological and historic features. Provide appropriate high quality facilities such as interpretation, picnic sites and visitor centres and accommodation.	**Recreation** **Sense of place/ inspiration** **Sense of history** **Biodiversity** **Geodiversity** **Tranquillity**

Service	Assets/ attributes: main contributors to service	State	Main beneficiary	Analysis	Opportunities	Principal services offered by opportunities
Biodiversity	Forest of Dean and Lower Wye Valley Bat SAC Wye Valley Woodlands SAC River Wye SAC SSSI Local Sites Local Nature Reserves Lady Park wood and the Hudnalls NNR Wye Valley AONB	Priority woodlands dominate the area, covering 35 per cent (11,000 ha) of the NCA, including over 10,000 ha of woodland (lowland mixed deciduous, upland oakwoods, wet woodland). There are some smaller priority habitat areas such as floodplain grazing marsh (123 ha) and lowland meadows (112 ha). 1,200 ha of the NCA are designated as SSSI (4 per cent of the NCA) and there are 3 SAC.	National	Given the amount of semi-natural habitat in this NCA, particularly one of the largest blocks of semi-natural woodland in the country, the current coverage of conservation designations is quite low and there is an opportunity to formally recognise the conservation importance of this resource. All of the SSSI within the NCA are in favourable or unfavourable recovering condition. Although some of the internationally important lesser and greater horseshoe bat roots are protected by the SAC designation, their flight lines and feeding ground are not protected. The current mechanism for ensuring the survival of these populations is through appropriate management of the surrounding farmland which can be enabled through Environmental and Countryside Stewardship schemes by maintaining hedgerows and more informed use of pesticides and herbicides. The River Wye and Wye Valley Woodlands SAC for their assemblages of internationally important species and outstanding geology. Activities further up the Wye catchment influence the water quality through this NCA.	Expand the number of nationally designated SSSI through the SSSI review process. Support the internationally important populations of lesser and greater horseshoe bats through bringing the surrounding farmland under appropriate management through Environmental and Countryside Stewardship. Increase areas of semi-natural habitat including grassland, heath and traditional orchard, creating extensive and connected areas of semi-natural habitat which are managed in favourable condition, to increase the resilience of these priority habitats to climate change. Use and expand local work on opportunity mapping to inform landscape scale projects and local development plans/decisions. Control invasive non-native species, particularly Himalayan balsam on the Wye, to prevent or reduce damage to native species populations and habitats. Improve the ecological quality of the River Wye through schemes such as catchment sensitive farming across the extensive catchment.	**Biodiversity** **Climate regulation** **Pollination** **Sense of place/ inspiration** **Tranquillity** **Recreation**

Service	Assets/ attributes: main contributors to service	State	Main beneficiary	Analysis	Opportunities	Principal services offered by opportunities
Geodiversity	Quarries Mines Scowles Wye gorge River geomorphology	There are 12 geological SSSI in this NCA consisting of quarries, cuttings and mines associated with the historical extraction of mineral wealth and building materials. There are also 62 local geological sites.	National	The geological SSSI provide important access to geodiversity, enabling the interpretation, understanding and continued research into the geological processes associated with the NCA. Exposure of these features, particularly the quarries, cliffs and mines, make a positive contribution toward sense of place and sense of history. The mines and caves also act as roost sites for the significant bat populations of the area as well as a recreational caving resource.	Opportunity to improve the interpretation of these sites to increase understanding of both the geological and historical aspects. Protect mine shafts from being blocked and filled in for both geological and biodiversity benefit.	**Geodiversity** **Sense of place/ inspiration** **Sense of history** **Biodiversity** **Recreation**

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