



## Introduction

As part of Natural England's responsibilities as set out in the Natural Environment White Paper,<sup>1</sup> Biodiversity 2020<sup>2</sup> and the European Landscape Convention,<sup>3</sup> 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.

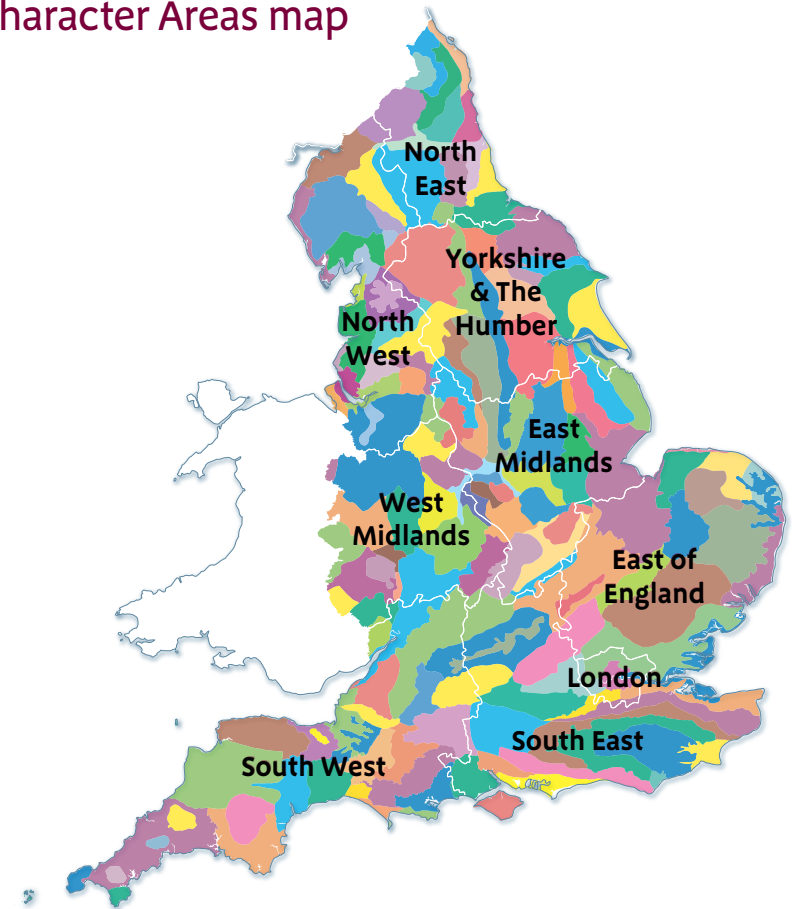
NCA profiles are guidance documents which can help communities to inform their decision-making about the places that they live in and care for. The information they contain will support the planning of conservation initiatives at a landscape scale, inform the delivery of Nature Improvement Areas and 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](mailto:ncaprofiles@naturalengland.org.uk).

## National Character Areas map



<sup>1</sup> The Natural Choice: Securing the Value of Nature, Defra (2011; URL: [www.official-documents.gov.uk/document/cm80/8082/8082.pdf](http://www.official-documents.gov.uk/document/cm80/8082/8082.pdf))

<sup>2</sup> 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](http://www.defra.gov.uk/publications/files/pb13583-biodiversity-strategy-2020-111111.pdf))

<sup>3</sup> European Landscape Convention, Council of Europe (2000; URL: <http://conventions.coe.int/Treaty/en/Treaties/Html/176.htm>)

## Summary

The lower valleys of the rivers Severn and Avon dominate this low-lying open agricultural vale landscape made up of distinct and contrasting vales, including Evesham, Berkeley, Gloucester, Leadon, and Avon, with Cotswold outliers like Bredon Hill punctuating the otherwise flat vale landscape. The M5 motorway runs through the centre and the eastern edge of the area. A small proportion of the National Character Area (NCA) is urban and includes towns such as Worcester, Cheltenham, Gloucester and Stratford-upon-Avon, with its world famous Shakespearian connections. Industrial development is still important at Avonmouth and the archaeology/heritage of former industry is prominent around Sharpness Docks, Pill, Gloucester-Sharpness Canal and Stroudwater Canal. The majority of the area is used as agricultural land.

Woodland is sparse and it is a generally open landscape. Traditional orchards are widespread across the area and with surrounding NCAs support the main UK population of the noble chafer beetle and provide an important genetic resource of local fruit varieties. Important concentrations of lowland meadow and floodplain grazing marsh support a range of priority species from green winged orchid and brown hairstreak butterfly to true fox sedge and a wide range of waterfowl. The Walmore Common Special Protection Area (SPA) and adjacent Severn Estuary SPA are of international importance for wintering wildfowl, such as Bewick's swan and shelduck.

The oolitic limestone outliers of the Cotswolds AONB overlie this area and the Bredon Hill SAC is particularly important as a site for the rare

violet click beetle. There are important staircases of fossil-bearing river terrace gravels containing evidence of Palaeolithic and Mesolithic human settlement, and rare inland salt deposits at Droitwich. Key ecosystem services within this NCA include flood regulation, food production due to extensive agriculture and sense of history which is internationally important due to its links with Shakespeare. Future challenges and opportunities include pressure from development around urban and industrial areas, pressure to increase food production and large scale wetland habitat restoration to aid flood management.

[Click map to enlarge](#); [click again to reduce](#).

## Statements of Environmental Opportunity

- **SEO 1:** Protect and manage the landscape, heritage and biodiversity associated with the Severn Estuary, the river valleys and other hydrological features, planning for a landscape scale expansion of wetlands, inter-tidal habitats and unimproved grasslands along river floodplains through, restoration, expansion and re-linkage of existing remnant areas of semi-natural habitat.
- **SEO 2:** Seek to safeguard and enhance this area's distinctive patterns of field boundaries, ancient hedgerows, settlements, orchards, parkland, small woodlands, chases, commons and floodplain management with their strong links to past land use and settlement history, and for the benefits this will bring to soil erosion, soil quality and biodiversity.
- **SEO 3:** Reinforce the existing landscape structure as part of any identified growth of urban areas, hard infrastructure and other settlements ensuring quality green infrastructure is incorporated enhancing health, access, recreation, landscape, biodiversity and geodiversity.
- **SEO 4:** Protect geological exposures and maintain, restore and expand semi natural habitats throughout the agricultural landscape, linking them together to create a coherent and resilient habitat network enabling ecosystems to adapt to climate change.



Cattle grazed saltmarsh Northwick Warth, Severn Estuary, Avon.

## Description

### Physical and functional links to other National Character Areas

To the western edge of the NCA the Malvern Hills form an abrupt feature, rising steeply out of the Severn Vale. On the eastern boundary the area flows more subtly into the Arden and Dunsmore and Feldon NCAs. There is a similarly subtle boundary with the Teme Valley and Herefordshire Plateau NCAs to the north and north-western edges of the area. From the Forest of Dean, Malvern Hills and the Cotswolds there are impressive views over the contrasting low lying and level landscape of the area and respectively there are expansive views outwards to the surrounding hills. The M5 motorway running right through the area, used by thousands of people each day, also provides widespread views of this landscape and those of neighbouring NCAs.

The River Severn flows from the Mid Severn Sandstone Plateau into the area and the Warwickshire Avon flows into the area from the Arden and Dunsmore and Feldon NCAs. The Teme, rising from the Welsh border, flows across the Clun and North West Herefordshire Hills, Herefordshire Lowland and Teme Valley NCAs entering the Severn and Avon Vales from the north of the Malvern Hills, while the Leadon, rising in the Herefordshire Plateaux flows across the Herefordshire Lowlands and South Herefordshire and Over Severn NCAs, entering the area from the south end of the Malvern Hills.

### Distinct areas

- Cotswold outliers: Bredon, Dumbleton, Churchdown and Robinswood Hills.



The Severn Vale from Crickley Hill and Barrow Wake Site of Special Scientific Interest.

## Key characteristics

- A diverse range of flat and gently undulating landscapes strongly influenced and united by the Severn and Avon rivers which meet at Tewkesbury.
- Prominent oolitic limestone outliers of the Cotswold Hills break up the low-lying landscape in the south-east of the area at Bredon Hill, Robinswood Hill, Churchdown Hill and Dumbleton Hill.
- West of the Severn the Mercia Mudstones predominate, producing poorer silty clay soils. Lias clays in the Avon Valley and east of the Severn create heavy but productive soils. River terrace gravels flank the edges of watercourses.
- Woodland is sparsely distributed across this landscape but a well wooded impression is provided by frequent hedgerow trees, parkland and surviving traditional orchards. Remnants of formerly extensive Chases and Royal Forests, centred around Malvern, Feckenham and Ombersley still survive.
- Small pasture fields and commons are prevalent in the west with a regular pattern of parliamentary enclosure in the east. Fields on the floodplains are divided by ditches (called rhines south of Gloucester) fringed by willow pollards and alders.
- Pasture and stock rearing predominate on the floodplain and on steeper slopes, with a mixture of livestock rearing, arable, market gardening and hop growing elsewhere.
- Unimproved neutral grassland (lowland meadow priority habitat) survives around Feckenham Forest and Malvern Chase. Along the main rivers, floodplain grazing marsh is prevalent. Fragments of unimproved calcareous grassland and acidic grasslands are also found.
- The River Severn flows broadly and deeply between fairly high banks,

north to south, while the Warwickshire River Avon meanders over a wide flood plain between Stratford, Evesham and Tewkesbury. The main rivers regularly flood at times of peak rainfall.

- A strong historic time line is visible in the landscape, from the Roman influences centred at Gloucester, earthwork remains of medieval settlements and associated field systems through to the strong Shakespearian heritage at Stratford-upon-Avon.
- Highly varied use of traditional buildings materials, with black and white timber frame are intermixed with deep-red brick buildings, grey Lias and also Cotswolds stone.
- Many ancient market towns and large villages are located along the rivers, their cathedrals and churches standing as prominent features in the relatively flat landscape.



The view from Stanway Hill across the Severn Vale showing Cotswold outlier hills standing out from the surrounding flat vale; Dumbleton Hill near the centre, Bredon Hill far centre, Malverns left horizon.

## Severn and Avon Vales today

The Severn and Avon Vales is a low-lying open agricultural vale landscape with the Severn and Avon rivers, threading through this large and complex area, providing a unifying feature. The Cotswolds to the south-east, the Forest of Dean to the south-west, and the Malvern Hills to the west, form abrupt boundaries providing prominent viewpoints across the vales. To the north, the Avon Vale rises more gently.

The Severn and Avon Vales are underlain by soft rocks, mostly consisting of the Mercia mudstone group and Liassic clays, which form heavy loam or clay soils. River terrace deposits of sands and gravels are found in the Severn Vale, some of which are worked commercially. An unusual feature is the localised salt deposit around Droitwich, which has been worked since Roman times and gives



Local rhubarb displayed at Tewkesbury Food and Drink Festival.



Green winged orchids at Foster's Green Meadows SSSI, an example of species-rich lowland meadow.

rise to inland salt marsh. Narrow riverside levels in the south widen out to the north of Gloucester. The northern section of the area divides into two distinct landscapes characterised by their historic patterns of settlement and field boundaries. In the west, on poor, wet soils of the Mercia Mudstones, there is an ancient landscape of dispersed settlements with numerous open commons (survivors of the historic droving trade which crossed the area) and small pasture fields. To the east, fertile soils on Lias clays give rise to rich agricultural land, particularly around the Vale of Evesham where market gardening predominates. Here settlements are more nucleated, often around a church that stand prominently in this low lying landscape, and fields are medium to large sized, with many following the narrow rectangular fields derived from parliamentary enclosure of medieval strip farming. Many villages are characterised by red brick, stone and black and white timber framed buildings.

The River Severn flows north to south through the NCA and the River Avon meanders east to west between Stratford and Tewkesbury where it joins the Severn. The floodplains of the two rivers, plus a small length of the River Teme north of Worcester, are a major unifying feature through this large and complex NCA. To the south and east the NCA is dominated by nucleated towns and villages; larger town and cities are mostly located on riversides, including the cathedral cities of Worcester and Gloucester, and the Abbey Towns of Tewkesbury and Pershore, which form prominent features in the landscape. To the west of the Severn, settlements are more dispersed in nature, linked by a network of lanes leading to the River Severn and to the higher ground to the west. Alongside the rivers the major land cover is pasture, or further south, estuarine levels. Many of the levels and grasslands have historically been managed as flood meadows, Hams or Lammas meadows. The nationally scarce narrow leaved water dropwort is particularly associated with the Hams and they are locally important for breeding waders.

Flood embankments, integral to past and current management of the floodplain grasslands, line much of the length of the rivers, allowing agricultural activity in former floodplain criss-crossed by tree lined ditches, called rhines south of Gloucester, and where veteran pollard willows are frequent. South of Gloucester the Severn floodplain takes on an estuarine character, ever widening and with a gently undulating topography. Here wetlands and saltmarshes are internationally important for wildlife such as wading birds. Rare plants such as sea barley, ribbon-leaved water-plantain and true fox-sedge utilise the ponds and rivers of the floodplain.

Oolitic limestone outliers of the Cotswolds stand out prominently in the landscape around Gloucester and to the north-east of Tewkesbury. These well wooded hills are part of the Cotswold Hills, standing as an isolated microcosm of the Cotswolds stranded in the vale. Bredon Hill is an internationally important site (designated Special Area for Conservation) for wildlife, with calcareous grassland and historic parkland containing many veteran trees, which host key invertebrate species such as the violet click beetle and red-horned cardinal click beetle. Across the Vales woodland is generally sparse, localised and broadleaf in nature. However, a well wooded feel is provided in many places by frequent hedgerow trees, traditional or bush orchards and poplar shelter belts, or remnants of Royal Forests and Chases such as Feckenham. One of the largest concentrations of the declining native black poplar is found at Castlemorton.

Across the NCA, many traditional orchards survive, retaining an important genetic resource in a wide range of local fruit varieties. Though commercially superseded by more recently planted bush orchards, the traditional orchards are rich in wildlife, providing the UK stronghold for the noble chafer beetle and nest

sites, including rot holes, for birds and bats. This and surrounding NCAs are a key area for mistletoe, which particularly thrives on old fruit trees, lime and poplar. Mistletoe along with annual orchard blossom and fruit displays, provide striking seasonal features that have strong cultural associations within the area.

In the north-east of the NCA pasture is more frequent. Many species-rich hedges (some of which date back to Saxon times), nationally significant areas of lowland meadow, traditional orchards, wood pasture, parkland and scattered ancient woodlands support many priority species. A high level of public access is enjoyed across the area, including 11 km of the Cotswold Way National Trail and long distance routes such as the Severn Way, Wysis Way and Gloucestershire Way, enabling the public to access and enjoy the natural environment. There are nationally recognised attractions such as sites associated with Shakespeare, Berkeley Castle, the Severn Bore and the Slimbridge wetland reserve which are popular with visitors.

The Roman influence on the landscape is particularly strong around Gloucester. Earthworks of medieval townships and extensive ridge and furrow survive, particularly in Honeybourne parish. There is also a nationally important ridge and furrow fieldscape at Weston Subedge on the eastern fringe of the area. Substantial estates and parklands survive across the area, such as Croome, Sudeley Castle, Overbury (Bredon Hill) and Berkeley.

The M5 runs through the length of the area while at the southern end, and along the tidal Severn, the M4, M48, M49 and M5 motorways together with the two Severn Bridges, riverside power stations, the canals and associated industrial heritage of mills and docks and the current industrial and commercial activity at Avonmouth and Sharpness docks create prominent features.



## The landscape through time

The whole of the NCA is underlain by soft rocks of Triassic and Jurassic age resulting in the fertile soil that has influenced the land use throughout the human settlement of the Vales. West of the Severn the Mercia Mudstones predominate, producing poorer silty clay soils. Lias clays in the Avon Valley and east of the Severn create heavy but productive soils surmounted in places by outliers of the Cotswold oolitic limestone forming Bredon, Dumbleton, Churchdown, Robinswood and Alderton Hills. The oldest Triassic sandstones of the Bromsgrove Formation give rise to hills and ridges fringing the northern part of the area.

Staircases of fossil-bearing river terrace gravels, formed in response to changes in global climate and sea levels, flank the edges of the Severn and Avon and are significant for interpreting environmental change during the Pleistocene. In places these deposits are worked commercially for gravel. Unusual localised salt deposits (from the Triassic Mercia mudstone group) feature around Droitwich, producing rare inland saltmarsh. Peat deposits occur in the Gordano Valley at the southern tip of the area and at Walmore Common, where they give rise to distinctive wetlands.

Along the lower reaches of the Severn, the youngest of the Triassic rocks (Rhaetic) crop out to produce a series of cliffs, for example Hock, Aust and Sedbury Cliffs, revealing further fossil exposures.

Extensive evidence of human settlement as far back as the Palaeolithic and Mesolithic has been found on the gravel terraces, Oldbury provides evidence of Neolithic tools. The second half of the 1st Millennium BC saw major woodland clearance, crop marks still showing where farmstead roundhouses

once stood. Bredon Hill was a focus of early activity, reflected in its surviving standing stones and hill forts. By the Iron Age, settlement had spread beyond the gravels and Droitwich salt was being exploited. This was expanded by the Romans and further evidence of their activity is seen in the legacy of Roman roads crossing the area and in the Roman centre at Gloucester.

The River Severn divides two sharply contrasting areas of historic significance that strongly influence the present character of the NCA. To the west, there is a predominant pattern of highly dispersed settlements, which was well established by the 11th century. The present pattern of small-medium scale fields and an intermingling of assorted fields and open commons, derives from medieval piecemeal enclosures of the once much more extensive heaths that developed through the grazing in common, of the poorer soils.



Flooding from the Severn in Cheluvelt Park, Worcester.

To the east the predominant pattern is of stronger nucleation, with fewer isolated farmsteads. The latter formed as part of the enclosure of open fields that extended across most of the land, between the 16th and 19th centuries. The surviving field boundary patterns give a real impression of the former nature and extent of the medieval townships, with their extensive common arable fields, most notably at the relict ridge and furrow fieldscapes of Weston Subedge. There is a high survival of 17th century and earlier houses across the area, from small wayside houses to the farmhouses of a prosperous class of farmer that developed from the 15th century. There are also some barns of medieval (mostly ecclesiastical) estates with notable concentrations along the Cotswolds Fringe where these estates were active in the clearance of woodland in the 12<sup>th</sup> and 13<sup>th</sup> centuries.

The heavy and fertile soils of the east have supported a concentration of arable farming, while the Vale of Berkeley and Gloucester provided rich pastures for cattle and for over-wintering sheep brought down from the Cotswolds. Fruit orchards for cider and perry developed from at least the 17th century. Horticulture developed on gravel terraces in the 19th century as railways brought urban markets closer.

The 9th-century Anglo-Saxon church at Deerhurst is an internationally significant survival of early Christian architecture, and early Christian centres have developed as important cities and towns across the area, for example, Worcester, Gloucester and Tewkesbury. Later, towns at Evesham and Stratford-upon-Avon developed from the 12th century while Cheltenham developed as a spa town from the 1830s. Shakespeare's Stratford, its theatre and historic buildings and Regency Cheltenham and associated festivals are internationally important visitor destinations.

The use of traditional building materials across the area has been highly varied; local stone (red sandstone, grey Lias or Cotswold stone) intermixed with timber frame buildings sometimes retaining their thatch, and deep-red brick and pantile roofs. The grander houses at the base of the Cotswolds benefitted from the availability of local Cotswold stone. Modern developments tend to be in modern red brick or render with a mixture of slate, tile or pantile being used.

Broadcloth production (a major feature of Stroud valleys in the Cotswolds NCA) developed in the south of the area from the late 14th century. Stocking knitting developed at Tewkesbury, which also became a major corn milling centre from the medieval period. The building of the canal network during the 18th and 19th centuries, to transfer and export the goods produced in the area, simulated the growth of the Worcester porcelain pottery. The one time important dairy industry around Gloucester gave us double and single Gloucester cheeses. The Severn has long been a major salmon fishery and historically, sturgeon and lamprey were supplied to the Crown.



**A traditional Worcestershire plum orchard showing standing dead wood, an important resource for orchard biodiversity.**

During the 20th century there has been rapid urban expansion, particularly of the larger cities and towns. This has been mirrored by many villages becoming commuter settlements with new residential areas. Elm was once a highly characteristic hedgerow tree of the area and the loss of mature elm trees during the Dutch elm disease outbreak of the 1970s, has dramatically changed the landscape making it feel far more open.

Research showed that in the period 1990 to 1998, the landscape of the Severn and Avon Vales experienced a slight increase in small woodland planting, consistent with the character of the NCA, but there were changes in agriculture and development that were inconsistent with character. In the second assessment period from 1998 to 2003, it was noted that the woodland resource appeared to have strengthened, but changes in agriculture and the pressure of development continued to transform the area. Riverine, boundary and historic elements also showed signs of neglect.

The development of the motorways that cross the area and the two Severn bridges have increased access to this NCA and neighbouring Wales. The old Severn Bridge, now a grade 1 listed building, was a pioneering design of its time using aerofoil technology, which produces its characteristic slim profile. The flat landscape and access to the water of the Severn has provided opportunities for industrialisation particularly at Avonmouth. Riverside power stations and industrial and commercial activity at Avonmouth and along the tidal Severn to Gloucester and beyond, all create prominent landscape features.

## Ecosystem services

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

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

### Provisioning services (food, fibre and water supply)

- **Food provision:** The Severn and Avon Vales NCA supports a mixture of farming from predominantly grazing in the west, to intensive agriculture and market gardening on the heavy but fertile soils of the Lias clay landscape to the east. It is renowned for its orchards, soft fruit and asparagus production.
- **Water availability:** This NCA is characterised by two of the major rivers of lowland England; the Avon and the Severn. The River Severn provides public water supplies to six million people. There is 'no water available' for abstraction along the length of the River Severn and its tributaries, including the River Teme and the River Avon within this NCA. There are no major reservoirs in this NCA.
- **Genetic diversity:** This and the surrounding NCAs of the major fruit producing counties of Gloucestershire, Herefordshire and Worcestershire hold a wide range of local varieties of orchard fruit, cultivated over hundreds of years.

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

- **Regulating soil erosion:** Soil erosion is recognised as a concern particularly along the River Teme catchment with its steeper slopes.
- **Regulating water quality:** The majority of surface water in this NCA is of moderate or poor ecological quality. The Severn and Avon rivers are considered 'heavily modified'.
- **Regulating water flow (flooding):** Flooding is a significant problem in this NCA with two major rivers, which confluence at Tewkesbury. The catchment management plan proposes ways to increase the regulation of river flooding.
- **Pollination:** Pollination services are particularly important in this NCA due to the pollination requirements of orchards and the horticultural nature of farming in parts of the area.
- **Regulating coastal flooding and erosion:** The Severn estuary has the second largest tidal range in the world, at 10-12 m, and is tidal as far upstream as Gloucester. In Avonmouth and surrounds there are approximately 1,043 properties at risk from all sources of flooding, including fluvial, tidal and coastal. Most of the flooding here results from tide-locking.

## Cultural services (inspiration, education and wellbeing)

- **Sense of place/Inspiration:** Sense of place is provided by the rivers Severn and Avon and their floodplains, with ancient market towns and villages located on them, such as Worcester, Stratford, with its strong associations with Shakespeare, Tewkesbury and Gloucester with their characteristic black and white timber framed buildings. The Vale of Evesham and its association with horticulture including soft fruits and the wider coverage and strong cultural associations of traditional orchards are also an essential part of the character of the area.
- **Sense of history:** The area contains a wealth of visible built and natural historic and prehistoric features including some which are internationally renowned such as those associated with Shakespeare.
- **Recreation:** Recreation is supported by waterways, over 5,000 km of rights of way at a density of 2.41 km per km<sup>2</sup>, including the 11 km of the Cotswold Way and 1 km of Offa's Dyke National Trails, plus just under 2,000 ha of open access land.
- **Biodiversity:** There are nine internationally designated sites in the NCA. The area is particularly important in terms of the floodplain wetland and associated bird assemblages, lowland meadow and traditional orchards. Most of the woodland is semi-natural ancient woodland, and important invertebrate assemblages are supported by the veteran trees of parkland such as that in the Bredon Hill SAC.
- **Geodiversity:** There are rare inland salt deposits at Droitwich, as well as staircases of fossil bearing river terrace gravels and other fossil bearing exposures along the rivers and the limestones of the Cotswold outliers.

## Statements of Environmental Opportunity

**SEO 1: Protect and manage the landscape, heritage and biodiversity associated with the Severn Estuary, the river valleys and other hydrological features, planning for a landscape scale expansion of wetlands, inter-tidal habitats and unimproved grasslands along river floodplains through, restoration, expansion and re-linkage of existing remnant areas of semi-natural habitat.**

**For example, by:**

- Restoring the natural floodplain function, landscape and habitat diversity associated with the rivers Severn and Avon and their tributaries through the opportunities provided by managed realignment, and the management of agricultural drainage/land use, increasing flood water storage capacity and reducing surface water run-off and soil erosion.
- Ensuring that managed realignment sites on the Severn Estuary are managed to create new intertidal and saline habitats that will contribute to, maintain and enhance biodiversity, contribute to climate regulation and enhance local landscape character, improve sustainability of current management practices and reduce flooding of built-up areas.
- Appropriately managing, restoring and creating fen, freshwater and intertidal grazing marsh, reedbed and ditch features to create an extensive and interconnected habitat network of wetlands, benefiting BAP species such as true fox sedge and supporting the large numbers of wildfowl that utilise both the estuary and surrounding wetlands, while ensuring that heritage assets, such as ridge and furrow, are not damaged or destroyed during the restoration or creation of wetland habitats.
- Protecting river terraces, important for their archaeological and geological record, retaining the outstanding evidence base for historic and prehistoric settlement, glacial and fossil record.
- Maintaining restoring and creating areas of wetland habitat, including estuary saltmarshes, mudflats and grazing marsh for nationally important assemblages of breeding waders; flood meadows, “hams” pastures and fen and the contribution salt marsh provides to carbon sequestration.
- Managing peat soils so that they remain wet or are re-wetted to maintain important wetland biodiversity and sequester carbon.
- Managing standing water features dispersed across the NCA to maintain their significant biodiversity interest.
- Protecting the exceptionally rare surviving example of inland saltmarsh near Droitwich by managing this habitat to ensure its continuity.
- Maintaining and extending low-input permanent pasture, hedgerows and woodland across slopes near the River Teme to reduce soil erosion and impact on water quality.
- Reverting arable to permanent unimproved grassland, particularly adjoining or close to existing remnant areas of semi-natural habitat.
- Promoting and expanding, multi-functional quality green spaces and linear routes, integrated with wetland habitats for recreation, health and educational benefits.

**SEO 2: Seek to safeguard and enhance this area's distinctive patterns of field boundaries, ancient hedgerows, settlements, orchards, parkland, small woodlands, chases, commons and floodplain management with their strong links to past land use and settlement history, and for the benefits this will bring to soil erosion, soil quality and biodiversity.**

**For example, by:**

- Retaining, restoring, and managing appropriately, all hedges and especially those that defines enclosure of medieval strip farming where this is a strong landscape feature. This will enhance the landscape, retain historic field patterns and provide an important biodiversity resource and connectivity of particular importance across the arable areas. Good hedgerow management will also assist reduce soil erosion and protect soil quality.
- Protecting and restoring the dry stone walls characteristic of the Cotswolds particularly seen on the Cotswold outliers in this NCA.
- Managing open commons to retain and enhance their open character and biodiversity value.
- Managing ditches and rhines together with veteran willow pollards that line their boundaries.
- Within 'ancient woodland restoration areas' (identified by Forestry Commission woodland opportunity mapping) where ancient woodland comprises 3 per cent or more of the landscape, linking the smaller woodland fragments to secure and enhance them. For example Bredon Hill, Malvern Hills and the Forest of Feckenham.
- Protecting the integrity of floodplain grasslands together with embankments that are fundamental to their historic management and are important for present day flood management.
- Protecting ridge and furrow and other buried archaeology from damage by cultivation and enhance biodiversity by restoring permanent grassland.
- Protecting varied heritage assets including archaeological features such as iron-age hill forts, earthwork remains, ridge and furrow, Roman estate boundaries for example on Bredon Hill, and patterns of former medieval strip farming, and ensure access to and interpretation of these important historical features.
- Promoting, managing, restoring and enhancing designed parklands, deer parks, wood pasture, commons and traditional orchards with their associated biodiversity, local genetic varieties and, historic buildings, for example cider houses and associated cultural heritage, through local and community events creating new recreation and education resources.
- Retaining genetic diversity of orchard trees to allow adaptability to the effects of a changing climate.

**SEO 3: Reinforce the existing landscape structure as part of any identified growth of urban areas, hard infrastructure and other settlements ensuring quality green infrastructure is incorporated enhancing health, access, recreation, landscape, biodiversity and geodiversity.**

**For example, by:**

- Ensuring that extensions to settlements, such as residential developments considered around Worcester, Redditch, Gloucester, Cheltenham and Tewkesbury, and further industrial expansion at Avonmouth, are designed to ensure their visual and functional integration with the surrounding landscape and the existing urban edge. Key views to and from settlements should be retained.
- Providing access to quality greenspace through well designed green infrastructure which will benefit health and wellbeing and provide habitat increasing the permeability of the urban landscape to biodiversity.
- Ensuring any new hard infrastructure, such as new power stations or other industrial plants along the Severn, are designed to ensure visual and functional integration with the surrounding landscape.
- Ensuring that new developments provide biodiversity enhancement rather than just mitigation.
- Encouraging the creation of sustainable urban drainage systems, and surface water management plans that can create new wetland features close to urban areas and new development, tying in as part of a green infrastructure network.
- Conserving the area's richly varied traditional architecture and farmsteads, vernacular and historic buildings in Cotswold stone, timber framing and deep-red brick, encouraging the use of appropriate styles and use of locally distinctive materials. Ensuring that the repair, restoration or conversion of vernacular buildings is carried out with due regard to this historic interest using local and appropriate materials, styles and detailing.

**SEO 4: Protect geological exposures and maintain, restore and expand semi-natural habitats throughout the agricultural landscape, linking them together to create a coherent and resilient habitat network enabling ecosystems to adapt to climate change.**

**For example, by:**

- Carrying out geo-conservation work at important geological sites improving accessibility so that they are available for research and education and all the geodiversity features are visible.
- Working with landowners to ensure geological sites are appropriately managed and their condition is monitored.
- Ensuring that the management of geological sites is integrated into all aspects of conservation practices in the National Character Area.
- Protecting river terrace gravel sites which, due to their unconsolidated nature, are particularly vulnerable to erosion, commercial extraction and development.
- Protecting and restoring calcareous grassland habitat on the Cotswold outliers.

- Protecting veteran trees in parklands, particularly in the Bredon Hill SAC and Dixton Wood SAC, and ensure plans for continuity of old trees and dead-wood resources are made.
- Conserving violet click beetle populations associated with veteran trees, particularly at Bredon Hill SAC and Dixton Wood SAC, and which also support other important invertebrates, bats, birds and fungi.
- Promoting sustainable farming practices to create a farmed landscape, which is more permeable to the movement and supporting of species.
- Protecting and enhancing ancient woodland across the area.
- Targeted planting of new woodland, informed by strategies such as the Forestry Commission ancient woodland opportunity mapping, paying due regard to the ancient open character of the landscape in places such as the Vale of Evesham.
- Improving the management of traditional orchards and developing age structure to ensure continuity of habitat resource and reverse the dramatic loss of this habitat for species associated with traditional orchard trees. Connecting orchards with other wood habitat to create functional habitat networks.
- Protecting species-rich grasslands, manage, restore and create unimproved grassland and traditional orchard habitat to provide an interconnected grassland habitat network.
- Protecting and managing hedgerows, particularly those with substantial blackthorn presence and extending the network of hedges suitable for brown hairstreak butterflies.
- Protecting ancient woodlands scattered across the former chase and royal forest areas and aiming to incorporate them into interconnected habitat networks by buffering woodlands with unimproved grassland, traditional

orchard and possibly short rotation coppice. Ensuring that extant historic woodland boundaries are not masked by buffering or woodland extensions. Protecting existing populations of green hound's tongue.

- Retaining and managing wood pasture and parkland in former chase and royal forest areas, particularly focussing on continuity of veteran tree and dead-wood resources.
- Managing peat soils in the Gordano Valley and Walmore Common so their biodiversity value associated with wet meadow, reed bed and carr communities and carbon sequestration potential is fully realised.
- Protecting all heritage assets, in particular ridge and furrow and other earthwork features in permanent grasslands.
- Maintaining and improving the quality and expanding a network of integrated public green spaces and rights of way for biodiversity, geodiversity, recreation and health benefits.



**Pershore Abbey, a prominent ecclesiastical feature standing out in the flat vale landscape.**



## Additional opportunity

### 1. Enhance and manage the relationship between access to the natural environment and conservation of the landscape, biodiversity, geodiversity and historic qualities of this popular area.

#### For example, by:

- Maintaining and enhancing the high level of public access through the dense network of rights of way and long distance routes, woodland and open access land with clear signposting and better 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 enable more people to enjoy the natural environment together.
- Providing more green infrastructure and route connectivity in areas close to where people live to improve access for all, sustainable transport options, and improve health and understanding of the natural environment.
- Improving access and facilities in selected areas, in particular to the rivers Severn and Avon for non-motorised recreational use that enables more people to engage in healthy activities in inspirational water environments.
- Managing sensitively and promoting the Cotswolds Way to national standards and also other long distance routes such as the Severn Way, to protect sensitive habitats, enhance tourism and ensure a high quality experience for all users.
- Providing interpretation of the many biodiversity and geodiversity features of the area to improve understanding and enjoyment of the distinctive landscape and natural environment.
- Ensuring interpretation of historic buildings and artefacts brings out their role in the development of landscape over time and continues to provide inspiration through sense of place and literary associations that the area provides.
- Enhancing the many recreational opportunities offered whilst minimising the pressures for tourism by ensuring sufficient infrastructure is in place, and managing visitor demand.

## Supporting document 1: Key facts and data

Total area: 210,326 ha.

### 1. Landscape and nature conservation designations

The Severn and Avon Vale includes 11,980 ha of the Cotswolds Area of Outstanding Natural Beauty (AONB) and 2,199 ha of the Malvern Hills AONB. In total AONBs cover 7 per cent of the total area of the NCA.

Management plans for the protected landscape(s) can be found at:

- [www.wyevalleyaonb.co.uk/](http://www.wyevalleyaonb.co.uk/)
- [www.cotswoldsaonb.org.uk/](http://www.cotswoldsaonb.org.uk/)

Source: Natural England (2011)

#### 1.1 Designated nature conservation sites

The NCA includes the following statutory nature conservation designations:

Tier	Designation	Name	Area (ha)	% of NCA
International	Ramsar	Severn estuary; Walmore Common	774	<1
European	Special Protection Area (SPA)	Severn estuary SPA; Walmore Common SPA	769	<1
	Special Area of Conservation (SAC)	Severn Estuary SAC; Bredon Hill SAC; Dixton Wood SAC; Lyppard Grange Ponds SAC; River Wye	969	<1
National	National Nature Reserve (NNR)	Bredon Hill NNR; Gordano Valley NNR; Foster Green Meadows NNR	109	<1
National	Site of Special Scientific Interest (SSSI)	A total of 92 sites wholly or partly within the NCA	2,754	1

Source: Natural England (2011)

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

There are 538 Local sites in the Severn & Avon Vales NCA covering 6,941 ha which is 5 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](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'

#### 1.1.1 Condition of designated sites

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

SSSI condition category	Area in condition (ha)	Percentage of SSSI in category condition
Unfavourable declining	1,133	41
Favourable	1,145	42
Unfavourable no change	282	10
Unfavourable recovering	176	6

Source: Natural England (2011)

Details of SSSI condition can be searched at:

<http://www.sssi.naturalengland.org.uk/Special/sssi/reportIndex.cfm>

## 2. Landform, geology and soils

### 2.1 Elevation

The NCA is on average 41 m above sea level with a maximum elevation of 295 m.

Source: Natural England (2010)

### 2.2 Landform and process

The Severn and Avon Vales NCA has a diverse range of flat and gently undulating landscapes largely consisting of silty clays thought to be deposited in an arid environment in ephemeral lakes, inland seas or saline lakes, punctuated in places by Cotswold outliers. The area is now drained by the rivers Severn and Avon, both of which have important 'staircases' of river terraces formed in response to changes in global climate and sea and land levels.

Source: Severn & Avon Vales Countryside Character Area description

### 2.3 Bedrock geology

The Severn and Avon Vales are underlain by Triassic and Jurassic soft rocks, mostly consisting of Mercia Mudstones (formerly known as Keuper Marls) and Liassic Clays, which form heavy loam or clay soils. Several outliers of Cotswold Jurassic Limestone occur at Bredon Hill and near Gloucester, for example, Churchdown and Robinswood Hills. They are the source of many important fossil faunas including fish, reptiles and insects. Along the lower reaches of the Severn are a series of cliffs where bands of hard Rhaetic Limestone are interspersed with layers of softer rocks. Thin bands of Rhaetic Limestone also underlie some of the low hills north of Gloucester through to the Natural Area boundary just south of Bromsgrove.

Source: Severn & Avon Vales Countryside Character area description, Severn & Avon Vales Natural Area profile, British Geological Survey maps

### 2.4 Superficial deposits

Thick deposits of Quaternary sediments were deposited across the NCA during the 'ice ages' by rivers and ice sheets. The Severn and Avon Rivers both have important 'staircases' of river terraces formed in response to changes in global climate and sea and land levels. Many of these river gravels are fossil bearing and contain vertebrate remains. Some deposits of sands and gravels here are worked commercially. Flooded former gravel workings form significant wildlife sites in several parts of the National Character Area. An unusual feature is the localised salt deposit around Droitwich, which has been worked since Roman times and gives rise to inland salt marsh.

Source: Severn & Avon Vales Countryside Character area description, Severn & Avon Vales Natural Area profile, British Geological Survey maps

### 2.5 Designated geological sites

Tier	Designation	Number
National	Geological Site of Special Scientific Interest (SSSI)	13
National	Mixed Interest SSSIs	1
Local	Local Geological Sites	42

Source: Natural England (2011)

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

### 2.6 Soils and Agricultural Land Classification

The 8 main soilscapes in the NCA are: Slightly acid loamy and clayey soils with impeded drainage, covering 29 per cent of the NCA; Lime-rich loamy and clayey soils with impeded drainage (25 per cent); Slowly permeable seasonally wet slightly acid but base-rich loamy and clayey soils (16 per cent); Freely draining slightly acid loamy soils (9 per cent); Loamy and clayey floodplain soils with naturally high groundwater (7 per cent); Loamy and clayey soils of coastal flats with naturally high groundwater (6 per cent); Freely draining lime-rich loamy soils (5 per cent); and Freely draining floodplain soils (1 per cent).

Maps showing locations of Statutory sites can be found at:

<http://magic.defra.gov.uk> – select 'Landscape' (shows ALC and 27 types of soils).

Source: National Soil Research Institute

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

Grade	Area in (ha)	Percentage of NCA
Grade 1	4,215	2
Grade 2	25,503	12
Grade 3	14,610	69
Grade 4	18,986	9
Grade 5	252	<1
Non-agricultural	1,036	<1
Urban	13,826	7

Source: Natural England (2010)

## 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 Arrow	4
River Avon	86
River Isbourne	17
River Leadon	15
River Severn	77
River Stour	1
River Teme	14
Gloucester & Sharpness Canal	25
Stratford upon Avon Canal	6
Worcester and Birmingham Canal	24

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.

### 3.2 Water quality

The total area of Nitrate Vulnerable Zone is 145,454 ha, 69 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](http://maps.environment-agency.gov.uk/wiyby/wiybyController?ep=maptopics&lang=_e)

## 4. Trees and woodlands

### 4.1 Total woodland cover

The NCA contains 11,148 ha of woodland (5 per cent of the total area), of which 3,080 ha is ancient woodland. The Forest of Avon Community Forest, one of twelve Community Forests established to demonstrate the contribution of environmental improvement to economic and social regeneration, covers 8,415 ha of this NCA, which is 4 per cent of the NCA.

Source: Natural England (2010)

### 4.2 Distribution and size of woodland and trees in the landscape

Tree cover is limited and the landscape is strongly affected by the presence or absence of hedgerows trees and the survival of older orchards many of which have been replaced by cultivated bush forms surrounded by poplar shelterbelts. Ash and oak dominate ancient woodlands and the remains of parks on higher ground. Little tree cover is evident alongside the rivers.

Source: Severn & Avon Vales 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.

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

Woodland type	Area (ha)	Percentage of NCA
Broadleaved	8,495	4
Coniferous	729	<1
Mixed	583	<1
Other	1,341	1

Source: Forestry Commission (2012)

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

Woodland type	Area (ha)	Percentage of NCA
Ancient semi-natural woodland	875	2
Ancient re-planted woodland (PAWS)	1	<1

Source: Natural England (2004)

## 5. Boundary features and patterns

### 5.1 Boundary features

Small pasture fields and commons are prevalent in the west. In the east agriculture is more intensive, with a regular pattern of parliamentary enclosure characterised by small to medium, straight-sided, narrow fields bounded by hawthorn and mixed species hedges. Fields on the floodplains are divided by ditches fringed by willow pollards and alders. Hedgerow trees are frequent across much of the area which is what gives it its wooded feel even though there is little woodland.

Source: Severn & Avon Vales Countryside Character Area description; Countryside Quality Counts (2003)

### 5.2 Field patterns

Earthwork remains of medieval settlements and associated field systems as at Billesley Trussell, Ullington or the former village of Polen, in Honeybourne parish. To the west of the Severn the present enclosure patterns, generally small to medium scale and irregular, derive from the piecemeal enclosure of medieval common field cores, and a complex intermingling of assarted fields, common land and common arable. Predominant pattern to east of Severn is piecemeal enclosure of the formerly extensive common arable fields, generally subject to enclosure from 14th century and complete by 18th century.

Source: Severn & Avon Vales Countryside Character Area description; Countryside Quality Counts (2003)

## 6. Agriculture

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

### 6.1 Farm type

The predominant farm types are Livestock Grazing and Cereal. Horticulture is also prominent, particularly around the fertile vale of Evesham: Cereal 466 farms (17 per cent); General Cropping 124 (4 per cent); Horticulture 281 (10 per cent); Specialist Pigs 23 (<1 per cent); Specialist Poultry 59 (2 per cent); Dairy 206 (7 per cent); Grazing Livestock (lowland) 776 (28 per cent); Mixed 183 (7 per cent); Other 683 (24 per cent). The number of mixed farms in the NCA decreased by 30 per cent between 2000 and 2009. Horticulture decreased by 30 per cent here during the same period. Cereal farming increased here by 14 per cent in this time.

Source: Agricultural Census, Defra (2010)

### 6.2 Farm size

There were 10 more large (100 ha >) holdings in 2009 than there were in 2000. Conversely, there were fewer holdings of all other sizes in 2009 than there had been at the start of the millennium.

Source: Agricultural Census, Defra (2010)

### 6.3 Farm ownership

2009: Total farm area = 155,338 ha; owned land = 101,786 ha

2000: Total farm area = 155,359 ha; owned land = 105,134 ha

Source: Agricultural Census, Defra (2010)

### 6.4 Land use

There has been an 11 per cent drop in the land area used for cereal farming but a 28 per cent increase in the area of land used for oilseeds, and a 25 per cent increase in land used for "other arable crops".

Source: Agricultural Census, Defra (2010)

### 6.5 Livestock numbers

There was a 39 per cent drop in the number of pigs farmed here between 2000 and 2009, along with a 30 per cent drop in the number of sheep farmed and a 17 per cent drop in the total number of cattle.

Source: Agricultural Census, Defra (2010)

### 6.6 Farm labour

There were 578 fewer Principal Farmers in the NCA in 2009 than there were in 2000; the numbers of managers and workers also fell.

Source: Agricultural Census, Defra (2010)

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

## 7. Key habitats and species

### 7.1 Habitat distribution/coverage

Important concentrations of unimproved neutral grassland (lowland meadow) resource survives around Feckenham Forest and Malvern Chase and along the main rivers. Coastal and floodplain grazing marsh is also prevalent, with fragments of calcareous grassland on higher ground, particularly on Bredon Hill. Below the Malvern Hills at Castlemorton and Hollybed commons there are localised areas of unimproved, acidic grasslands. Below Frampton, Gloucester, there are areas of regularly inundated saltmarsh.

Past industrial activity has created areas of open water habitat at places like Upton Warren Pools, Grimley Brick Pits (Worcestershire) and Frampton Pools (Gloucestershire).

Woodland is sparsely distributed across this landscape but a well wooded impression provided by frequent hedgerow trees and surviving traditional orchards which are particularly common around Evesham and Westbury on Severn.

The Gloucestershire Nature Map (a localisation of the South West Nature Map), and South West Nature Map identify Strategic Nature Areas which provide the highest priority opportunity for restoration of priority habitat in the Gloucestershire and West of England part of the NCA. In the Herefordshire, Worcestershire and Warwickshire portion of the NCA, County level biodiversity opportunity mapping has been carried out providing similar information opportunity for restoration.

In addition the NCA contains important arable habitats. These support nationally important assemblages of arable birds.

Source: Severn & Avon Vales Natural Area Profile (Natural England 2011)

### 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](http://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.

Habitat	Area (ha)	Percentage of NCA
Coastal and floodplain grazing marsh	13,923	7
Broadleaved mixed & yew woodland	3,484	2
Traditional orchard	2,280	1
Lowland meadows	383	<1
Lowland calcareous grassland	146	<1
Mudflats	74	<1
Reedbeds	70	<1
Fens	39	<1
Maritime cliff and slope	37	<1
Purple moor grass & rush pasture	36	<1
Lowland dry acid grassland	8	<1

Source: Natural England (2011)

Maps showing locations of priority habitats are available at:

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

### 7.3 Key species and assemblages of species

■ 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

Although the area is mainly one of towns and nucleated villages, towards the west and particularly on the poorer land there are hamlets and common-edge settlements in a rather dispersed pattern.

**Source: Severn & Avon Vales Countryside Character Area description; Countryside Quality Counts (2003)**

### 8.2 Main settlements

The main towns/cities within the NCA: are Cheltenham, Gloucester and Worcester; smaller settlements include Droitwich Spa, Great Malvern and Evesham. The total estimated population for this NCA (derived from ONS 2001 census data) is: 699,655.

**Source: Severn & Avon Vales Countryside Character Area description; Countryside Quality Counts (2003), Natural England (2012)**

### 8.3 Local vernacular and building materials

The vernacular here is an abundance of red brick, timber framing and pantile roofs. At the edge of the Cotswolds, the availability of high quality building stone has produced some grander houses.

**Source: Severn & Avon Vales Countryside Character Area description; Countryside Quality Counts (2003)**

## 9. Key historic sites and features

### 9.1 Origin of historic features

There is extensive evidence for Palaeolithic and Mesolithic activity on gravel terraces. There was major woodland clearance in 1st millennium BC. Early Christian centre at Worcester becomes bishopric in 679, and other evidence of early Christian activity at Gloucester, Pershore, Evesham and in minster churches founded by local Hwiccan aristocracy: 9th-century Deerhurst survives as internationally significant example of early Christian architecture.

Major abbeys built after Norman Conquest at Tewkesbury (1087) and Gloucester (1089), and Berkeley Castle became important in south of area as administrative centre of the Berkeley estates that continue to present.

To the west of the Severn, the predominant settlement pattern of high to very high levels of dispersal was clearly evident by the late 11th century, nucleated villages and being rare. Moated sites are common.

To the east, the predominant settlement pattern is of strong nucleation. Very low to extremely low levels of dispersed settlement, with some moated sites



occur. Settlements deserted in 14th to 16th centuries, some contracting into individual farmsteads. The Great majority of isolated farmsteads formed as part of enclosure of open fields, between 16th and early 19th centuries.

Source: Draft Historic Profile, Countryside Character Area description

### 9.2 Designated historic assets

This NCA has the following historic designations:

- 23 Registered Parks and Gardens covering 2,425 ha.
- 3 Registered Battlefield/s covering 622 ha.
- 263 Scheduled Monuments.
- 9,799 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

- There are 5,063 km of Public Rights of Way at a density of 2.4 km per km<sup>2</sup>.
- There are 2 National Trails the Cotswold Way (for 11 km) and Offa's Dyke Path (for 1 km) cross the NCA.

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)	3	<1
Common Land	1,520	<1
Country Parks	135	<1
CROW Access Land (Section 4 and 16)	1,715	1
CROW Section 15	1,298	<1
Village Greens	57	<1
Doorstep Greens	8	<1
Forestry Commission Walkers Welcome Grants	611	<1
Local Nature Reserves (LNR)	353	<1
Millennium Greens	8	<1
Accessible National Nature Reserves (NNR)	109	<1
Agri-environment Scheme Access	49	<1
Woods for People	820	<1

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) the most tranquil areas are at the mouth of the River Severn and in the north of the NCA.

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

Category of tranquillity	Score
Highest Value within NCA	42
Lowest Value within NCA	-97
Mean Value within NCA	-6

Sources: CPRE (2006)

- More information is available at the following address:  
<http://www.cpre.org.uk/what-we-do/countryside/tranquil-places>

### 11.2 Intrusion

A breakdown of intrusion values for this NCA are detailed in the table below.

Category of intrusion	1960s (%)	1990s (%)	2007 (%)	Percentage change (1960s-2007)
Disturbed	23	49	55	32
Undisturbed	72	45	38	-34
Urban	4	5	7	3

Sources: CPRE (2007)

Notable trends from the 1960s to 2007 are the 33 per cent decrease in undisturbed area and the corresponding increase in disturbed area.

- More information is available at the following address:  
<http://www.cpre.org.uk/what-we-do/countryside/tranquil-places>



Native black poplar by the sharpness Canal at Frampton, Gloucestershire; characteristic bowed down branches make them a striking landscape feature.

## 12. Data sources

### National

- 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)

**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.**

## Supporting document 2: Landscape change

### Recent changes and trends

#### Trees and woodlands

- Woodland is sparsely scattered across this NCA, between 1999 and 2003 an area equivalent to 582 ha (10 per cent of the 1999 resource) was approved for planting under the Woodland Grant Scheme in the form of scattered small blocks in keeping with the character of the area, and a significant single block has been planted north of Frampton on Severn.
- About 28 per cent of the woodland cover is on an ancient woodland site. The proportion of these sites covered by a Woodland Grant Scheme has increased since 1999.
- Traditional orchards have declined and been lost, particularly on the fringes of settlements. This has major landscape and biodiversity implications as this and neighbouring NCAs are the main UK population stronghold for noble chafer.
- The orchard tree age structure is too limited. The older fruit tree population is declining and there are too few middle aged trees to replace them in the future. This is a particularly significant problem in perry pears

#### Boundary features

- Field boundaries have been neglected. Only 2 per cent of boundaries were in environmental stewardship agreements between 1999 and 2003.

- Loss and deterioration of hedges is ongoing. The loss of hedgerow trees and failure to nurture a new generation of hedgerow trees has created some very open areas, though some loss can be attributed to Dutch elm disease. However around 2,649 km of hedgerow are currently managed through environmental stewardship.
- 185 km of ditches and 34 km of stone wall are also currently managed under environmental stewardship agreements.

#### Agriculture

- Loss of dairy herds is causing the fragmentation of holdings, as small farms are broken up and the scale of farming is changing, with a decline of small units.
- There has been an increase in arable land with some increase in cereals and horticulture, and loss of mixed and general cropping.

#### Settlement and development

- Rural areas of the NCA have experienced a higher than national average build rate, with concentrations of development especially along the axes of the major transport route corridors.
- There has been extensive expansion of the urban fringe into the peri-urban zone around Droitwich, Worcester, Tewkesbury, Cirencester, Gloucester and Stonehouse.

## Semi-natural habitat

- In respect of the SSSI within the area, all of the rivers and streams and half of the fen, marsh and swamp are classified as 'unfavourable no change' as a result of increased nutrient input from floodwater, related to agricultural change rather than sewage farms.
- Decline in grassland area has been arrested but not reversed. The break up of traditional landholdings for use as pony paddocks, resulting in fragmentation and inappropriate management, is increasingly a problem. Both overgrazing and undergrazing remains a significant problem, resulting in species losses.

## Historic features

- The area of Countryside Stewardship agreements for managing historic landscapes has been limited. About 38 per cent of the remaining historic parkland is covered by an historic parkland grant, and about 30 per cent is included within an environmental stewardship scheme.

## Coast and rivers

- The biological and chemical river water quality between 1995 and 2000 was predominantly excellent. Under the new water framework directive analysis the majority of rivers in the area are of good or moderate ecological status. Only Marlbank Brook flowing from the Malverns is classified as poor ecological quality.

## Minerals

- There are sand and gravel deposits stretching throughout the Severn and Avon Vales with particularly extensive deposits around the north of Cheltenham. Some of the deposits have been historically worked around Cheltenham, Gloucester and surrounding areas and out as far as Frampton in the south and Twyning in the north. Working now occurs on a very small scale with a few extant permissions scattered around the Severn Vale.

## Drivers, future challenges and opportunities

### Climate change

- Climate change is likely to result in periods of heavy rain that may cause more frequent flood events, increased flooding of settlements and transport infrastructure within the vales.
- Opportunities for managed realignment are already being considered along some of the major rivers.
- A longer growing season potentially leading to double cropping.
- Summer droughts leading to increase in water demand for crop growth and drying out and erosion of peat soils.
- Species migration and loss of small or isolated habitats.
- Likely impact of climate change on orchards, both traditional and commercial bush orchards, needs to be monitored and managed. It is important to retain variability of genetic resource to allow adaptability to changing climate. More information is available at this link.

<http://www.farmingfutures.org.uk/sites/default/files/casestudy/pdf/Fact%20Sheet%2016%20Orchards.pdf>,

## Future opportunities

- Potential for creation of wetland habitats, especially on peat soils, including through managed realignment, where appropriate.
- A requirement for increasing renewable energy generation could result in increased pressure for onshore windfarms; tidal energy creation from the Severn; growth of biomass crops where suitable land has been identified for example, maps show potentially high miscanthus and medium short rotation coppice yields in this area but they are not appropriate for the floodplain due to soil stability and water requirement issues.
- Sites for residential development are being considered around Worcester, Redditch, Gloucester, Cheltenham and Tewkesbury. While industrial expansion continues around Avonmouth, land purchase and holding sites for future development impacts current land use as well as future.
- The current nuclear energy plan names Oldbury in south Gloucestershire as a potential new site, replacing the current reactor with a new adjacent facility potentially impacting a large area of floodplain grazing marsh but may supply opportunities through mitigation and compensation.
- There is likely to be increased pressure for food production in the future as a result of a national drive for greater self-sufficiency in food.
- 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 both the Severn Estuary SAC and River Wye SAC.
- Rising sea levels will put pressure on existing flood defences, this could lead to higher tidal defences being built, or opening up opportunities for more managed realignment and flood storage schemes, which could include creation of wetland habitats.

- The Severn and Avon Vales Wetlands Partnership, Wetlands West, is working to restore large-scale floodplain wetlands along the rivers Avon and Severn, from Worcester on the Severn and Stratford-upon-Avon down to Slimbridge in Gloucestershire providing more opportunities for integrated access and linking green spaces for recreation.
- Partnership working at a landscape scale is ongoing, to deliver benefits for the full range of habitats and species within them through the strengthening of ecological networks and the maintenance and restoration of large areas of habitat.



The old Severn crossing looking across to Aust, a prominent feature of the Severn Vale, now a grade 1 listed building.

## 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.



The Old River Severn, Upper Lode, SSSI is composed of an old cut-off meander of the River Severn.

The following analysis shows the projected impact of Statement of Environmental Opportunity on Ecosystem Service Provision:

Statement of Environmental Opportunity	Ecosystem Service																		
	Food provision	Timber provision	Water availability	Genetic diversity	Biomass energy	Climate regulation	Regulating water quality	Regulating water flow	Regulating soil quality	Regulating soil erosion	Pollination	Pest regulation	Regulating coastal erosion	Sense of place/ inspiration	Sense of History	Tranquillity	Recreation	Biodiversity	Geodiversity
<b>SEO 1:</b> Protect and manage the landscape, heritage and biodiversity associated with the Severn Estuary, the river valleys and other hydrological features, planning for a landscape scale expansion of wetlands, inter-tidal habitats and unimproved grasslands along river floodplains through, restoration, expansion and re-linkage of existing remnant areas of semi-natural habitat.	↘ ***	↔ ***	↗ **	○	○	↗ ***	↗ **	↗ **	↗ **	↗ **	↗ **	○	↗ **	↗ ***	↗ *	↗ *	↗ *	↗ ***	○
<b>SEO 2:</b> Seek to safeguard and enhance this area's distinctive patterns of field boundaries, ancient hedgerows, settlements, orchards, parkland, small woodlands, chases, commons and floodplain management with their strong links to past land use and settlement history, and for the benefits this will bring to soil erosion, soil quality and biodiversity.	○	↔ ***	↔ **	↗ *	↔ ***	↔ ***	↗ ***	↗ **	↗ **	↗ ***	↗ **	○	↔ **	↗ ***	↗ ***	↗ *	↔ *	↗ ***	↔ ***
<b>SEO 3:</b> Reinforce the existing landscape structure as part of any identified growth of urban areas, hard infrastructure and other settlements ensuring quality green infrastructure is incorporated, enhancing health, access, recreation, and landscape, biodiversity and geodiversity.	○	↔ **	↔ **	○	↔ **	↔ **	↔ **	○	↔ **	↔ **	↗ *	○	↔ **	↗ *	↔ **	↔ *	↗ **	↗ **	↔ ***
<b>SEO 4:</b> Protect geological exposures and maintain, restore and expand semi-natural habitats throughout the agricultural landscape, linking them together to create a coherent and resilient habitat network enabling ecosystems to adapt to climate change.	○	↔ **	↗ *	○	↔ *	↗ **	↗ **	↗ **	↗ **	↗ **	↗ ***	↗ *	↔ **	↗ **	↔ **	↗ *	↗ *	↗ ***	↗ **

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.

■ =National Importance; ■ =Regional Importance; ■ =Local Importance



## Landscape attributes

Landscape attribute	Justification for selection
<p>Distinct field boundary patterns with small pasture fields reflecting less favourable soils and open commons, arising from the medieval stock droving industry predominating in the west, while in the east, regular patterns of small to medium, straight-sided, narrow fields, which retain the pattern of medieval strip farming, bounded by hawthorn and mixed species hedges predominate.</p>	<ul style="list-style-type: none"> <li>■ The regular field patterns associated with parliamentary enclosure of medieval strip farming are well preserved in the east of the area.</li> <li>■ Over commons such as Castlemorton, and Hollybed Commons preserve a distinctive and historic open landscape feature arising from medieval holding commons. These are popular visitor destinations for informal recreation and some are important as priority grassland habitats.</li> <li>■ Hedges in the Forest of Feckenham are a national stronghold for brown hairstreak butterflies, a priority species.</li> <li>■ Recent Victorian hedges in floodplains, especially where they have grown up, make a significant barrier to the restoration of breeding wader populations.</li> </ul>
<p>Floodplain and estuary landscape of the rivers Severn and Avon with extensive pasture and ditch and rhine bounded fields, plus historic embanked flood meadow management and flood defence features. Towns and cities defined by riverside locations.</p>	<ul style="list-style-type: none"> <li>■ Important areas of grazing marsh, managed embanked flood meadows, "ham" meadows, pastures and fen. Locally important for breeding waders and botanically rich grasslands, for example, Upham Meadow SSSI at Twynning; Upton Ham SSSI, Upton-on-Severn and Ashleworth Ham SSSI. The lowland meadow resource is nationally important. In recent years further areas of floodplain wetlands have been restored along the Avon, Severn and Chelt.</li> <li>■ Tree lined ditches and rhines with many veteran willow pollards.</li> <li>■ River terrace gravels, fossil bearing and containing vertebrate remains from the Quaternary glaciations. The terraces are also important for determining the relative ages of the Quaternary glaciations in England.</li> <li>■ River terraces contain key archaeological sites, providing a significant record of Neolithic occupation and subsequent settlement history, particularly on terraces of the rivers Avon, Carrant, Isbourne and the Severn south of Worcester.</li> <li>■ Over 750 ha SPA designated wetland; the Severn Estuary SPA and Walmore Common SPA. These are also Ramsar sites. The estuary saltmarshes and upper saltmarshes are of international importance for wintering wildfowl, including Bewick's swan and shelduck.</li> <li>■ Key populations of the very restricted plant species such as ribbon-leaved water-plantain and the restricted true fox-sedge, coral-necklace and pennyroyal.</li> <li>■ Attractive riverside Cities (Gloucester and Worcester) and towns (Tewkesbury, Evesham, Stratford, Upton on Severn), containing many listed buildings and nationally important monuments, for example, Gloucester and Worcester Cathedrals, Tewkesbury Abbey) are defined by their riverside locations and are a key feature in the floodplain landscape.</li> </ul>
<p>Surviving character of the formerly extensive chases and royal forests centred on Malvern, Feckenham and Ombersley containing, unimproved meadows, ancient woodlands and ancient hedgerows.</p>	<ul style="list-style-type: none"> <li>■ A nationally important concentration of unimproved (neutral grassland) meadows, containing a rich diversity of grassland species such as meadow saffron, green winged orchid and wild daffodil. Some of these meadows contain extant ridge and furrow features.</li> <li>■ One of only two remaining recorded sites for the fungus Berkeley's earthstar.</li> <li>■ Ancient species-rich hedgerows, contributing to distinctive landscape character and harbouring the priority butterfly, brown hairstreak.</li> </ul>

Landscape attribute	Justification for selection
<p>Distinctive Cotswold outliers rising up from the surrounding landscape and a distinctive Cotswold scarp on the eastern boundary of the area. More detail on the Cotswold landscape is available in NCA 107.</p>	<ul style="list-style-type: none"> <li>■ Bredon Hill - parts of which are in the Bredon Hill SAC and contain calcareous grassland with a distinctive flora including early gentian, stemless thistle and rock rose; wood pasture with many veteran trees hosting an important deadwood invertebrate fauna, which includes the nationally rare and protected violet click beetle.</li> <li>■ Geological features such as an important exposure of Jurassic rocks of the Lias Group at Robin Wood Hill Quarry SSSI.</li> <li>■ The topography presented by the Cotswold outliers is of geological interest, contributing to understanding of how rocks of differing weathering resistance shape the landscape.</li> <li>■ Bredon Hill SAC and Dixton Wood SAC are designated for their population of the endangered priority species, violet click beetle.</li> <li>■ Distinctive high status buildings built with Cotswold stone.</li> </ul>
<p>A rich historic landscape, including medieval ridged cultivation and fish ponds, Roman settlement, iron-age hill forts and many moated sites. Historic parklands, wood pasture and orchards are features of the area.</p>	<ul style="list-style-type: none"> <li>■ 263 Scheduled Monuments, primarily associated with medieval village earthworks, and 9,799 listed buildings are within the NCA. 1.15 per cent of the area is covered by Registered Parks and Gardens.</li> <li>■ Iron-age hillforts are an important feature on hilltops, for example, Mid-Summer Hill and Bredon Hill where there are extant Roman estate boundaries.</li> <li>■ Many areas of ridge and furrow, centred around nucleated villages and below the Cotswold scarp, including at Weston Subedge, one of England's best surviving patterns of former open fields of a medieval township. Some of the ridge and furrow sites are also important for their botanical interest, for example, Fosters Green Meadows NNR.</li> <li>■ Earthwork remains of medieval settlements and associated field systems, for example, Billesley Trussell, Ullington and Honeybourne parish.</li> <li>■ A large number of moated sites.</li> <li>■ Substantial estates within designed parkland, such as Charlecote Park and Croome Landscape Park. Both are important visitor destinations. Also, many parks derived from medieval deer parks, including Berkeley Castle, Spetchley Park and Elmley Castle (Bredon Hill). Many of these parks, contain numerous ancient trees and accordingly they are a valuable landscape and biodiversity resource, supporting a range of deadwood invertebrates such as the violet click beetle and the red-horned cardinal click beetle, lichen communities and hole nesting birds and bats.</li> <li>■ At Pipershill Common, there is an area of ancient wood pasture containing some of the oldest trees in Worcestershire and is a significant site for fungi.</li> <li>■ Traditional orchards across the area, particularly concentrated in the Vale of Evesham and around Gloucester and Westbury on Severn, are a surviving feature from the area's heyday as a fruit growing centre, dating from the late 17th century. The annual display of blossom, the "blow", is an enigmatic hallmark of this area, which attracts many visitors. The orchards are a priority habitat, for example, Mutlows SSSI and Melrose Farm Orchards SSSI, and host important lichen communities and invertebrate populations, such as a strong population of noble chafer beetle, a priority species which is virtually confined to old orchards.</li> <li>■ Battlefields, historic cities, towns, villages and field patterns, together with numerous scheduled ancient monuments contribute significantly to the sense of place in the NCA.</li> </ul>

Landscape attribute	Justification for selection
Woodlands concentrated in small areas within the NCA.	<ul style="list-style-type: none"> <li>■ Although woodland is an infrequent feature across the NCA, there are important pockets in the north-west to the east of Worcester and west of Pershore, where a series of ancient semi-natural woodlands occur, containing important fauna and flora such as green hound's-tongue, herb-paris, early purple orchid and greater butterfly orchid, for example, Grafton Wood SSSI and Tiddesley Wood SSSI in Worcestershire. Shrawley Wood SSSI in the north of the area is one of the most important small-leaved lime woodlands in England.</li> <li>■ Many woodlands retain medieval boundary features, such as Grafton Wood east of Worcester.</li> </ul>
A distinctly contrasting settlement pattern in the west and east of the NCA, with dispersed villages in the west and strongly nucleated settlement in the east.	<ul style="list-style-type: none"> <li>■ Distinctive timber-framed villages in the south of the NCA.</li> <li>■ Many distinctive buildings, with Cotswold stone used in numerous high status buildings and some larger farms, plus deep-red brick in many other buildings, shaping the character of many settlements.</li> <li>■ There are a very high number of listed buildings in this NCA (9,799).</li> </ul>
Wetlands and river terraces in the southernmost tip of the NCA.	<ul style="list-style-type: none"> <li>■ Gordano Valley NNR at the southernmost tip, wet meadow, reed bed and carr communities have developed over significant peat deposits and clay.</li> </ul>
Inland saltmarsh and a series of pools dispersed across the NCA.	<ul style="list-style-type: none"> <li>■ Exceptionally rare surviving examples of inland saltmarsh occur at Upton Warren Pools SSSI near Droitwich and at Old River Severn, Upper Lode SSSI, Gloucestershire.</li> <li>■ Several standing water bodies are found in the NCA. Many are of wildlife importance and have been designated as SSSIs or Special Wildlife Sites. Most were formed as a result of past industrial activity, for example, sand, clay or gravel extraction (Grimley Brick Pits, Worcestershire, Frampton Pools, Gloucestershire) or brine pumping (Oakley Pool, Upton Warren Pools, Worcestershire) or originated as ornamental lakes (Westwood Great Pool, Pirton Pool, Worcestershire). Some are of botanical importance, supporting a number of nationally scarce plants and one site is the only location in Britain for ribbon-leaved water-plantain, a species listed on Schedule 8 of the Wildlife and Countryside Act.</li> </ul>
Extensive public rights of way network and areas of access land.	<ul style="list-style-type: none"> <li>■ Over 5,000 km of public rights of way, including 11km of the Cotswold Way and 1 km of Offa's Dyke National Trails.</li> <li>■ Over 1,500 ha of access land, mainly on the Malvern Hills and common land beneath the Malvern Hills, for example, Castlemorton and Hollybed Commons, providing valued open access for many visitors.</li> </ul>

## Landscape opportunities

- Protect and appropriately manage the landscape, geodiversity and biodiversity associated with the river floodplains and estuarine environments, maintaining management regimes that will conserve; saltmarsh and freshwater wetlands, flood meadows, "hams", pastures, fen and tree lined ditches needed to conserve internationally important wildfowl populations; the wide variety of species and habitats valued for their flora and fauna; important geodiversity and historic environment features on river terraces; and landscape character.
- Protect and manage the historic and distinctive landscape of the former chases and royal forests around Malvern, Feckenham and Ombersley, maintaining traditional orchards, unimproved grasslands, ancient woodlands and ancient hedgerows valued for their wide variety of rare and scarce species, plus historic environment interest.
- Protect historic environment features across the NCA, including earthwork remains of medieval settlements and field systems so that the nationally important record of medieval township field systems is conserved. Also protect valued historic environment assets including hill forts, moated sites and parklands that contribute to historic and landscape character.
- Protect veteran trees, unimproved calcareous grassland, wood pasture and geological features throughout the NCA, particularly on Cotswold Outlier hills so that nationally important invertebrate populations such as violet click beetle, a valued landscape feature, and valued flora and geodiversity resources are maintained.
- Manage the distinct field boundary patterns across the NCA to maintain the historic record of parliamentary enclosure in the east and the more open patterns with open common land in the west, safeguarding important populations of brown hairstreak butterfly and the valued recreational and biodiversity resource of the open commons.
- Manage peat soils in the Gordano Valley and Walmore Common so that biodiversity value associated with wet meadow, reed bed and carr communities and carbon sequestration potential is fully realised.
- Manage standing water bodies and inland saltmarsh distributed across the NCA, to maintain significant flora, wetland bird populations and historic landscape features.
- 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.
- Plan to extend, through restoration and creation, areas of unimproved grassland, wetland and traditional orchard, so that extensive and connected habitat networks are created in the former royal chase and forest areas and along river floodplains.
- Plan for the creation of a robust habitat network, connecting the ancient woodlands in the north west of the NCA with the nationally important ancient woodland resource centred on the Wyre Forest in the Severn Sandstone Plateau NCA. Do this by restoring existing ancient woodlands and restoring plus creating new blocks of semi-natural habitat, including new woodland, in intervening spaces between ancient woodlands.
- Plan for a continuous resource of mature and veteran trees at wood pasture and parkland sites, particularly on Bredon Hill, so that nationally important invertebrate populations, lichen communities and fungi can be conserved and a valued historic landscape feature can be retained. Provide habitat linkage between the two SAC on Bredon Hill and Dixton Woods (Oxenton Hill).
- Plan to extend areas of flood meadows/grazing marsh to create an extensive ecological network of unimproved grassland and wetland habitat, plus flood storage zones. Do this with due care for the integrity of embankments genuinely associated with historic flood meadow management, characteristic of the river floodplain.

## Ecosystem Service analysis

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

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

Service	Assets/ attributes: main contributors to service	Main beneficiary	State	Analysis	Opportunities	Principal services offered by opportunities
<b>Food provision</b>	Agri environment schemes Naturally fertile soils Water availability Gently undulating landscape	Regional	The Severn and Avon Vales NCA supports a mixture of farming from predominantly grazing in the west, to intensive agriculture and market gardening on the heavy but fertile soils of the Lias clay landscape to the east. Cereal and grass/ uncropped land cover near equal areas at approximately 14,500 ha each, this coverage has remained relatively stable between 2000 and 2009. Numbers of cattle and sheep now stand at approx 18,000 and 12,000 respectively having fallen since 2000 from around 22,000 each. Pig numbers have dropped more significantly from 45,000 to 18,000 post foot and mouth disease. Fruit and vegetables and a further range of mixed arable cropping are also important to the area. The Vale of Evesham is particularly renowned for its fruit and vegetables.	The Severn and Avon Vales have a long history of food production, which relates to the quality of the soils, particularly the fertility of the floodplain, and the relatively flat nature of the landscape providing easy accessibility for cultivation. The mixed farming approach to much of the area is at risk from current farm economics and may result in fewer larger more intensively managed farms. Food production is intrinsic in the culture of the area. The celebration of seasons is particularly strongly associated with the cultural history of orchards.	Work with the local farming community to safeguard future food production while enhancing key ecosystem services such as biodiversity, water quality, water regulation (flooding), soil erosion and quality, pollination services and genetic diversity  Encourage the purchasing of local produce to benefit climate regulation and local culture.	<b>Food provision</b> <b>Biodiversity</b> <b>Regulating water quality</b> <b>Regulating water flow</b> <b>Regulating soil erosion</b> <b>Regulating soil quality</b> <b>Pollination</b> <b>Genetic diversity</b>

Service	Assets/ attributes: main contributors to service	Main beneficiary	State	Analysis	Opportunities	Principal services offered by opportunities
<b>Timber Provision</b>	Areas of existing woodland	Local	Very limited conifer plantation in this NCA. Most of the semi natural woods have been previously managed by coppice or coppice with standards so there are few large old trees.	The opportunity for commercial timber production from conifer plantation is limited within this area and much of the broadleaved woodland is of high nature conservation value.	Opportunities for expansion of woodland including conifer woodland where appropriate, in line with the Combating Climate Change: A role for UK forests report, the Woodland Opportunities Ancient Woodland landscape map (West Midlands) <sup>4</sup> and the South West Regional Woodland and Forestry Framework <sup>5</sup> .	<b>Timber provision</b> <b>Climate regulation</b> <b>Biodiversity</b>
<b>Biomass energy</b>	Coppice woodland Established miscanthus production Short rotation coppice	Local	Tree cover is limited over much of this NCA. Riversides have very little tree presence; however, on higher ground there are ash and oak woodlands and the remains of parklands <sup>6</sup> . Overall, existing woodlands cover (11,148 ha, 4 per cent of the NCA area). The previous history of coppiced woodlands may provide some limited opportunity for biomass production, rather than timber, as part of woodland management.	Currently there is little biomass production in this NCA as most of the productive land area is used for food production. Some initial research has been done on the potential for using wet grassland, from the expanse of floodplain grazing marsh, in biogas production.  There is some potential for the provision of biomass through bringing unmanaged woodland back under small scale coppice management.  There may also be some potential for miscanthus, and short rotation coppice in some areas of the NCA, however its siting would have to be carefully assessed to avoid damage to features and other ecosystem services. For information on the potential landscape impacts of biomass plantings within the NCA, refer to the tables of 'opportunities and optimum sitings for energy crops' on the Natural England website <sup>7</sup> .	Opportunities for short rotation coppice and miscanthus exists in the NCA, however the siting is critical due to the potential water use requirements, chemical inputs and affect on soil structure and erosion. Damage to historic features such as field boundaries, parkland and ridge and furrow should also be avoided.  There is scope to bring areas of woodland back into traditional coppice for small scale wood fuel production and benefits to biodiversity.  The large areas of wet grassland provide opportunities for wet grassland to be harvested to produce biogas <sup>8</sup> , providing an alternative market for outputs from the appropriate management of historic wet meadows benefitting both people and wildlife.	<b>Biomass energy</b> <b>Climate regulation</b> <b>Biodiversity</b> <b>Water availability</b> <b>Regulating water flow</b>

<sup>4</sup> Woodland Opportunities Ancient Woodland landscape map - <http://www.forestry.gov.uk/website/forestry.nsf/byunique/inf-d-6n4gzu>

<sup>5</sup> South West Regional Forestry Framework <http://www.forestry.gov.uk/website/forestry.nsf/byunique/inf-d>

<sup>6</sup> Natural England website (accessed October 2010), <http://www.naturalengland.org.uk/ourwork/farming/funding/ecs/sitings/areas/106.aspx>

<sup>7</sup> <http://www.naturalengland.org.uk/ourwork/farming/funding/ecs/default.aspx>

<sup>8</sup> Wetlands West Annual Report 2009/10, Appendix C.

Service	Assets/ attributes: main contributors to service	Main beneficiary	State	Analysis	Opportunities	Principal services offered by opportunities
<b>Water availability</b>	<p>Abstraction</p> <p>Wetland habitat reducing peak flow events across landscape</p> <p>This NCA receives a high volume of fresh water from the Severn's extensive catchment including Welsh uplands</p>	Regional	<p>This NCA is characterised by two of the major rivers of lowland England, the Avon and the Severn. The Severn's main tributary is the Teme and there are many streams running through the lowland east of the Malvern Hills in the north-west of the NCA. The River Severn provides public water supplies to six million people. This includes water exported to south Staffordshire and to Bristol via the Gloucester and Sharpness Canal. Water is also abstracted from the River Severn to meet the demands of agriculture, industry and navigation<sup>9</sup>. The Avon is joined by watercourses such as the River Isbourne rising at the foot of the Cotswolds and by meandering streams draining from the north. The River Avon joins the Severn at Tewksbury.</p> <p>The majority of the NCA does not overlay a major aquifer, however there are some groundwater sources in the area. The Avon confined aquifer located approximately between Stratford upon Avon, Bromsgrove, and Evesham has no or very limited recharge, that is, no surface water can reach the water-bearing rocks, as they are overlain by impervious rocks. A pocket of the Cotswolds aquifer protrudes slightly into the area. There are no major reservoirs in this NCA.</p>	<p>There is 'no water available' for abstraction along the length of the River Severn and its tributaries, including the River Teme<sup>10</sup>, or the River Avon<sup>11</sup> within this NCA. Tributaries of the River Avon, Bow Brooke, which runs south from Feckenham and joins the Avon near Pershore, is over abstracted, and the River Isbourne, running north from Winchcombe to Evesham, is over licensed<sup>12</sup>.</p> <p>Groundwater resources in the Avon confined aquifer are over licensed<sup>13</sup>. A pocket of the Cotswold aquifer at Bredon Hill (south-west of Evesham) has 'water available' but its status has been overridden to 'no water available' in order to maintain ecological flow levels in the River Severn and Severn Estuary<sup>14</sup>.</p> <p>Low flow levels, due to over abstraction, are detrimental to the biodiversity of the rivers and the Severn Estuary, particularly during times of low rainfall. Measures to reduce abstraction by retaining more water on the land through water storage reservoirs and semi natural wetland habitat and better soil quality (increased permeability) can potentially alleviate dips in river flow.</p>	<p>Maintain ecological flow levels in water courses by managing abstraction so as to avoid over abstraction resulting in low flow levels.</p> <p>Well designed winter water storage reservoirs on farms could help alleviate the levels of abstraction for water used on farmland.</p> <p>Slow the flow of water across the landscape to maintain more constant river levels through ponds, scrapes and more naturalised drainage. Hedgerows across steeper slopes, for example, the Teme catchment will also help to slow the flow of water from the land.</p> <p>Support measures to maintain and improve soil structure to increase permeability and water retention by the soil.</p>	<p><b>Water availability</b></p> <p><b>Food provision</b></p> <p><b>Biomass energy</b></p> <p><b>Regulating water flow</b></p> <p><b>Regulating water quality</b></p> <p><b>Regulating soil erosion</b></p> <p><b>Regulating soil quality</b></p> <p><b>Recreation</b></p>

<sup>9, 10</sup> Environment Agency, Severn Corridor Catchment Abstraction Management Strategy, 2003.

<sup>11, 12, 13, 14</sup> Environment Agency, Warwickshire Avon Catchment Abstraction Management Strategy, June 2006.

Service	Assets/ attributes: main contributors to service	Main beneficiary	State	Analysis	Opportunities	Principal services offered by opportunities
<b>Genetic diversity</b>	Orchard fruit varieties	National	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.	Genetic diversity of orchard fruit varieties is important to maintain in order to safeguard food provision and afford increased resilience to climate change and disease.	<p>Maintain county orchard variety collections such as the perry pear collection at Hartpury.</p> <p>Raise awareness of local varieties and link owners with suppliers.</p> <p>Encourage regeneration and planting of local varieties.</p>	<p><b>Genetic diversity</b></p> <p><b>Climate regulation</b></p> <p><b>Pollination</b></p> <p><b>Biodiversity</b></p> <p><b>Sense of place/ inspiration</b></p> <p><b>Sense of history</b></p>



Service	Assets/ attributes: main contributors to service	Main beneficiary	State	Analysis	Opportunities	Principal services offered by opportunities
<b>Climate regulation</b>	<p>Carbon-rich soils, particularly peat soils at Gordano and Walmore</p> <p>Soil carbon and stable microbial community under permanent pasture</p> <p>Extensive hedgerows networks and orchards</p> <p>Tidal saltmarsh</p>	Regional	<p>The majority of this NCA has a low soil carbon content of 0-5 per cent<sup>35</sup> although the soils of the floodplain grazing marsh, wetland, and woodland habitats, with their carbon-rich soils, will provide important carbon stores, as will the significant peat deposits in the Gordano Valley, by Avonmouth, and the buried peat at Walmore Common.</p> <p>The concentration of permanent pasture contributes through soil carbon storage which would otherwise be released by aerobic microbial activity on exposure of the soil to air through activity such as ploughing.</p> <p>Although this NCA is not highly wooded, ancient hedgerows and the trees of woodland, parkland and orchards also contribute to carbon storage.</p>	<p>The potential for soil carbon sequestration in this NCA is low as there is no active peat deposition, however the peat deposits at Walmore Common and Gordano Valley are important carbon stores, as are other permanently saturated wetland soils, due to limited aerobic microbial activity. Peat deposition could potentially be reactivated by altering the management of water at Walmore or Gordano, however this would affect the features that the two sites are currently notified and managed for.</p> <p>Tidal saltmarsh is one of the most effective habitats for sequestering carbon with very limited methane release<sup>36</sup>. The upper reaches of the Severn estuary has shown a net trend of accretion over the past 100 years providing potential for the expansion of saltmarsh.</p> <p>Wetlands will also slow the flow of water into rivers reducing flood impacts during increase extreme weather events.</p> <p>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. However, grazing of permanent pasture by cattle, in this dairying area, can result in release of methane by the animals themselves.</p> <p>Although the area is not heavily wooded, both ancient hedgerows and traditional orchards add to the overall carbon storage capacity of this NCA.</p> <p>The rapid loss of traditional orchards that has been seen over the last few decades will have reduced the carbon storage capacity of this landscape.</p> <p>Production of inorganic fertilizer is particularly energy intensive and large volumes of greenhouse gases emitted during production. Soil testing enables the calculation of optimal fertilise application rates, so reducing excess use of fertiliser, saving energy, money and benefiting water quality.</p>	<p>Increase sequestration of carbon dioxide through expansion and creation of areas of favourably managed wetland habitat.</p> <p>Maintain carbon storage particularly on peat soils and buried peat deposits, for example, at Gordano Valley and Walmore Common.</p> <p>Support estuarine management resulting in the maintenance and accretion of tidal saltmarsh with its high carbon sequestration rates and low methane emissions.</p> <p>Prevent release of carbon dioxide by maintaining permanent pasture and ensuring it is managed within a sustainable regime.</p> <p>Some opportunity for carbon storage through small-scale woodland expansion on appropriate sites and increasing the number of hedgerow trees where these have declined.</p> <p>Maintaining traditional orchards and wood pasture and parkland, stores carbon both through the trees themselves and the permanent grassland beneath.</p> <p>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.</p>	<p><b>Climate regulation</b></p> <p><b>Regulating water flow</b></p> <p><b>Water availability</b></p> <p><b>Regulating water quality</b></p> <p><b>Biodiversity</b></p>

<sup>35</sup> Environment Agency, NSRI National Soils Map for England and Wales, January 2009.

<sup>36</sup> Global carbon sequestration in tidal, saline wetland soils, Chmura et al., 2003, Global Biogeochemical Cycles, Vol. 17

Service	Assets/ attributes: main contributors to service	Main beneficiary	State	Analysis	Opportunities	Principal services offered by opportunities
<b>Regulating soil erosion</b>	<p>Hedgerows and buffer strips across steeper slopes</p> <p>Permanent grassland</p> <p>Sustainable systems of arable cultivation</p> <p>Well managed livestock systems</p>	Regional	Soil erosion is recognised as a concern in some parts of the river corridors in this NCA <sup>37</sup> . The north-west corner of the NCA west of Worcester is part of Defra's River Teme Priority Catchment. Soil erosion is a particular problem due to the steep sided nature of the river valley.	<p>Particularly on the steep slopes of the Teme catchment, soil erosion from intensively managed grassland, which can include the overwintering of livestock and associated poaching of soils, and from cultivated fields is an issue<sup>38</sup>, here. Permanent grassland and reduced poaching will reduce soil exposure and vulnerability to run off.</p> <p>Woodlands, dense hedgerows and buffer strips across slopes and alongside water courses can reduce the velocity of water as it flows across farmland, potentially reducing soil erosion and safeguarding soil quality.</p>	<p>Work with landowners to produce sustainable systems of arable cultivation and well managed livestock to reduce poaching and soil exposure, particularly on the steeper slopes in the north-west of this NCA, using measures such as expanding areas of permanent grassland, woodland, dense hedgerows and buffer strips across steeper slopes.</p> <p>Furthermore maintain and create areas of semi-natural habitat and permanent grasslands to minimise soil compaction to improve water retention and reduce soil run-off across the NCA</p>	<p><b>Regulating soil erosion</b></p> <p><b>Regulating water flow</b></p> <p><b>Regulating water quality</b></p> <p><b>Biodiversity</b></p>

<sup>37</sup> Interim Integrated Objectives, NCA 106: Severn and Avon Vales, 2010.

<sup>38</sup> Natural England, Capital Grant Scheme – Funding Priority Statement 2010/11, Catchment 28: River Teme, date unknown.

Service	Assets/ attributes: main contributors to service	Main beneficiary	State	Analysis	Opportunities	Principal services offered by opportunities
<b>Regulating soil quality</b>	<p>Unimproved pastures</p> <p>Appropriate tillage</p> <p>Appropriate stocking levels</p>	Regional	<p>There are 8 main soilscape types in this NCA:</p> <ul style="list-style-type: none"> <li>■ Slightly acid loamy and clayey soils with impeded drainage, covering 29 per cent of the NCA.</li> <li>■ Lime-rich loamy and clayey soils with impeded drainage (25 per cent).</li> <li>■ Slowly permeable seasonally wet slightly acid but base-rich loamy and clayey soils (16 per cent).</li> <li>■ Freely draining slightly acid loamy soils (9 per cent).</li> <li>■ Loamy and clayey floodplain soils with naturally high groundwater (7 per cent).</li> <li>■ Loamy and clayey soils of coastal flats with naturally high groundwater (6 per cent).</li> <li>■ Freely draining lime-rich loamy soils (5 per cent).</li> <li>■ Freely draining floodplain soils (1 per cent).</li> </ul>	<p>The slightly acid loamy and clayey soils with impeded drainage are easily poached by livestock and compacted by machinery when the soil is wet. Weak topsoil structures can easily be damaged. Careful timing of activities is required to reduce the likelihood of soil compaction.</p> <p>The lime-rich loamy and clayey soils with impeded drainage are calcareous soils with some natural resilience and enhanced workability. Soils are at risk from topsoil compaction and poaching. Careful management of weak topsoils, for example, through minimal tillage and the addition of organic matter, will help to maintain a good soil structure.</p> <p>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. Permanent grassland should be retained on these soils, with appropriate stocking levels to minimise damage to them. Such soils are found on Castlemorton, Hollybed and Combe Green Commons. These areas owe their character to the underlying periglacial gravels, which would be lost if the commons were ploughed.</p>	<p>Support measures which employ minimal tillage and organic matter incorporation to increase soil organic matter and also relieve soil compaction on a landscape scale.</p> <p>Work with the farming community to achieve appropriate stocking regimes which avoid poaching and reduce erosion.</p> <p>Support measures which increase the volume of organic matter within the soil to improve soil structure and conditions for soil fauna, increasing water infiltration.</p> <p>Protect the thin poor soils on Castlemorton, Hollybed and Combe Green Commons by retaining as unploughed permanent grassland to protect the association of the soil with the underlying periglacial gravels.</p>	<p><b>Regulating soil quality</b></p> <p><b>Regulating water quality</b></p> <p><b>Biodiversity</b></p>

Service	Assets/ attributes: main contributors to service	Main beneficiary	State	Analysis	Opportunities	Principal services offered by opportunities
<b>Regulating water quality</b>	<p>Hedgerows and buffer strips across steeper slopes</p> <p>Watercourse fencing</p> <p>Permanent grassland</p> <p>Appropriate tillage</p> <p>Good livestock management</p> <p>Buffer strips alongside water courses</p> <p>Diffuse and point source pollution prevention</p> <p>Sustainable urban drainage</p> <p>Naturalised rivers</p>	Regional	<p>The majority of surface water in this NCA is of moderate or poor ecological quality. The Severn and Avon rivers are considered 'heavily modified' and have 'moderate' ecological quality as has the Severn Estuary. The chemical status of the River Severn varies along its length from 'good', for example, south of Worcester, to 'failing to achieve good' status, for example, south of Tewkesbury. The River Avon is 'failing to achieve good' chemical status' except between Stratford upon Avon and Evesham where it has 'good' status. The chemical status of groundwater resources in the NCA is 'good'<sup>19</sup>.</p>	<p>The north-west corner of the NCA, west of Worcester is part of Defra's River Teme Priority Catchment. Priorities in this catchment are; to reduce the impact of grazing and over-wintering livestock on water quality; minimise the impact to watercourses of point source pollution risk within farmyards; and to reduce soil and nutrient run-off from intensive grassland and cultivated fields<sup>20</sup>.</p> <p>Large stands of Himalayan balsam, an invasive non-native plant species, can cause erosion of the banks as they shade out other species, reducing the proportion of plants with stabilising roots, and then die back in the winter leaving the soil of the bank exposed.</p>	<p>Maintain ecological flow levels in water courses by managing abstraction, as described above, to avoid over abstraction resulting in low flow levels.</p> <p>Expand the network of semi-natural wetland habitats adjacent to watercourses including; floodplain grazing marsh, fen and reedbeds, plus creation of grassland buffer strips, restoration of hedgerows across slopes within river catchments, particularly the River Teme Priority Catchment to reduce the amount of soil entering the rivers through runoff.</p> <p>Work with farmers particularly in the River Teme Priority Catchment, to reduce point source emanating from farmyards.</p> <p>Control of invasive non-native species particularly along the riverbank to reduce soil exposure and erosion of the bank.</p>	<p><b>Regulating water quality</b></p> <p><b>Regulating soil erosion</b></p> <p><b>Biodiversity</b></p> <p><b>Climate regulation</b></p>

<sup>19</sup> Environment Agency, Severn River Basin Management Plan, Annex A: Current state of waters, December 2009.

<sup>20</sup> Natural England, Capital Grant Scheme – Funding Priority Statement 2010/11, Catchment 28: River Teme, date unknown.

Service	Assets/ attributes: main contributors to service	Main beneficiary	State	Analysis	Opportunities	Principal services offered by opportunities
<b>Regulating water flow</b>	<p>Extensive areas of wetland habitats</p> <p>Renaturalisation of river courses</p> <p>Measures to reprofile defined reaches of water courses</p> <p>Sustainable urban drainage programmes</p>	Regional/national	<p>The landscape of much of this NCA is a low-lying, undulating plain through which the rivers Severn and Avon and their many tributaries flow. The coastal floodplain around the Severn Estuary is extremely flat and largely below sea level. Floodplain soils are frequently saturated and so rainfall is slow to drain away, which leads to some localised surface water flooding in addition to fluvial flooding<sup>21</sup>. Much of the land adjacent to the rivers still floods regularly in winter.</p> <p>The fluvial flood risk in this NCA is focused in Cheltenham, Gloucester and Tewkesbury<sup>22</sup> as demonstrated by the devastating flooding of Tewksbury, Gloucester and Cheltenham in July 2007 when the Severn and Avon burst their banks along much of their length within the NCA following prolonged rainfall over much of the Severn catchment. Tewksbury is particularly vulnerable<sup>23</sup>, being at the confluence of the rivers Severn and Avon and of several tributaries. Construction of earth embankments in the lower reaches of the Severn between Worcester and Gloucester provides protection to properties and agricultural land from more frequent flood events but, as demonstrated by the floods of 2007, are overtopped in major flood events. Just under 500 homes are at risk of fluvial flooding in Worcester and in Tewksbury<sup>24</sup>. There are almost 3,000 residential properties at risk of fluvial flooding in Gloucester and Quedgeley, while Stratford-upon-Avon is equally vulnerable to flooding. Within the flood plain of the Severn estuary, there is a relatively low level of fluvial flood risk, but tide-locking is a significant source of flooding - for example around Berkeley<sup>25</sup>.</p>	<p>Due to the large size of the Severn catchment and the fact that it crosses the Welsh border, flood management requires the issues to be tackled on both sides across an area far greater than just this NCA. The catchment management plan proposes ways to increase the regulation of river flooding, as well as increase biodiversity and water availability, through the expansion, restoration and siting of semi natural habitats, which have a higher water storage potential than more intensively managed land and therefore regulate water flow across the landscape. Wetland expansion and re-establishing hedgerows and woodland across the floodplain potentially reduces overland flood flow, While buffer strips across steep slopes regulate run off and associated soil erosion.</p> <p>Surface water management plans have the potential to regulate the contribution from surface water runoff and surface water flooding through soft landscaping and soft road edges, which reduce water flowing straight into drains. Such landscaping can also create multi-functional quality green spaces, and integrated wetland habitats resilient to flooding, for access and recreation close to where people live on the floodplain.</p>	<p>Seek to restore semi-natural habitats, particularly wetland habitats including floodplain grazing marsh, fen, reedbeds and wet woodland to regulate water flow across the landscape.</p> <p>Look to return rivers to their natural courses where they have been straightened or hard engineered. Allow or reinstate natural meanders, and re-profile, where appropriate, to slow flows.</p> <p>Seek opportunities to incorporate grass buffer strips and restore hedgerows across slopes within river catchments, particularly the River Teme Priority Catchment.</p> <p>Improve soil quality to increase water retention and reduce runoff.</p> <p>Work with the Environment Agency, water companies, local authorities, highways and developers to create more sustainable urban drainage and surface water management strategies to reduce the volume of water running directly into drains and therefore into watercourses.</p>	<p><b>Regulating water flow</b></p> <p><b>Regulating water quality</b></p> <p><b>Biodiversity</b></p> <p><b>Regulating soil erosion</b></p> <p><b>Regulating soil quality</b></p>

<sup>21</sup>, <sup>25</sup> Environment Agency, Severn Tidal Tributaries Catchment Flood Management Plan, Summary Report, December 2009.

<sup>22</sup> Environment Agency, Severn River Basin Management Plan, Annex A: Current state of waters, December 2009.

<sup>23</sup> Natural England, Flood Map, 2010.

<sup>24</sup> Environment Agency, River Severn Catchment Flood Management Plan, Summary Report, December 2009.

Service	Assets/ attributes: main contributors to service	Main beneficiary	State	Analysis	Opportunities	Principal services offered by opportunities
<b>Regulating coastal flooding and erosion</b>	Estuarine habitat, for example, saltmarsh	Regional	<p>Although the Severn Estuary is largely under erosional pressure due to rising sea levels and reclamation of intertidal habitat, the upper areas of the estuary, in which this NCA lies, show a clear trend of net accretion (gradual depositing of sediments) over the past 100 years<sup>26</sup>.</p> <p>The Severn estuary has the second largest tidal range in the world, at 10-12 m<sup>27</sup>, and is tidal as far upstream as Gloucester<sup>28</sup>. In Avonmouth and surrounds there are approximately 1,043 properties at risk from all sources of flooding, including fluvial, tidal and coastal. Most of the flooding here results from tide-locking<sup>29</sup>. Further information on fluvial flooding and tidal-locking in the NCA is provided under "Regulating water flow" above.</p>	<p>The upper areas of the estuary show a clear trend of net accretion. Accordingly reclamation of intertidal habitat should be minimised so as to maintain the accretion trend and encourage expansion of saltmarsh which has high carbon sequestration potential.</p> <p>Erosion will result in loss of grazing pasture and saltmarsh, reducing rates of carbon fixation and provision of habitat for wading birds across an internationally important area. In extreme cases it may cause instability of infrastructure.</p> <p>Coastal squeeze (the fixing of the shoreline by hard structure preventing the natural estuarine cycles of habitat creation and erosion) is a problem along the Severn Estuary due to flood embankments. The shoreline management plan identifies many areas for managed realignment in the medium term<sup>30</sup>.</p>	Establish a programme of managed realignment in appropriate areas to create habitats such as saltmarsh and floodplain grazing marsh, providing natural regulation of flooding, important wading bird habitat, and carbon storage and sequestration.	<p><b>Regulating coastal flooding and erosion</b></p> <p><b>Regulating water flow</b></p> <p><b>Biodiversity</b></p>

<sup>26, 27</sup> Severn Estuary Coastal Group, Severn Estuary Shoreline Management Plan Review (SMP2), Appendix C, September 2010.

<sup>28, 29</sup> Environment Agency, Severn Tidal Tributaries Catchment Flood Management Plan, Summary Report, December 2009.

<sup>30</sup> Severn Estuary Coastal Group, Severn Estuary Shoreline Management Plan Review – Appendix1, Part A, September 2010

Service	Assets/ attributes: main contributors to service	Main beneficiary	State	Analysis	Opportunities	Principal services offered by opportunities
<b>Pollination</b>	<p>Species-rich grassland (lowland meadow)</p> <p>High density of agri-environment schemes</p> <p>Well dispersed networks of traditional orchards and hedgerows</p> <p>Flower-rich road verges</p>	National	<p>Pollination services are particularly important in this NCA due to the pollination requirements of commercial orchards and horticulture.</p> <p>Grassland and meadows, including 900 ha of priority habitat, provide nectar sources for pollinating insects in this NCA.</p> <p>Hedgerows and traditional orchards also provide additional resource both during the blossom and in the ground flora, if managed appropriately.</p>	<p>This area contains approximately 10 per cent of the remaining national lowland meadow, flower-rich meadows which provide important nectar-rich areas in this mixed farming and horticultural landscape. Lowland meadow within this NCA continues to be lost due to changes in land management, for example, intensification, or changes in land use practices such as the breaking up of traditional farm units for use as pony paddocks, which may be over or under grazed. Loss of lowland meadow would reduce the provision of large expanses of nectar rich flowers which maintain pollinator populations which also pollinate food crops.</p> <p>Traditional orchards, while benefitting from pollinators themselves, also provide nectar-rich blossom which helps to maintain pollinator densities in areas where commercial orchards also benefit.</p> <p>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.</p> <p>Late flowering nectar sources are important, in an NCA such as this where heathland and therefore heather is limited as a late nectar source, species such as ivy are particularly important.</p>	<p>Increase the area of semi-natural habitats, with particular emphasis on unimproved flower-rich grasslands (lowland meadow), floodplain grazing marsh and traditional orchard. In addition, encourage the use of nectar and forage mixes in arable land, and species-rich hedgerows, to increase the availability of nectar sources in close proximity to food crops requiring pollination.</p> <p>Work with, local authorities and 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.</p>	<p><b>Pollination</b></p> <p><b>Food provision</b></p> <p><b>Biodiversity</b></p> <p><b>Sense of place/ inspiration</b></p>
<b>Pest regulation</b>	<p>Existing semi natural habitat</p> <p>Agricultural field margins</p> <p>Species-rich hedgerows</p> <p>Woodland</p> <p>Mixed farming</p>	Regional	<p>There are large areas of semi natural habitat, which will support species that will aid pest regulation.</p>	<p>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.</p>	<p>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.</p> <p>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.</p>	<p><b>Pest regulation</b></p> <p><b>Pollination</b></p> <p><b>Biodiversity</b></p> <p><b>Food production</b></p>

Service	Assets/ attributes: main contributors to service	Main beneficiary	State	Analysis	Opportunities	Principal services offered by opportunities
<b>Sense of place/ inspiration</b>	Traditional Orchards Horticulture Mixed farming	Regional	<p>Sense of place is provided by the rivers Severn and Avon and their floodplains, with significant remnant areas of unimproved meadow and neutral grassland and gravel terraces that support fruit growing, reinforced with the survival of older orchards that characterise the lower slopes of the Malvern Hills and Vale sides, supporting the production of Worcestershire and Gloucestershire traditional orchard cider and apple juice. The Vale of Evesham and its association with horticulture including soft fruits is also an essential part of the character of the area<sup>31</sup>.</p> <p>Ancient woodlands and the remains of parks are distinctive features of higher ground, as are fragments of calcareous grassland, while prominent views of hills such as the Cotswolds, Bredon and the Malverns occur at the edges of the character area. Further sense of place is provided by the ancient market towns and villages along the rivers, such Worcester, Stratford with its strong associations with Shakespeare, Tewkesbury and Gloucester, plus their characteristic black and white timber frame and red brick buildings and elegant spired churches. Also, the spa town of Cheltenham with its Regency architecture and horseracing festival.</p>	<p>Traditional orchards and rich ancient hedgerows with hedgerow trees maintain a wooded feel within a sparsely wooded landscape. Annual shows of blossom are inspiring and strongly connected to the traditions and culture of the area but are at risk from loss due to commercialised fruit production which used bush orchards and a lack of market for produce.</p> <p>The differences in field and settlement pattern between the east and west sides of the NCA provide different feelings of rural tranquillity in the west and a more linked feel to the hustle and bustle of major towns and cities in the east. Local development plans may impact on tranquillity if housing allocation is not sited appropriately.</p> <p>Wetlands, the rivers and the estuary, which are particularly important for overwintering birds, provide easy access to view s of flocks of birds which can inspire a feeling of connectivity with nature.</p>	<p>Maintain the dispersed settlement pattern in the west and the strongly nucleated pattern in the east, with a local vernacular of red brick, timber framing and Cotswold stone.</p> <p>Also maintain the historic division of field patterns; small fields with open commons in the west and a regular pattern of straight sided parliamentary enclosure in the east.</p> <p>Maintain and restore the distinctive traditional orchards and work to find markets for produce to ensure their future viability and sustainability.</p> <p>Maintain and restore the traditional orchards, parklands and hedgerow trees that provide a wooded feel, and unimproved grasslands along river valleys on Cotswold outlier hills and in former royal chases and forests.</p> <p>Maintain the long distance views from Cotswold outlier hills and Malvern Hills and protect traditional orchards throughout the area.</p> <p>Maintain the setting of villages together with the integrity of their vernacular styling.</p> <p>Maintain and restore mixed farming associated with the landscape and provides variability of habitat found across this area.</p>	<p><b>Sense of place/ inspiration</b></p> <p><b>Sense of history</b></p> <p><b>Biodiversity</b></p>

<sup>31</sup> Countryside Agency, Exploration of the relationship between locality foods and landscape character, Report Annexe, August 2006.



Service	Assets/ attributes: main contributors to service	Main beneficiary	State	Analysis	Opportunities	Principal services offered by opportunities
<b>Sense of history</b>	<p>Prehistoric remains</p> <p>Fossil beds</p> <p>Historic parkland and estates</p> <p>Birthplace of William Shakespeare</p> <p>Historic towns</p>	International	<p>A sense of history is provided by prehistoric remains that include standing stones and hill forts, such as at Bredon Hill, areas of ridge and furrow and old sea walls, as well as by the substantial designed parklands and estates such as Croome, Westbury, Overbury and Hindlip. The historic market towns add to this, with the major Roman centre at Gloucester, the industrial centres at Worcester and Droitwich, the medieval origin of Stratford and Regency Cheltenham. The sense industrial history is conveyed through the ports, pills and canals and their associated mills and buildings.</p> <p>The associations of Stratford with Shakespeare mean that the history of this part of England is known around the world. Berkeley Castle, lived in by the same family for over 900 years, has been involved in some key events in British history and once played host to Queen Elizabeth I. Worcester also has important cultural associations, including with the composer Elgar and the poet Housman. Inspiration is also likely to be found on the more prominent outlier hills, notably Bredon Hill with its Roman and iron-age associations and more recent cultural association with the author Fred Archer's books documenting an earlier agricultural way of life which all convey a further sense of history.</p>	<p>The area contains a wealth of visible built and natural historic and prehistoric features including some which are internationally renowned such as those associated with Shakespeare.</p>	<p>Increase protection of above and below ground archaeology, medieval township field systems, ridge and furrow, designed parkland, standing stones, hill forts and sea walls.</p> <p>Provide interpretation to purvey the importance of historic land use in shaping the current landscape.</p> <p>Recreational opportunities such as circular walks and themed local events linked to the positive management and conservation of historic features to aid understanding, enjoyment and a sense of well-being.</p>	<p><b>Sense of history</b></p> <p><b>Biodiversity</b></p> <p><b>Geodiversity</b></p> <p><b>Sense of place/ inspiration</b></p> <p><b>Recreation</b></p>

Service	Assets/ attributes: main contributors to service	Main beneficiary	State	Analysis	Opportunities	Principal services offered by opportunities
<b>Tranquillity</b>	Riverside walks Cotswold outliers Rural western areas Ancient woodlands and parklands	Regional	The NCA has 38 per cent of its area classified as undisturbed, a drop from 72 per cent in the 1960s. The main remaining undisturbed areas are found within the Vale of Berkeley in the south and adjacent to the Cotswolds in the north east, and away from the major towns and transport networks, notably the M5. Feelings of tranquillity are likely to be associated with the remoter wetland habitats and ancient woodlands and parklands, as well as the outlier hills such as Bredon Hill.	In spite of the cities, large market towns and large scale infrastructure particularly on the eastern side of the NCA, many quieter, often rural areas exist across the NCA, particularly in the west.  Visual intrusion is limited due to the low lying flat nature of the landscape, and the effects of significant infrastructure projects are localised or affect the views from the higher ground of neighbouring NCAs.	Maintain the relative tranquillity of undisturbed areas in the Vale of Berkeley, adjacent to the Cotswolds, on Cotswold outlier hills, in ancient woodlands, remoter wetland habitats and parklands.  Limit the visual impacts of large infrastructure through careful design and planning.	<b>Tranquillity</b> <b>Sense of place/ inspiration</b>

Service	Assets/ attributes: main contributors to service	Main beneficiary	State	Analysis	Opportunities	Principal services offered by opportunities
<b>Recreation</b>	Rights of way Open access land Historical features and associations Waterways	National/ International	<p>Recreation is supported by over 5,000 km of rights of way at a density of 2.41 km per km<sup>2</sup>, including 11 km of the Cotswold Way and 1 km of the Offa's Dyke National Trails, plus under 2,000 ha of open access land covering around 0.8 per cent of the NCA. Stratford-upon-Avon, its historic buildings associated with Shakespeare and world renowned theatre is a major tourist destination.</p> <p>The medieval cathedral cities and towns, Regency Cheltenham, its spa, racing and music festivals and the natural attraction at Slimbridge Wildfowl and Wetland Trust site, are all major national and international visitor destinations as are areas adjacent to the NCA such as the Cotswolds, Malverns and the Forest of Dean.</p> <p>The waterways offer a range of recreational opportunities from boating to coarse fisheries, river walks and wetland nature reserves.</p>	<p>This area is accessible by both road and rail to large urban areas of Birmingham and the Black Country to the north and Bristol to the south, as well as the towns, cities and villages within the area. Recreation reconnects or maintains people connection with the landscape and ecosystems that support them and encourages a valuing of their surroundings.</p> <p>Opportunities for access throughout the area through access to the countryside and urban green spaces, is also valuable for health and wellbeing, particularly mental health and provision is currently available through a network of green spaces and linear rights of way network, along the Severn and Shakespeare's Avon Ways, to areas of access land associated with the Malvern Hills. Worcestershire, Gloucestershire and Warwickshire Rights of Way Improvement Plans provide potential measures to improve upon the current provision.</p>	<p>Maintain the current access network and improve through implementation of the Worcestershire, Gloucestershire and Warwickshire Rights of Way Improvement Plans.</p> <p>Increase understanding and enjoyment through education and interpretation materials.</p> <p>Maintain and improve the quality of opportunities for access throughout the area through a network of green spaces and linear rights of way network, along the Severn and Shakespeare's Avon Ways, to areas of access land associated with the Malvern Hills, to nature reserves and as proposed in the Rights of Way Improvement Plans.</p> <p>Ensure access balances recreational enjoyment with the protection of biodiversity, geodiversity and historic features.</p>	<p><b>Recreation</b></p> <p><b>Sense of place/ inspiration</b></p> <p><b>Sense of history</b></p>

Service	Assets/ attributes: main contributors to service	Main beneficiary	State	Analysis	Opportunities	Principal services offered by opportunities
<b>Biodiversity</b>	Wide range of priority habitats	International	<p>A total of 9 per cent of the NCA area is covered by priority habitats, the vast majority of which is coastal and floodplain grazing marsh. Other priority habitats include a large proportion of England's lowland meadow and, traditional orchard habitat, in addition to wet woodland, lowland mixed deciduous woodland and wood pasture and parkland.</p> <p>There are nine internationally designated sites in the NCA; two SPAs, five SAC and two Ramsar sites, totalling just 0.6 per cent of the NCA area. This includes the Severn Estuary SPA/SAC/Ramsar site. There are 103 SSSI in the NCA, totalling 1 per cent of the NCA area.</p>	<p>The NCA contains important areas of lowland meadow priority habitat supporting rare species such as the fungus Berkley's earthstar, and traditional orchards which together with neighbouring NCAs in the counties of Herefordshire, Worcestershire and Gloucestershire support England's main population concentration of noble chafer beetle among other important species</p> <p>Rivers and their floodplains also support large assemblages of wetland birds, which are popular attractions and some very rare plants such as true fox sedge and ribbon-leaved water plantain.</p> <p>Bredon Hill SAC and Dixton Wood SAC support internationally important populations of violet click beetle and an assemblage of saproxylic invertebrates, which require a constant supply of dead wood, often standing dead wood and rot holes in veteran trees.</p>	<p>Significantly increase areas of floodplain grazing marsh, fen, reedbed, lowland meadow, traditional orchard and calcareous grassland habitats, 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.</p> <p>Improve connectivity of traditional orchards and ancient woodland using associated woody habitats such as hedgerows and woodpasture and parkland</p> <p>Work with horse owners to improve management on horse grazed permanent pasture to increase biodiversity and restore degraded lowland meadow priority habitat.</p> <p>Use local work on opportunity mapping / priority areas available for Herefordshire, Gloucestershire, Worcestershire and Warwickshire, to inform landscape scale projects and local development plans/ decisions.</p> <p>Control invasive non-native species to prevent or reduce damage to native species populations and habitats.</p>	<p><b>Biodiversity</b></p> <p><b>Climate regulation</b></p> <p><b>Pollination</b></p> <p><b>Sense of place/ inspiration</b></p> <p><b>Tranquillity</b></p> <p><b>Recreation</b></p>

Service	Assets/ attributes: main contributors to service	Main beneficiary	State	Analysis	Opportunities	Principal services offered by opportunities
<b>Geodiversity</b>	River gravel terraces Fossil beds Cotswold outliers Local stone for building	National	<p>14 geological SSSI. 42 local geological sites.</p> <p>Inland salt deposits at Droitwich, result in rare inland salt marsh.</p> <p>Staircases of fossil-bearing river terrace gravels, formed in response to changes in global climate and sea levels, flank the edges of the Severn and Avon and are significant for interpreting environmental change during the Pleistocene.</p> <p>Along the lower reaches of the Severn, the youngest of the Triassic rocks (Rhaetic) crop out to produce a series of cliffs, for example Hock, Aust and Sedbury Cliffs, producing further fossil exposures.</p>	<p>The geological SSSIs provide important access to geodiversity, enabling the interpretation, understanding and continued research into the geodiversity of the NCA. Exposure of these features also makes a positive contribution towards sense of place and sense of history. Accessible fossil exposures are particularly good for instilling a sense of history in young children.</p>	<p>Maintain views of geological features and exposures and where appropriate, improve access to cuttings, quarries and other exposures of geological features to enable improving understanding and enjoyment of geodiversity and sense of history.</p> <p>Carry out a public awareness programme to encourage an appreciation and understanding of the importance of geodiversity and its influence on shaping the landscape and biodiversity.</p>	<p><b>Geodiversity</b></p> <p><b>Sense of place/ inspiration</b></p> <p><b>Sense of history</b></p> <p><b>Biodiversity</b></p>

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