



Introduction

As part of Natural England's responsibilities as set out in the Natural Environment White Paper¹, Biodiversity 2020² and the European Landscape Convention³, 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.

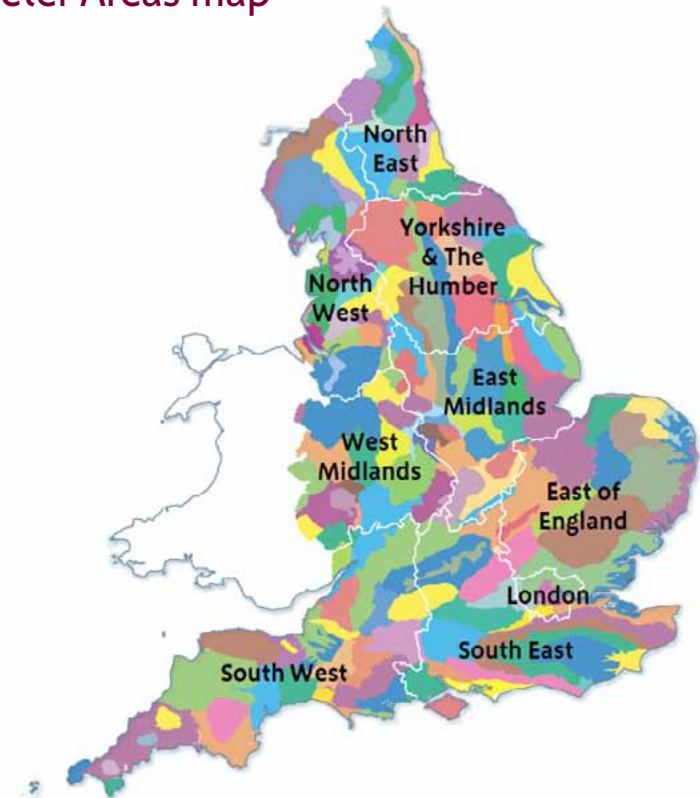
NCA profiles are guidance documents which can help communities to inform their decision-making about the places that they live in and care for. The information they contain will support the planning of conservation initiatives at a landscape scale, inform the delivery of Nature Improvement Areas and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

National Character Areas map



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

² Biodiversity 2020: A Strategy for England's Wildlife and Ecosystem Services, Defra (2011; URL: www.defra.gov.uk/publications/files/pb13583-biodiversity-strategy-2020-111111.pdf)

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

Summary

The Bristol, Avon Valleys and Ridges National Character Area (NCA) encompasses the City of Bristol with its historic port, and the surrounding area including the Chew and Yeo valleys, Keynsham, Clevedon, Portishead and parts of the Cotswolds and Mendip Hills Areas of Outstanding Natural Beauty (AONB). The area is characterised by alternating ridges and broad valleys, with some steep, wooded slopes and open rolling farmland. It is flanked by the Somerset Levels and Moors and the Mendip Hills to the south, the Cotswolds to the east and the Severn and Avon vales to the west, which largely separates it from the Severn Estuary except for a small stretch of coastline between Clevedon and Portishead. It has a complex geology, being rich in geomorphological features such as the dramatic Avon Gorge, and there are many designated exposures and rich fossil beds. The varied settlement pattern has been influenced by the geology and geomorphology and the expansion of the City of Bristol at its centre. The M5 motorway runs up the western edge and the M4 skirts across the north of Bristol, with Bristol Airport to the south. Although the urban area covering this NCA is significant at over 21 per cent, much of the surrounding rural landscape is farmed.

The area is rich in history, from the evidence of Neolithic activity in the long barrows, through the Roman port at Sea Mills, to the more recent industrial history of mines and mills and the wealth of the port at Bristol. The Chew Valley Lake, which supplies water to Bristol, is designated a Special Protection Area for its internationally important numbers of shoveler ducks and nationally important numbers of gadwall, tufted duck and teal. The Mendip Hills AONB extends into the NCA to include the Chew Valley and Blagdon lakes. Species-rich grasslands and ancient woodlands are a feature of the area, with

the ancient woodland and limestone grassland habitats of the Avon Gorge supporting many rare and unique species, including the Bristol whitebeam. The cultural ecosystem services in this NCA provide a strong sense of history. Biodiversity and geodiversity are nationally and internationally important. Food provision, especially dairy farming, is particularly prominent around the Yeo Valley, and water availability, water quality and regulation of water flow are all important ecosystem services in this NCA. Pressure from development and population expansion within this significantly urban area is a serious challenge, particularly in retaining the character of rural villages and avoiding widespread suburbanisation and increased traffic.

Click map to enlarge; click again to reduce.

Statements of Environmental Opportunities:

SEO 1: Conserve and manage the distinction between small rural settlements and the densely urban City of Bristol, the urban fringe transitional zone and the commuter settlements; and ensure that new development is sensitively designed to contribute to settlement character, reduce the impact of the urban fringe and provide well-designed green infrastructure to enhance recreation, biodiversity and water flow regulation.

SEO 2: Protect and manage the strong sense of history and many historical assets ranging from prehistoric barrows to the mining legacy, as well as the Avon Gorge and the many varied geological exposures within this geologically significant landscape, to enable recreation and access, education, tourism and continued enjoyment of the heritage of the area.

SEO 3: Conserve and sustainably manage the gentle clay vales and limestone ridges and downs of the rural agricultural landscape and enhance the network of semi-natural habitats, linking them together to create a coherent and resilient ecological network, enabling ecosystems to adapt both to climate change and for the benefits to landscape, biodiversity, water flow, water quality, soil quality, soil erosion, rural heritage and culture.

SEO 4: Protect and manage the landscape, heritage and biodiversity associated with the Avon River corridor, other river valleys and lakes, planning for a landscape-scale enhancement of wetlands, wet woodland and semi-natural grasslands along river flood plains for the benefits to biodiversity, climate regulation, water quality and flooding mitigation.



View to the north from Chewton Edge showing undulating vale landscape. Livestock farming predominates in this NCA.

Description

Physical and functional links to other National Character Areas

The western and north-western edge overlooks the flat Lower Severn Levels of the Severn and Avon Vales NCA, with further views across the estuary to the Forest of Dean and Wales. To the south, the Mendip Hills NCA rises from the Chew Valley. Outstanding viewpoints of Bristol and the surrounding area are gained from Brandon Hill and Cabot Tower. To the east and the south, the Cotswold scarp and Mendip Hills rise in an abrupt boundary, while at the south-eastern corner of the NCA the southern end of the Cotswolds and eastern end of the Mendips merge into an area of 'confused undulations'.

The River Avon cuts a steep-sided valley through the area from the east, having passed through the Severn and Avon Vales NCA and Cotswolds NCA. It is joined by the Chew near Keynsham, which rises on the Mendips' edge, and the Frome, which flows from the Cotswold edge at the north-east of the area to form the 2.5 km spectacular Avon Gorge in the centre of Bristol. Other streams and rivers in the south-east flow eastwards to join the Avon outside the NCA, and the Yeo on the south-western edge flows out across the North Somerset Levels and Moors directly to the sea. The River Severn connects this NCA with others that border the estuary through fluvial and tidal processes up and down the estuary.

The area is well connected to neighbouring NCAs and beyond by the rail network and the M4 and M5 motorways that cross the area, intersecting at the northern edge of Bristol, which provide fast connections north, south, east and west.



Rockface at Avon Gorge showing strata of the Carboniferous Limestone.

Distinct areas

- City of Bristol

Key characteristics

- Low-lying, shallow vales that contrast sharply with high, open downland ridges as the varied landform reflects the complex underlying geology, comprised of Carboniferous limestones with sandstones, silts and conglomerates, together with muds, clays and alluvium. Coal Measures are also present.
- The River Avon cuts a steep-sided valley through the area from the east, forming the 2.5 km long, c.100 m high gorge at Bristol. It is joined by the Frome at the centre of Bristol and the Chew near Keynsham. Other streams and rivers in the south-east flow eastwards to join the Avon outside the NCA, and the Yeo on the south-western edge flows directly to the sea.
- Water supply for Bristol and the surrounding area provided by Chew Valley Lake, Blagdon Lake, and the smaller Chew Magna Reservoir and the reservoirs at Barrow Gurney. These reservoirs also impound river flow, while releasing a set minimum flow downstream at all times.
- A wide range of soil types, from brown earths on Limestone outcrops to poorly draining gleys on clays, which reflects the underlying influence of the complex geology.
- The most extensive areas of woodland lie between Congresbury and the Avon Gorge and on the Failand Ridge. These are internationally significant, containing rare endemic whitebeam species. Elsewhere, woodlands are smaller and fragmented and mainly confined to steeper land; the majority are broadleaf.
- Agriculture is predominantly livestock rearing, with arable in the flatter land to the north-east, with larger field sizes and infrequent hedgerow trees. Valleys and steeper slopes in the south-east tend to have irregular fields and overgrown, species-rich hedges.
- A diverse landscape important for greater and lesser horseshoe bats. Grasslands of high nature conservation interest remain on the wetter valley bottoms and dry downland slopes. Chew Valley Lake Special Protection Area (SPA) and Blagdon Lake Site of Special Scientific Interest (SSSI) support large numbers of wildfowl, plants and invertebrates, and are surrounded by species-rich lowland meadow.
- A long, historic timeline, with important fossil features visible in geological exposures, Neolithic long barrows and stone circles, iron-age hill forts and historic associations with Bristol's port and parkland creating important landscape features.
- Settlements dating from the medieval period, clustered around springheads of the Cotswold scarp or along the springline of the Mendips. In the vales they are scattered, linked by a complex network of lanes, with linear mining villages superimposed. Settlement becomes especially dense in the south-east, with many villages enlarged as commuter settlements.
- Older village buildings, gentry houses and mansions of local ashlar, which includes pale yellow Jurassic oolitic limestones and grey Carboniferous and Lias limestones. Red or brown sandstone is used in the north, and Pennant Sandstone at Nailsea 'Flats' in the south-west.
- Bristol and its commercial, industrial and residential areas; major roads (M4 and M5 motorways); the airfields (Filton and Bristol); and reservoirs, which occupy a substantial area around Bristol. There is considerable commercial development around Cribbs Causeway, Aztec West and Abbey Wood.
- The City of Bristol itself, which is a popular destination for overseas and domestic visitors and is one of the most affluent cities in the UK, providing employment for settlements in the NCA and beyond.

Bristol, Avon Valleys and Ridges today

Characterised by alternating ridges and broad valleys, with some steep, wooded slopes and open rolling farmland, the large urban expanse of the City of Bristol, with its dramatic limestone gorge of the River Avon, dominates the central and western part. The area is strongly defined by the NCAs that border it, with the scarps of the Cotswolds and Mendips in neighbouring NCAs to the east and south, and provides part of the landscape setting for the Cotswolds and Mendip Hills Areas of Outstanding Natural Beauty (AONB). To the west, the area overlooks the flat Lower Severn and North Somerset Levels and, beyond that, the Severn Estuary and Wales. Occasional high points break through creating landmarks, for example Dundry Hill to the south of Bristol, at 233 m in height with 360° views and, within the City of Bristol itself, Brandon Hill, topped by Cabot Tower, which provides a platform for a panoramic view of the city and beyond to the hills in the distance.

The varied landforms and settlement patterns of the NCA are strongly influenced by its diverse geology and complex geological history. The area has also made a considerable contribution to the history of the development of geology as a science through the studies of William Smith, the 'Father of English Geology'.

Rivers such as the Chew and Avon have carved gorges in the older, more resistant rocks, while those such as the Frome have formed wide, shallow valleys in the softer, younger ones. The rivers have been heavily modified in urban areas. The limestone-derived soils are predominantly brown rankers and argillic brown earths. On the clays, poorly draining gleys are common, whereas the Coal Measure soils are more acidic. This variability in soil type is a result of the complex underlying geology and is reflected in the range of habitats that have developed and the opportunities for human land use.



Wilmott's whitebeam, one of the endemic species of the Avon Gorge.

The higher ground and steep scarps of the limestone ridge along the western edge extend from the Yeo Valley towards Thornbury; sandstone outcrops are present in places. The dramatic Avon Gorge cuts through the ridge at Bristol, spanned by the historic Clifton Suspension Bridge, rising about 100 m from the tidal River Avon to Observatory Hill on the eastern side and Stokeleigh Camp to the west. The gorge has natural cliffs and quarry exposures of Carboniferous Limestone, which are of great geological interest, and, together with the screes, scrub, pockets of grassland and adjacent woodland, it supports an exceptional number of nationally rare and scarce plant species. Further south the ridge forms the distinctive landscape of

the Failand Hills. Ashton Court, the grandest of the parklands, makes good use of the limestone landform and provides a wide range of recreation opportunities for the surrounding population. To the west, the ridge falls – often steeply – to the levels. Along the scarp, woodland predominates; above the scarp there is open country, where large fields and low, rectilinear hedges lie around scattered farmsteads and houses, with mixed woodland blocks and patches of arable.

Concentrations of ancient woodland are found at Leigh Woods on the gorge's western side, to the north-east of Congresbury along the Failand Ridge (for example Lime Breach Wood near Cadbury Camp) and at Lower Woods SSSI near Wickwar. Elsewhere, the woodlands are much smaller and fragmentary, often on the steeper land, with their great variety reflecting the overall complex geology. In the former mining areas, they are augmented by planting on reclaimed colliery tips. Parkland such as at Tyntesfield and Ashton Court form characteristic features south and west of Bristol, where the woodlands and mature and exotic trees bring a distinctive local character.

The ridge contrasts with the gentle clay vale of the Frome north of the Avon; here the landscape is more open, particularly on the lower ground, giving way to an intricate field pattern mixed with woodland on the surrounding higher land. There are few hedgerow trees, and pylons are conspicuous. The settlement pattern is indistinct; there are some large villages, but many houses are scattered along the sparse network of roads and there are isolated farmsteads. At the northern edge of the area there is another, more undulating, type of landscape, as the land rises to the Cotswolds. To the east, the land is more rolling, and views of the Cotswold scarp begin to dominate. New settlements are particularly noticeable since there is little woodland.

South of Bristol, the land falls to the Yeo and Chew valleys, where Chew and Blagdon lakes, within the Mendip Hills AONB, are prominent features near the foot

of the Mendip scarp. These lakes also provide a valuable source of drinking water and are designated as Drinking Water Protected Areas under the Water Framework Directive (WFD). Both lakes and the surrounding land are also of conservation value and provide recreational fishing, windsurfing and sailing. Chew Valley Lake is an SPA due to its internationally important population of shoveler ducks and nationally important numbers of gadwall, tufted duck and teal. The surrounding species-rich lowland meadow adds to the nature conservation value of the area. Long barrows, iron-age hill forts and the Wansdyke (a linear defensive earthwork) provide evidence of how long this area has been settled.

Merging with the eastern part of the Mendip Hills is a rolling landscape of hill-top pastures, deep river valleys, many stone villages and hamlets, and farmsteads linked by narrow, hedged lanes. There are often contrasts in the textures of the grassland, with rough grassland on the steeper slopes and lush pastures in the valley bottoms. The gentler slopes are more open; the hedges are lower and there is more arable. Threading through this south-eastern landscape are the remains of the mining industry characterised by occasional spoil heaps, straggling settlements and small irregular fields including smallholdings. Midsomer Norton, Radstock and Paulton form large settlements that were once strongly associated with mining but are now commuter towns for Bath and Bristol.

At the heart of the NCA is the City of Bristol – the oldest parts and those with the most distinctive townscapes being the old city centre, the docks and Clifton, with its downs. The conurbation spreads down the river to the industrial complex of Avonmouth in the adjacent Severn and Avon Valleys NCA. To the south-west, a boundary is formed by the Avon Gorge, and the river continues through the city. To the south and east, housing extends to Dundry Hill and is broken by fragments of farmland. Bristol Airport dominates the hill top along from Dundry. In the north and north-east, development is dispersed across a

wide area and the motorways are prominent. Modern residential development, extending as far as Yate, is broken by open farmland. The strongest landscape structure is represented by formal landscapes such as Stoke Park and Oldbury along the lower Frome Valley and by modern commercial landscapes such as Aztec West and Cribbs Causeway. With its mix of urban and rural landscape, the provision of green infrastructure and quality green space is highly valued by the City of Bristol and surrounding unitary authorities in order to retain its attractiveness for inward investment. The NCA has a high level of accessible green space per head of population.⁴

A short coastal stretch of the NCA occurs between Clevedon and Portishead, where limestone cliffs descend to the Severn Estuary. The Victorian seaside resort of Clevedon hosts the only structurally intact Grade I-listed pier in the UK, opened in 1869 to enable passengers to board steamers to south Wales. The town is well connected to the heart of Bristol by public transport and the National Cycle Network.

Although there is much uniform 20th-century housing across the area, many of the older village and town buildings in grey Carboniferous or Lias limestones or Jurassic oolites survive. There is much variation in the building stone used;⁵ for example, sandstone is prevalent in the north, while white, rather bleak Lias limestone is common in the south-east within the Midsomer Norton–Radstock area. Around Nailsea, stone boundary walls of Pennant Sandstone known as Nailsea „flats are found; where this stone is used in buildings it tends to be rendered. With a wide choice of attractive materials, including Bath Stone and Cotswold Stone, many of the mansions, gentry houses and churches are fine buildings in mellow tones, but there are also unspoilt village and town streets such as the centre of Chipping Sodbury. The principal roads radiate from the old centre of Bristol. Much modern settlement is close to these corridors or to the M4 and M5 motorways.



Blagdon Church tower with Blagdon Lake beyond. Blagdon and Chew Valley lakes are important for both their conservation value and for water supply.

Bristol is one of the most affluent cities in the UK and has a strong manufacturing and service sector, providing employment for the settlements in the NCA and beyond. It is a popular destination for overseas and domestic visitors, as it is easy to reach by road, rail and air and is close to Bath, another popular tourist destination.

⁴ Accessible Natural Greenspace Standard data, published by Natural England

⁵ Strategic Stone Study: A Building Stone Atlas of Avon, English Heritage (2011; URL: www.bgs.ac.uk/mineralsuk/mines/stones/EH_atlases.html)

The Landscape through time

The varied topography of this NCA is related both to the nature of the underlying rocks and to the amount of erosion to which they have been subjected. In general, the harder Palaeozoic rocks form areas of moderately high relief (such as Broadfield Down near Bristol Airport) that exceed 125 m above sea level. The solid geology consists mainly of Upper Palaeozoic (Devonian Sandstone and Carboniferous Limestone) and Mesozoic (Triassic–Middle Jurassic) rocks. The extreme north of this NCA also features important Silurian rocks with igneous intrusions. The Carboniferous Limestone has been quarried in the area since prehistoric times, ranging from small extractions to large, modern quarries such as at Wickwar, Tytherington and Chipping Sodbury.

Repeated geological periods of inundation and drying have resulted in sedimentation forming fossil-rich strata from a number of geological periods. The Coal Measures were formerly extensively mined but the last pit closed in 1973 and exposures today are usually confined to small scrapes on disused, landscaped tips. Writhlington SSSI is a notable exception, and fossil Coal Measure plants and insects can still be collected from the shales. The area around Keynsham is famous for its 'Blue Lias' fossils.

During the early Jurassic, parts of the area remained as islands, and Lower Lias deposits occurred here. The youngest Jurassic sediments exposed in the area are approximately 190 to 175 million years old and out-crop on Dundry Hill. Here Middle–Upper Lias siltstones and limestones are capped by pale oolitic limestones. These marine sediments are well known for their abundant and well-preserved ammonite and brachiopod fossils.

The high ground in the west and south of the area was settled at an early date. There is good evidence of Neolithic activity, for example the long barrows and stone circle at Stanton Drew. The ridges continued to be of importance through the Iron Age not least as the sites of hill forts, of which Cadbury Hill is the best known. The lower-lying clay vales had attracted settlement too, but it is likely that the heavier ground, for instance along the Frome Valley, was not cleared until later.

By Roman times, many parts of the area had been settled for a long time and the importance of the Avon was evident from the port at Sea Mills. Villas lay either side of the Avon Valley and on the fertile soils north of the Mendip Hills. After the Romans left, significant 'dark-age' settlements were present on the eastern edge. The Saxon takeover occurred in the 6th century and the impressive earthworks of the Wansdyke, cutting across the ridges south of Bristol, date from this era.

By the later Saxon period, important centres existed at Pucklechurch, Chew and elsewhere, and the town of Bristol was already established by the time of the Norman Conquest.

The area was dominated by the port of Bristol, which expanded rapidly into England's second largest city from the 12th century, exporting corn and especially wool and cloth, and importing wine and wool from western France. As a result, lesser towns like Thornbury and Chipping Sodbury also prospered. The area's settlement, as developed by the 11th century and later centuries, displayed a great variation, from villages surrounded by open fields to medieval farmsteads and hamlets with early enclosed fields in the clay vales, all interspersed with patches of common and woodland. There was, however, extensive open downland on the western limestone area, and a large royal forest lay around Kingswood, up to 500 km² at its peak (Kingswood Chase was carved out of the forest in the early 13th century).

Following the 14th century and, in particular, the rapid population decline that followed the disaster of the Black Death, open fields began to be enclosed; however, many remained in use in the north of the area, and much of the open downland was unenclosed until the 19th century. Grazed calcareous grasslands have largely been ploughed up or improved in the last 50 years; those that remain are generally restricted to very shallow soils or the steep hillsides that are less accessible to farm machinery.

A coal industry was present in the Middle Ages, and it developed on a large scale from the mid-18th century. Small pits were dispersed across the countryside, often fuelling local industries such as the brass foundry at Keynsham and the smelting works at Wormley. The Somerset Coalfield was significant enough to justify the construction of the Somerset Coal Canal. William Smith was one of the surveyors on the canal and some of the mines, and it was here that he developed his theory of stratigraphy. The pits were active well into the last century, but there was rapid decline following nationalisation and the last pit closed in 1973. Today, most of the obvious evidence has disappeared and the tips have been largely reclaimed.

During the medieval period, Bristol had become important enough as a port to sponsor John Cabot's 1497 expedition of discovery to America in the *Matthew*, founding Newfoundland. In the post-medieval period, Bristol expanded to become Britain's second port based on its trade in sugar cane, tobacco, rum, cocoa and slaves; indeed, Bristol's trade in slaves exported to the colonies brought great wealth to the city. Exported goods such as tobacco were processed in warehouses and factories, visible alongside the docks today. In the 18th and 19th centuries the city continued to prosper and expand on the basis of its trade, engineering and other industries. The wealth that it generated is evident in the legacy of wealthy merchants' houses that remains today,



Leigh Woods ancient woodland SSSI along the Avon Gorge.

including the area around King Street, Queen Square, St Michael's Hill and Clifton village. The 19th century witnessed renewed efforts to deepen the Avon and remodel and extend the city docks. Isambard Kingdom Brunel helped to attract further investment into the area. Brunel did more than anyone to shape the character of modern Bristol; his legacy includes Clifton Suspension Bridge, the SS Great Britain and Temple Meads station. Despite this, the city lost the transatlantic trade to Liverpool and other ports, Avonmouth taking its place as a major port from the early 20th century.

The legacy of Bristol's wealth is also evident in the parks and mansions that surround the city, such as Dyrham Park, Dodington House, Tyntesfield, Blaise Castle and Ashton Court. These parklands are nationally important for their diversity and range of architectural styles and planting. The parklands now provide biodiversity interest in addition to significant areas of comparative tranquillity and recreation.

In the 20th century, Bristol expanded even more rapidly to include the Avonmouth port and oil refining complex (within the Severn and Avon Vales NCA). Issues of water supply to the expanding city led to the creation in the 1950s of Chew Valley Lake, by flooding farmland, to supplement the by-then insufficient Blagdon Lake, which had been created in the 1890s. These lakes are now of significant conservation interest for wildfowl, invertebrates and plants and are surrounded by important neutral grasslands that support a range of rare plant species, such as the green-winged orchid.

The M4 and M5 motorways through the area were constructed between 1962 and 1977. The airport at Lulsgate Bottom became Bristol International Airport in 1997 (now named Bristol Airport). Residential, commercial and light industrial areas, such as Cribbs Causeway and Aztec West, have extended into the surrounding countryside, and major new roads have been developed. Expansion, notably at Emersons Green, Bradley Stoke and Cribbs Causeway, has resulted in areas of farmland being lost, and the landscape character of these areas has altered significantly. The growth has affected the whole NCA, and many of the outlying settlements such as Yate developed both as their own employment centres and as dormitories of Bristol. The growth of settlement has probably been the main influence on the rural landscape. The decline and greening over of the coal industry, the construction of major reservoirs and the loss of substantial tree cover as a result of Dutch elm disease have also been significant.



The Clifton Suspension Bridge rising above the Avon Gorge, designed by Isambard Kingdom Brunel but constructed after his death.

Future development within Bristol and South Gloucestershire is focused near existing services. Bristol City Council is not planning any urban extension, but South Gloucestershire Council is proposing significant development on the northern (the majority of which is housing) and eastern (mostly employment) fringes of Bristol, together with expansion at Yate and Thornbury, largely to accommodate new housing. Bath and North East Somerset Council is focusing on development in urban areas and brownfield at Keynsham and the larger settlements in the Somer Valley within this NCA, while North Somerset Council is concentrating its urban development outside this NCA. The planned expansion of Bristol Airport may significantly impact on the tranquillity and traffic of this NCA and the adjacent Mendip Hills NCA.



View from Dundry Hill showing the contrast between the rural landscape and the urban expanse of the City of Bristol.

Ecosystem Services

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

Provisioning services (food, fibre and water supply)

- **Food provision:** The Bristol, Avon Valleys and Ridges NCA supports a wide range of farming. Figures from 2009 show that 46,251 ha are covered by commercial farming, which is dominated by livestock farming. Yeo Valley foods (a national dairy producer) is based in the fertile soils north of the Mendip Hills.
- **Water availability:** The main rivers in this NCA are the Avon, the Frome, the Chew and the Congresbury Yeo. There are also two major reservoirs that supply water within this NCA: Blagdon Lake; and Chew Valley Lake. These reservoirs are fed by springs, rivers and streams that emerge from the Mendip Hills. Blagdon and Chew Valley lakes are eutrophic due to high levels of nutrients in the water, and both lakes are designated as Drinking Water Protected Areas. The area surrounding each lake is designated a nitrate vulnerable zone (NVZ) under the Nitrates Directive. There are no major aquifers within the NCA itself. Most of the area is classed as having 'no water available' for additional abstraction. The reservoirs supply 1.1 million people and businesses in the Bristol area.



Field scabious nectar cafe. The species-rich grasslands and verges of the NCA are important resources for pollinators.

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

- **Regulating soil erosion:** The majority of the soils in this NCA are subject to erosion where management results in a loss of stabilising vegetation, as the soil types are easily damaged. Current contributions to the regulation of soil erosion are low. The North Somerset Moors catchment priority funding statement supports measures being taken to minimise soil wash entering watercourses, prevent pathways for run-off and protect receiver watercourses. Such measures could beneficially be applied across the NCA and neighbouring NCAs.
- **Regulating water quality:** Part of the NCA falls within the North Somerset Moors priority catchment. The Congresbury Yeo has problems relating to sedimentation, phosphates, nitrogen enrichment and low dissolved oxygen, which have resulted from downwash off the steep slopes of the Mendip Hills and Broadfield Down. The upper Congresbury Yeo catchment is included within an NVZ. Stretches of the River Avon have failed to achieve good chemical quality, and the lower part of the catchment suffers from Water Framework Directive (WFD) ecological failures (primarily fish failures). Equally, parts of the Frome within this NCA are classified as having bad ecological status, on account of fish failures and the presence of phosphates in some waterbodies. This contrasts with tributaries in the upper reaches of the NCA boundary, which are at 'good' ecological status.
- **Regulating water flow:** While there is little or no risk of flooding across most of the NCA largely due to the flood defence works that have been put in place, there are some areas where flood risk is higher, including parts of the River Avon, the Chew Valley and the coastal settlements such as Portishead and Clevedon.



Cotswold Way National Trail at Little Sodbury Fort.

Cultural services (inspiration, education and wellbeing)

- **Recreation:** Recreation is supported by the area's outstanding range of parks, the Forest of Avon Community Forest, the Mendip Hills AONB Partnership, the River Avon Trail, the Bristol and Bath Railway Path, The Monarch's Way, 1.9 km of the Cotswold Way National Trail and a large number of other long-distance trails and National Cycle Network routes.

Overall there is a 2,200 km network of rights of way at a density of 2.56 km per km² and around 1,000 ha of open access land covering 1.12 per cent of the NCA, which is particularly important in this highly populated area. The geology provides opportunities for caving and climbing.

- **Sense of history:** The area retains a strong sense of its maritime past and contains a wide range of visible history across both the rural and the urban landscape, from Neolithic barrows and iron-age hill forts, to the Roman influences such as the port of Sea Mills and its architectural and parkland heritage, to the more recent industry and activity associated with mining, mills and the port at Bristol.
- **Biodiversity:** Some 5 per cent of the NCA is covered by UK Biodiversity Action Plan (BAP) priority habitats (4,300 ha): 3,600 ha of this is BAP priority woodland (lowland mixed deciduous and wet woodland), with 900 ha of reedbeds and 600 ha each of lowland meadows and coastal and flood plain grazing marsh. Some 2,000 ha (2 per cent) of the NCA is designated as SSSI; there are two SPAs, three Special Areas of Conservation, one Ramsar site and two National Nature Reserves – Gordano Valley (in part) and Leigh Woods. The majority of SSSI in the area are currently in favourable or recovering condition. The Avon Gorge SAC supports
- **Geodiversity:** There are 27 SSSI in this NCA that are designated for their features of geological interest. These reflect the geological importance of this area. Many of these sites consist of quarries and cuttings, but there are also natural features such as the Avon Gorge and coastal exposures. Geological SSSI that contain significant fossil assemblages are a feature of the NCA.



View from Blagdon across the farmland to Bristol Airport in the distance.

Statements of Environmental Opportunity

SEO 1: Conserve and manage the distinction between small rural settlements and the densely urban City of Bristol, the urban fringe transitional zone and the commuter settlements; and ensure that new development is sensitively designed to contribute to settlement character, reduce the impact of the urban fringe and provide well-designed green infrastructure to enhance recreation, biodiversity and water flow regulation.

For example by:

- Working with local planning authorities to regulate and mitigate the impact of residential and commercial development pressure, which is particularly prevalent along the M5 corridor and around the Bristol conurbation. This will safeguard the countryside, greenbelt and Areas of Outstanding Natural Beauty (AONB).
- Enhancing the many recreational opportunities offered, through active management and provision of quality infrastructure such as the development of multi-user paths, clear signposting and better interpretation, to improve understanding, appreciation and enjoyment of the natural, historic and built environment, while planning for increasing recreational pressure due to population expansion.
- Protecting the strong character of the old City of Bristol, its port and its historic associations.
- Working with landowners and local planning authorities to manage increasing urban fringe pressures on agricultural land, including the difficulties of managing urban fringe farms.
- Encouraging local planning authorities and developers to incorporate landscape design into urban extensions from the start of the process, to include biodiversity, green infrastructure and access enhancements together with well-planned transport routes, including public transport, to reduce the impact of traffic.
- Improving the links between settlements, particularly the City of Bristol and the surrounding countryside, to improve access to the countryside, utilising the rights of way network, river corridors and sustainable transport networks.
- Promoting sustainable drainage in development to increase permeable surfacing, to reduce run-off and increase water filtration in urban areas. This will slow the water entering the system.
- Protecting and maintaining the surface water environment through sustainable use of water resources by ensuring that low water consumption devices are included in all developments.
- Maintaining characteristic settlement patterns of the ridges and vales and encouraging sensitive development or alterations in villages, using vernacular materials to maintain their local and rural character.
- Managing the continued quarrying of local stone, ensuring that it is sensitive to the needs of geological interests, biodiversity and landscape.

SEO 2: Protect and manage the strong sense of history and many historical assets ranging from prehistoric barrows to the mining legacy, as well as the Avon Gorge and the many varied geological exposures within this geologically significant landscape, to enable recreation and access, education, tourism and continued enjoyment of the heritage of the area.

For example by:

- Protecting evidence of Neolithic, bronze-age and iron-age activity in the landscape – for example, Neolithic long barrows and the stone circle at Stanton Drew, bronze- and iron-age barrows and features such as Cadbury hill fort – through appropriate land management, such as permanent grassland to protect below-ground features.
- Promoting the importance of the port at Sea Mills during the Roman period and protecting the evidence of villas either side of the Avon Valley and on the fertile soils north of the Mendip Hills, with interpretation for educational and recreational uses.
- Protecting the remaining earthworks of the Saxon Wansdyke.
- Protecting medieval field patterns and ridge and furrow through permanent grassland.
- Conserving and enhancing, for the enjoyment of all, the area's diverse range of architecture, including its traditional buildings and farmsteads, and Bristol's historic port and its suburbs, houses and buildings constructed from the wealth that it generated, evident in parks and mansions such as Dyrham Park, Tyntesfield, Doddington House, Blaise Castle and Ashton Court.
- Conserving and providing interpretation for the area's rich and complex industrial history, particularly features associated with the coal and copper industries, rural mills and early port and industrial buildings; and the legacy of Brunel through the architecture of Temple Meads station and the Clifton Suspension Bridge.
- Conserving and managing the area's important range of historic parklands, many of which are designated as Registered Historic Parks and Gardens. This will ensure a high-quality experience for all visitors and the retention of the important contribution of the parklands to landscape character, including through the establishment of new generations of trees, appropriate management of ancient and veteran trees and retention of deadwood fauna and flora.
- Conserving and protecting the area's many ancient and veteran trees through the use of Tree Preservation Orders to ensure that they are properly considered in planning decision-making; and promoting best practice to ensure a succession of veteran trees in woodland and the wider landscape.
- Conserving and protecting the geological features representative of the complex geology of the area through working with landowners and land managers to manage these features appropriately, and by providing good-quality access and interpretation to improve the understanding of the significance of the geology of this area, as well as to provide recreation opportunities.
- Ensuring that interpretation of Bristol's historic port, city and industrial legacy brings out their role in the development of landscape over time and continues to provide inspiration through the sense of place that the area provides.

SEO 3: Conserve and sustainably manage the gentle clay vales and limestone ridges and downs of the rural agricultural landscape and enhance the network of semi-natural habitats, linking them together to create a coherent and resilient ecological network, enabling ecosystems to adapt both to climate change and for the benefits to landscape, biodiversity, water flow, water quality, soil quality, soil erosion, rural heritage and culture.

For example by:

- Protecting and managing existing species-rich lowland meadow, lowland calcareous and flood plain grassland UK Biodiversity Action Plan (BAP) priority habitats for the species they support; and restoring, creating and consolidating areas of semi-improved grasslands, which have an important role in accentuating underlying geology and in maintaining a sense of locality. This will create a functional and resilient grassland network.
- Sensitively managing road verges, which can play an important part in linking grasslands and provide important sources of nectar for pollinating insects, thus benefiting agriculture.
- Continuing to encourage the conservation and active management of existing woodland, including ancient woodland, mixed woodland blocks and shelterbelts; and promoting new planting where appropriate in accordance with the strategic ambition of the Forest of Avon Community Forest and the Mendip Hills AONB and Cotswolds AONB management plans. This will enhance the contribution of woodland to the landscape, recreation and biodiversity.
- Managing and restoring the historic network of field boundaries, including hedgerows and hedgerow trees. This will enhance historic landscape value, facilitate their key function of reducing surface water flows and soil erosion and recognise their importance, in combination with the area's geology, as habitats for rare species, in particular the greater horseshoe bat.
- Connecting the woodland network by managing hedgerows appropriately, to link woodland with other wooded habitats – such as traditional orchards and wood pasture and parkland.
- Managing, restoring and planting traditional orchards, to conserve the genetic continuity of fruit species; to retain significant archaeology and wood pasture habitats, including a continuity of deadwood and rot holes; and to improve the condition of the underlying grassland to enhance the lowland meadow resource.
- Managing and restoring field boundaries including hedgerows, hedgerow trees, drystone walls and drainage ditches in keeping with local styles and management traditions.
- Protecting the unique and rare species of the Avon Gorge.
- Promoting sustainable farming practices that encourage the movement and support of species.
- Managing peat soils in the Gordano Valley and managing other wetland habitats so that biodiversity value associated with wet meadow, reedbed and carr communities and carbon sequestration and protection of existing carbon storage is fully realised.
- Encouraging the restoration of natural condition to those watercourses in the NCA that are classed as heavily modified or artificial waterbodies and seeking mitigation work through new development to help restore natural conditions.
- Managing river corridors to utilise existing river flows for the maximum ecological benefit and protecting and enhancing the ability of waterbodies to provide wildlife corridors.

SEO 4: Protect and manage the landscape, heritage and biodiversity associated with the Avon River corridor, other river valleys and lakes, planning for a landscape-scale enhancement of wetlands, wet woodland and semi-natural grasslands along river flood plains for the benefits to biodiversity, climate regulation, water quality and flooding mitigation.

For example by:

- Enhancing and protecting the river landscape, particularly the Avon, through landscape-scale approaches to conservation and restoration of semi-natural habitat, particularly flood plain habitat such as wet woodland and flood meadows. This will create a coherent river and flood plain ecological network.
- Promoting catchment sensitive farming practices, reducing sources of diffuse agricultural pollution and the volume and rates of run-off and soil erosion. This will protect the water quality of open water, such as the internationally important Chew Valley Lake and Blagdon Lake, as well as the rivers of the area, benefiting many ecosystem services, including soil quality, soil erosion, water quality, water availability and biodiversity.
- Conserving and expanding areas of semi-natural habitat, woodland and hedgerows, which slow the flow of water across the landscape. Potentially this will reduce peak flow levels during high rainfall, mitigating flooding and helping to slow soil erosion; will maintain higher flow during dry periods for the benefit of people and biodiversity; and will allow opportunities for flood water storage to be realised where they are identified.
- Encouraging the re-profiling and naturalisation of watercourses to reduce the speed of water flow through river and stream channels.
- Ensuring that water companies, local authorities, highways agencies and developers create surface water management strategies that include sustainable urban drainage, to reduce the volume of water running directly into drains and therefore watercourses.
- Influencing and delivering improvements through the Bristol Avon Catchment Plan (the Department for Environment, Food and Rural Affairs Bristol Avon catchment-based approach pilot).
- Increase understanding and awareness of the importance of the area's water resources among groups such as visitors, schools and landowners.

Additional opportunities

1. Manage the recreational and tourism opportunities of both the City of Bristol and its surrounding countryside to improve opportunities for enjoyment and understanding of the area's heritage, countryside and coast for their inspirational and diverse qualities.

For example by:

- Maintaining and developing multi-user routes and improved route connectivity to provide sustainable transport options wherever possible and enable more people to access the natural and built environment.
- Enhancing the many recreational, educational and tourism opportunities offered while managing visitor demand through provision of sufficient good-quality infrastructure and information.
- Ensuring completion of the Wansdyke ditch long distance footpath, which would provide many opportunities for historical interpretation.
- Promoting sustainable tourism initiatives that target a broad range of visitors and reduce car dependency. This involves accommodating high visitor numbers while conserving the natural and built environment, for example through promotion of the Bristol waterbus ferry service, the National Cycle Network and good rail connections.



The area is defined by the strong landscapes surrounding it such as the Mendip Hills: view from Cowslip Green looking towards the Mendip Hills.

Supporting document 1: Key facts and data

1. Landscape and nature conservation designations

About 5 per cent of the Bristol, Avon Valleys and Ridges NCA is designated as an Area of Outstanding Natural Beauty (AONB). This is made up of a combination of the Mendip Hills AONB to the south covering 4 per cent and the Cotswolds AONB covering 1 per cent to the north.

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

- www.mendiphillsaonb.org.uk/
- 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	30	<1
European	Special Protection Area (SPA)	Chew Valley Lake SPA; Severn Estuary SPA	605	1
	Special Area of Conservation (SAC)	Avon Gorge Woodlands SAC; North Somerset and Mendip Bats SAC; Severn Estuary SAC	303	<1
National	National Nature Reserve (NNR)	Gordano Valley NNR; Leigh Woods NNR	140	<1
National	Site of Special Scientific Interest (SSSI)	A total of 51 sites wholly or partly within the NCA	2,083	2

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.

Land covered by International and European nature conservation designations totals 882 ha, or 1 per cent of the total land area; national designations cover 2,083 ha or 2 per cent. The Severn Estuary Ramsar and SPA cover the same area and lie within the Severn Estuary SAC. Most of the Severn Estuary SAC is not designated as SSSI, but the other SACs and both SPAs are. The NNRs mostly lie within an SSSI designated area.

There are 379 local sites in the Bristol, Avon Valleys & Ridges NCA covering 4,341 ha or 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
- Maps showing locations of Statutory sites can be found at: <http://magic.defra.gov.uk/website/magic/> – select 'Rural Designations Statutory'.

1.1.1 Condition of designated sites

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

SSSI condition category	Area (ha)	% of SSSI land in category condition
Unfavourable declining	68	3
Favourable	1,564	75
Unfavourable no change	39	2
Unfavourable recovering	412	20

Source: Natural England (March 2011)

Details of SSSI condition can be searched at:

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

2. Landform, geology and soils

2.1 Elevation

At its lowest, the land lies 0.2 m below sea level rising to a maximum height of 227 m. The mean height is 80 m.

Source: Natural England (2010)

2.2 Landform and process

A predominantly limestone ridge extends from the Yeo Valley towards Thornbury, where sandstone outcrops are present. It is cut by the spectacular Avon Gorge on the edge of Bristol and to the west forms the distinctive landscape of the Failand Hills. To the west the ridge falls, often steeply, to the levels. To the east is a landscape of clay vales. They are large and broad-scale, around the River Frome and its tributaries, but smaller-scale and more complex around the many minor rivers and streams like the River Cam, Wellow Brook and River Chew. At the northern edge of the area there is another, more undulating, type of landscape as the land rises to the Cotswolds.

Source: Bristol, Avon Valleys and Ridges Natural Area Profile, Bristol, Avon Valleys and Ridges Countryside Character Area Description

2.3 Bedrock geology

The ridge, which extends irregularly through the area roughly parallel with the Severn, is mainly composed of Carboniferous Limestone, with sandstones, silts and conglomerates outcropping at the northern end. To the east, the mudstones and clays along the Severn are overlain widely by alluvium. To the north-east, red Mercia Mudstones and the grey clay of the Lias have been eroded to form a shallow vale. To the south-east, there is a complex of older

faulted rocks overlain by younger Mesozoic limestone, clays and mudstones. The latter have been eroded in places resulting in many varied exposures.

Source: Bristol, Avon Valleys and Ridges Natural Area Profile, Bristol, Avon Valleys and Ridges Countryside Character Area Description

2.4 Superficial deposits

Extensive alluvial deposits extend from Clapton Moor to Avonmouth and northwards; in places along the River Avon, First and Second Terrace Gravel deposits can be distinguished. Alluvial sands and gravels at Weston-in-Gordano are fluvioglacial and interglacial in origin.

Source: Bristol, Avon Valleys and Ridges Natural Area Profile, Bristol, Avon Valleys and Ridges Countryside Character Area Description

2.5 Designated geological sites

Designation	Number of Sites
Geological Site of Special Scientific Interest (SSSI)	25
Mixed Interest SSSIs	2

There are 4 Local Geological Sites within 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>

2.6 Soils and Agricultural Land Classification

The limestone-derived soils are predominantly brown rankers and argillic brown earths. On the clays, poorly draining gleys are common, whereas the Coal Measures soils are more acidic. This NCA has 8 main soilscape types: slightly acid loamy and clayey soils with impeded drainage, covering 31 per

cent of the NCA; slowly permeable seasonally wet slightly acid but base-rich loamy and clayey soils, 14 per cent; freely draining slightly acid but base-rich soils, 13 per cent; shallow lime-rich soils over limestone, 11 per cent; freely draining slightly acid loamy soils, 11 per cent; slowly permeable seasonally wet acid loamy and clayey soils, 8 per cent; lime-rich loamy and clayey soils with impeded drainage, 8 per cent; and loamy and clayey flood plain soils with naturally high groundwater, 2 per cent.

Source: Bristol, Avon Valleys and Ridges Natural Area Profile, Bristol, Avon Valleys and Ridges Countryside Character Area Description

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

Agricultural Land Classification	Area (ha)	% of NCA
Grade 1	4,108	5
Grade 2	5,520	7
Grade 3	51,134	61
Grade 4	5,773	7
Grade 5	35	<1
Non-agricultural	2,393	3
Urban	15,188	18

Source: Natural England (2010)

Maps showing locations of Statutory sites can be found at:

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

3. Key water bodies and catchments

3.1 Major rivers/canals

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

River Name	Length (km)
River Avon	16
River Frome	33
River Kenn	<1
River Yeo	9

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.

The River Avon cuts a steep-sided valley through the area from the east. The Frome flows southwards to join it at the centre of Bristol and the Chew follows a tortuous course to join it near Keynsham. Other streams and rivers in the south-east flow eastwards to join the Avon outside the character area and the Yeo on the south-western edge flows directly to the sea.

3.2 Water quality

The total area of Nitrate Vulnerable Zone is 22,823 ha or 27 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=maptopic&lang=_e

4. Trees and woodlands

4.1 Total Woodland Cover

The NCA contains 6,636 ha of woodland, 8 per cent of the total area, of which 1,690 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 49,359 ha or 59 per cent of this NCA.

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

4.2 Distribution and size of woodland and trees in the landscape

The most extensive areas of woodland, which are ash-maple dominated and of high nature-conservation interest, lie between Congresbury and the Avon Gorge, and on the Failand Ridge. They are of international significance. Elsewhere, the woodlands are much smaller and fragmentary. They are often on the steeper land, with their great variety reflecting the overall complex geology.

Small-leaved lime is a tree which is only ever found on ancient woodland sites and it is a characteristic tree of many of the woods on ridges to the south and south-east of Bristol. Damper woods or areas along the edges of streams may support more moisture tolerant species such as willow and alder. This type of woodland is not very common but small areas are found fringing Blagdon and Chew Valley lakes. Where more acidic conditions prevail sessile oak and birch occur because of their preference for such soils for example at Bickley Wood. One of the finest ancient woodlands within this NCA is Leigh Woods near Bristol. This supports a high number of restricted plant species including nationally rare and endemic whitebeam species. Part of the woodland is a National Nature Reserve and part has been put forward as a Candidate Special

Area of Conservation under the Habitats Directive 1992. Another outstanding wood is Lower Woods at Wickwar in the far north of the NCA. These woods are the most extensive ancient woodlands in the area with the SSSI extending to 280 ha.

Source: Bristol, Avon Valleys and Ridges Natural Area Profile, Bristol, Avon Valleys and Ridges 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)	% of NCA
Broadleaved	5,288	6
Coniferous	588	1
Mixed	357	<1
Other	403	<1

Source: Forestry Commission (2011)

Area and proportion of Ancient Woodland and Planted Ancient Woodland within the NCA.

Woodland type	Area (ha)	% of NCA
Ancient semi-natural woodland	1,237	1
Ancient re-planted woodland (PAWS)	453	<1

Source: Natural England (2004)

5. Boundary features and patterns

5.1 Boundary features

In the flatter land and on the downland, hedgerows are low and often intermittent. In the valleys and steeper slopes of the south-west, overgrown hedgerows predominate. They are often species-rich, with frequent ash and oak, although pure hazel hedgerows are a feature of the area north of the Mendip Hills.

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

5.2 Field patterns

While the flatter land and downland consist of large fields the valleys and steeper slopes predominantly in the south-east have irregular fields.

Source: Bristol, Avon Valleys & Ridges 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 area has a mixed character. The main farm types are: grazing livestock lowland, 331 farms; dairy, 112 farms. Other farm types present include cereals, 103 farms; horticulture, 64 farms; mixed farms, 61 farms; specialist poultry, 28 farms; general cropping, 15 farms; and specialist pigs, 11 farms.

Between 2000 and 2009, most farm types saw a reduction in the number of holdings. The greatest was in dairy by 85 holdings or 43 per cent followed by mixed farms at 13 holdings or 18 per cent. Only two farm types saw an increase, other types by 22 holdings or 7 per cent and specialist poultry by 12 holdings or 75 per cent.

Source: Agricultural Census, DEFRA (2010)

6.2 Farm size

In terms of numbers of holdings, farms between 5 and 20 ha are the commonest farm size with 343 holdings. The greatest coverage is by farms over 100 ha at 24,292 ha. Between 2000 and 2009, all farm sizes saw a reduction in the number of holdings apart from those above 100 ha which saw an increase of 12. The greatest fall was in farms between 20 and 50 ha where there was a reduction of 36 holdings.

Source: Agricultural Census, DEFRA (2010)

6.3 Farm ownership

Owned land makes up 68 per cent of total farm area, while the remainder is tenanted. There has been a slight decrease in both owned land by 3 per cent and land held in tenancy by 1 per cent over the 2000 to 2009 period.

2009: Total farm area = 46,251 ha; owned land = 31,376 ha

2000: Total farm area = 44,740 ha; owned land = 32,198 ha

Source: Agricultural Census, DEFRA (2010)

6.4 Land use

The commonest crop type by far is grass and un-cropped pasture at 32,512 ha or 70 per cent of the total farmed area, followed by cereals at 7,377 ha or 16 per cent. Between 2000 and 2009, several crop types saw a decline. The largest by hectareage was cereals which fell by 261 hectares. Grass and un-cropped land increased by 1,120 ha and oilseeds and other arable crops increased by 450 ha and 314 ha respectively.

Source: Agricultural Census, DEFRA (2010)

6.5 Livestock numbers

The most numerous livestock is cattle with 55,300 animals followed by sheep at 41,000 then pigs at 17,700. During the period 2000 to 2009, the numbers of all livestock fell. The largest reduction was in pigs with 16,600 animals followed by sheep with 10,600 animals and cattle with 3,400.

Source: Agricultural Census, DEFRA (2010)

6.6 Farm labour

Most farms are run by principal farmers, but 47 are run by salaried managers. The numbers of all farm workers declined markedly between 2000 and 2009. Principle farmers fell by 113, salaried managers by 33, full time workers by 246, part-time workers by 364 and casual/gang workers by 134.

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

Ancient woodland is found throughout this NCA in small patches but has major concentrations at Leigh Woods, to the north-east of Congresbury, Kings and Urchin Wood SSSI, and at Lower Woods SSSI near Wickwar. The central part of this NCA is dominated by the large urban area of Bristol with satellite settlements such as Nailsea to the south-west and Yate/Chipping Sodbury to the north-east. 'Green spaces' within urban areas have an increased importance for a number of reasons and particularly so within the large urban setting of Bristol.

This area has a number of significant open water features together with some wildlife rich waterways. Important parklands of conservation value include Dyrham Park, Doddington House, Blaise Castle and Ashton Court.

The Avon Gorge has natural cliffs and quarry exposures of carboniferous limestone, which are of great geological interest and together with the screes, scrub, pockets of grassland and adjacent woodland, support an exceptional number of nationally rare and scarce plant species.

Neutral grasslands of interest can be found in the fields fringing Blagdon and Chew Valley Lakes, at Dundry Slopes and Stockwood open space, and at fields in the vicinity of Lower Woods, Wickwar.

Limestone grassland has a very limited distribution within this NCA. It is more characteristic of the adjacent areas of the Mendips and Cotswolds.

Source: Bristol, Avon Valleys and Ridges Natural Area Profile

7.2 Biodiversity Action Plan (BAP) Priority habitats

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

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

UK BAP Priority Habitat	Area (gha)	% of NCA
Broadleaved mixed and yew woodland (Broad Habitat)	3,619	4
Reedbeds	903	1
Lowland meadows	615	1
Coastal and flood plain grazing marsh	563	1
Lowland calcareous grassland	246	<1
Lowland dry acid grassland	87	<1
Purple moor grass and rush pasture	65	<1
Maritime cliff and slope	43	<1
Lowland heathland	12	<1
Mudflats	8	<1

Source: Natural England (2011)

7.3 Key species and assemblages of species

- Maps showing locations of UK BAP Priority Habitats are available at: <http://magic.defra.gov.uk/website/magic/> – select ‘Habitat Inventories’
- Maps showing locations of S41 species are available at: <http://data.nbn.org.uk/>

8. Settlement and development patterns

8.1 Settlement pattern

The settlement pattern is probably at its simplest on the limestone areas. Here, villages clustered around the scarpfoot springs and locally in the lower parts of the

combes. Farmsteads occur on the ridge tops where they are mainly contemporary with enclosure in the 18th and 19th centuries, but they are also found in sheltered sites lower down. Villages are more widespread in the clay vales as are scattered farmsteads and hamlets linked by a complex network of lanes and trackways. Many of the villages are tightly clustered around a church, but settlements like Timsbury are more straggling. In the former mining areas the settlements are interspersed with rows of cottages and isolated houses strung out along minor roads. Small towns like Paulton and Norton-Radstock have been formed by the spread of the mining industry in contrast to the ancient settlements like Pucklechurch and Thornbury clustered around a church on higher ground. Some areas are exceptions to the generally dense settlement pattern, notably the high ridges, the downland, the Frome valley and parts of the land below the Cotswold scarp.

Source: Bristol, Avon Valleys and Ridges Countryside Character Area description; Countryside Quality Counts (2003))

8.2 Main settlements

The main settlements in the NCA are: Bristol, Portishead, Clevedon, Yate, Midsomer Norton, Nailsea, Keynsham and Thornbury. The total estimated population for this NCA, derived from ONS 2001 census data, is: 839,103.

Source: Bristol, Avon Valleys and Ridges Countryside Character Area description; Countryside Quality Counts (2003)

8.3 Local vernacular & building materials

There is much variation in the building stone used across the area, for instance between the sandstone in the north and the white, rather bleak Lias limestone in the south-east within the Norton-Radstock area. With a wide choice of attractive materials, including Bath Stone and Cotswold Stone, it is hardly surprising that many of the mansions, manor houses and churches are fine buildings in mellow tones but there are also unspoilt village and town streets such as the centre of Chipping Sodbury.

Source: Bristol, Avon Valleys and Ridges Countryside Character Area description; Countryside Quality Counts (2003)

9. Key historic sites and features

9.1 Origin of historic features

The high ground in the west and south of the area was settled at an early date. There is good evidence of Neolithic activity, for example the long barrows and stone circle at Stanton Drew. The ridges continued to be of importance through the Iron Age not least as the sites of hillforts, of which Cadbury Hill is the best known. The lower-lying clay vales, too, had attracted settlement but it is likely that the heavier ground, for instance along the Frome Valley, was not cleared until later.

By Roman times, many parts of the area had been settled for a long time and the importance of the Avon was evident from the port at Sea Mills. Villas lay either side of the Avon valley and on the fertile soils north of the Mendip Hills. After the Romans left, significant 'Dark Age' settlements were present on the eastern edge. The Saxon take-over occurred in the 6th century and the impressive earthworks of the Wansdyke cutting across the ridges south of Bristol date from this era. By the later Saxon period, there were important centres at Pucklechurch, Chew and elsewhere and the town of Bristol was already established by the time of the Norman Conquest. During the Middle Ages, open fields surrounded the frequent villages, interspersed with patches of common and woodland. There was, however, extensive open downland on the western limestone and a royal forest lay around Kingswood. Bristol grew rapidly, not least as a centre for the cloth industry and as a port, and was one of the great towns of medieval England. Lesser towns like Thornbury and Chipping Sodbury also prospered. Following the 14th century disasters and population decline, open fields began to be enclosed, but many remained in use in the north of the area and much of the open downland was unenclosed until the 19th century.

A coal industry was present in the Middle Ages but it did not really become significant until the 18th century. It always consisted of small pits dispersed across the countryside, often fuelling local industries like the brass foundry at Keynsham. They were active well into the present century, but there was rapid decline following nationalisation and the last pit closed in 1973. Today, most of the obvious evidence has disappeared and the tips have been largely reclaimed. In the post-medieval period, Bristol expanded to become Britain's second port. In the 18th and 19th centuries the city prospered and expanded on the basis of its trade, engineering and other industries. The wealth that it generated is evident in the parks and mansions that surround the city. In the 20th century Bristol expanded even more rapidly to include the Avonmouth complex. Residential, commercial and light industrial areas extended into the surrounding countryside and major new roads were developed. The growth has affected the whole area and many of the outlying settlements like Yate developed both as their own employment centres and as dormitories of Bristol.

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

9.2 Designated historic assets

This NCA has the following historic designations:

- 21 Registered Parks and Gardens covering 1,723 ha
- 0 Registered Battlefield/s covering 0 ha
- 117 Scheduled Monuments
- 4,822 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

- 1 per cent of the NCA 935 ha is classified as being publically accessible.
- There are 2,161 km of public rights of way at a density of 2.6 km per km².
- There is 1 National Trail, the Cotswold Way, within the NCA covering 2 km within its boundaries.

Sources: Natural England (2010)

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

Access designation	Area (ha)	% of NCA
National Trust (Accessible all year)	127	<1
Common Land	749	1
Country Parks	511	1
CROW Access Land (Section 4 and 16)	1,221	1
CROW Section 15	799	1
Village Greens	76	<1
Doorstep Greens	3	<1
Forestry Commission Walkers Welcome Grants	612	1
Local Nature Reserves (LNR)	370	<1
Millennium Greens	12	<1
Accessible National Nature Reserves (NNR)	142	<1
Agri-environment Scheme Access	54	<1
Woods for People	1,608	2

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) much of the NCA is heavily disturbed particularly around Bristol and its environs. Although little of the NCA is truly tranquil the area to the south of Bristol around the Chew and Yeo Valleys show some of the least disturbance.

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

Tranquillity	Tranquillity Score
Highest Value within NCA	28
Lowest Value within NCA	-86
Mean Value within NCA	-19

Sources: CPRE (2006)

More information is available at the following address:

<http://www.cpre.org.uk/what-we-do/countryside/tranquil-places/in-depth/item/1688-how-we-mapped-tranquillity>

11.2 Intrusion

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

Intrusion category	1960s (%)	1990s (%)	2007 (%)	Percentage change (1960s-2007)
Disturbed	36	61	59	23
Undisturbed	53	27	21	-32
Urban	12	12	20	8

Sources: CPRE (2007)

Notable trends from the 1960s to 2007 are the considerable increase in areas subject to disturbance.

More information is available at the following address:

<http://www.cpre.org.uk/resources/countryside/tranquil-places>

12 Data sources

- British Geological Survey (2006)
- Natural Area Profiles, Natural England (published by English Nature 1993-1998)
- Countryside Character Descriptions, Natural England (regional volumes published by Countryside Commission/Countryside Agency 1998/1999)
- Joint Character Area GIS boundaries, Natural England (data created 2001)
- National Parks and AONBs GIS boundaries, Natural England (2006)
- Heritage Coast Boundaries, Natural England (2006)
- Agricultural Census June Survey, Defra (2000,2009)
- National Inventory of Woodland & Trees, Forestry Commission (2003)
- Countryside Quality Counts Draft Historic Profiles, English Heritage (2004)*
- Ancient Woodland Inventory, Natural England (2003)
- BAP Priority Habitats GIS data, Natural England (March 2011)
- Special Areas of Conservation data, Natural England (data accessed in March 2011)

- Special Protection Areas data, Natural England (data accessed in March 2011)
- Ramsar sites data, Natural England (data accessed in March 2011)
- Sites of Special Scientific Interest, Natural England (data accessed in March 2011)
- Detailed River Network, Environment Agency (2008)
- Source protection zones, Environment Agency (2005)
- Registered Common Land GIS data, Natural England (2004)
- Open Country GIS data, Natural England (2004)
- Public Rights of Way Density, Defra (2011)
- National Trails, Natural England (2006)
- National Tranquillity Mapping data, CPRE (2007)
- Intrusion map data, CPRE (2007)
- Registered Battlefields, English Heritage (2005)
- Record of Scheduled Monuments, English Heritage (2006)
- Registered Parks and Gardens, English Heritage (2006)
- World Heritage Sites, English Heritage (2006)
- Incorporates Historic Landscape Characterisation and work for preliminary Historic Farmstead Character Statements (English Heritage/Countryside Agency 2006)Detailed River Network, Environment Agency (2008)

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

Supporting document 2: Landscape change

Recent changes and trends

Trees and woodlands

- In 1999 about 12 per cent of the established eligible National Inventory of Woodland and Trees woodland stock was covered by a Woodland Grant Scheme management agreement, by 2003 this had risen slightly to 15. About a quarter (1,690 ha) of the woodland cover is on an ancient woodland site, the proportion of these sites covered by a Woodland Grant Scheme agreement increased from 11 per cent in 1999 to 18 per cent by 2003.
- Currently about 18 ha of traditional orchard are being maintained and restored through Environmental Stewardship agreements. Interest in planting community orchards has also increased, for example the Forest of Avon Trust has assisted a number of new community orchards to be planted.

Boundary features

- The estimated boundary length for the NCA is about 5,277 km. Total length of agreements between 1999 and 2003 was equivalent to about 3 per cent of this total including, hedgerow management and restoration (68 km), stone wall restoration (4 km) suggesting the resource had been neglected.
- In 2011, 15 per cent (873 km) were under environmental stewardship agreements including 33 km of ditches, 810 km of hedgerows and 15 km of stone wall, this is largely due to entry level agreements but is a significant increase from the 2003 figures suggesting a general improvement in the condition of boundary features.



Large scale quarrying of Carboniferous Limestone in South Gloucestershire.

Agriculture

- Livestock farming is predominant in this area, 50 per cent of holdings in 2000 and 46 per cent of holdings in 2009 being classed as livestock farms. Within this, grazing dominates, remaining relatively stable at 30 per cent and 32 per cent in 2000 and 2009 respectively. Dairying, however, was substantially higher in 2000 (17 per cent) than 2009 (11 per cent).
- The cereal, general cropping and horticulture figures have remained largely stable comparing 2000 with 2009 data.
- Land holding sizes are generally larger in 2009 compared with 2000, there being more than 100 ha, the total number of holdings has fallen but an extra 1,511 ha is covered by holdings demonstrating a move in the industry to fewer larger farms.

Settlement and development

- Many rural settlements are now strongly influenced by modern development and infill. Older village character remains more strongly defined towards the outer part of the area. Research showed that between 1999 and 2003, outside urban and fringe areas there were moderately high rates of development in terms of the share of national build. There was some urbanisation with development concentrated locally, such as around Bristol (Mangotsfield and Stoke Gifford) and the small towns and villages to the north, Nailsea, Bristol Airport and the open countryside to the south. These changes diluted the historic character of the area.
- More recently, continued development along the motorway corridors, particularly at Cribbs Causeway and Aztec West has dominated the open, undulating countryside around them which has little tree cover.

Semi-natural habitat

- The NCA contains approximately 6,225 ha of semi-natural priority (BAP) habitat, of which 2,083 ha (34 per cent) is designated as SSSI. In 2012, 75 per cent of SSSI were in favourable condition, 20 per cent were unfavourable recovering, 2 per cent were unfavourable no change and 3 per cent were unfavourable declining.
- Countryside Stewardship uptake for semi-natural features was above the national average up to 2003. The most extensive annual agreements in 2003 were for lowland pastures on neutral/acid soils (956 ha) and lowland hay meadows (466 ha) (together they represent the lowland meadow priority habitat). 2012 data shows 641 ha of neutral, calcareous or acid grassland currently under species-rich grassland management or restoration options in Higher Level Stewardship. Direct comparison of the figures is difficult



Example Farm at Whitfield. A planned 1840s farmstead in a replanned regular enclosure landscape.

due to the way the grassland habitats have been grouped in the different schemes, but management of grassland remains one of the more popular options in this area.

Historic features

- In 1918 about 3 per cent of the NCA was historic parkland. By 1995 it is estimated that 44 per cent had been lost. In 2003 about 49 per cent of the remaining parkland was covered by an Historic Parkland Grant, and about 32 per cent was included within an agri-environment scheme. About 55 per cent of historic farm buildings remained unconverted. About 91 per cent were intact structurally. Although many historic farm buildings have been lost, the character of parkland landscape has largely been maintained.
- There are a number of historic buildings and scheduled ancient monuments in this NCA that are on the English Heritage 2011 risk register including, for example, several sections of the Wansdyke that are at risk from arable ploughing. 136 ha of the NCA currently have archaeologically sensitive Higher Level Stewardship options applied to them.

Coast and rivers

- The coastal section of this NCA lies between Portishead and Clevedon and is largely composed of north-west facing Carboniferous Limestone cliffs with a narrow intertidal width; therefore there is little coastal change.
- The biological river water quality and the chemical water quality in 1995 were predominantly excellent and this status was maintained in 2003.
- The ecological status of rivers in the NCA in 2009 ranges from good through to bad, the Ladden Brook being classed as bad, the majority being moderate or poor.

⁶ South Gloucestershire Core Strategy, South Gloucestershire Council (December 2011)

Minerals

- The impact of quarrying on the character of the area is minimal and Bristol and Bath and North East Somerset lack opportunities for mineral extraction.
- In South Gloucestershire,⁶ Carboniferous Limestone continues to be the most important mineral resource, being utilised for roadstone and construction aggregate. The number of quarries has not changed over the last 10 years, five quarries remain active. Two of these are likely to exhaust their reserves before the end of the core strategy at the end of 2026 and new sites may be required. Clay is extracted at Almondsbury, and Shortwood for engineering bricks and pipes.
- Within North Somerset, the opportunity for mineral development is largely within the Carboniferous Limestone, currently three quarries are active.⁷

Drivers of change

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. Increased surface water run-off is likely to overload the current storm drainage systems in the urban areas.
- Increase in summer temperatures could exacerbate the urban heat island effect with possible impacts on the health and wellbeing of urban residents and increasing energy consumption, from both business and residential premises, to power more air conditioning units.

⁷ North Somerset Core Strategy, North Somerset Council (April 2012)

- Six per cent of the area is wooded and changes to seasonal temperature and rainfall may result in changes to tree productivity. For broadleaved species, although a drop in productivity is likely in the south-east of England, productivity elsewhere may increase. Suitability of the climate for new non-native species could alter woodland composition and potentially result in the loss of important rare and scarce species, especially within the Avon Gorge.
- Increased storminess, drought and prevalence of pests and diseases such as phytophthora may result in the loss of ancient woodlands and mature and/or veteran trees, especially parkland trees.
- A longer growing season could potentially lead to double cropping with impacts on soil condition due to increased cultivation.
- More frequent droughts leading to increases in water demand for crop growth and drying out and erosion of soils.
- Species migration and loss of small or isolated habitats and populations.

Other key drivers

- The four unitary authorities within the West of England are focussing future development within urban areas and utilising brownfield sites to avoid green field development, Bristol plans no urban extensions but South Gloucestershire is proposing significant development on the north (majority housing) and eastern (mostly employment) fringes of Bristol and expansion at Yate and Thornbury which may have landscape impacts.
 - Regeneration of former industrial sites within the area, for example Filton airfield, which is allocated for mixed development with an emphasis on housing.
- Three of the unitary authorities within the west of England have agreed a green infrastructure strategy and all development will provides an opportunity to incorporate provisions for biodiversity and green infrastructure.
 - 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. There is a trend towards fewer larger farms. This may result in increased pressure on species-rich permanent grassland and ecosystem services such as water availability and water quality but may provide an opportunity to encourage low water consumption devices to be installed.
 - Population growth in Bristol has been high since the 2001 census with an increase of 13.2 per cent (2.5 times higher than the estimated increase in Great Britain as a whole)⁸ and an increase has also been experienced in the other unitary authorities of the west of England. Such increases in population drive development pressures and require sensitive, active management for recreation to protect the archaeological features, the historical built environment, biodiversity and geodiversity that visitors and residents value. There is also a need to protect the cumulative impacts of the population increase on ecosystem services such as water availability and water quality.
 - The West of England joint transport plan includes a number of major schemes, for example the South Bristol Link which will alter the setting of south-west Bristol. Proposed plans to expand Bristol International Airport will also affect the tranquillity of the surrounding area.
 - The Carboniferous Limestone continues to be quarried and there is continuing pressure for expansion.

⁸ The Population of Bristol April 2012, Bristol City Council (2012)

Supporting document 3: Analysis supporting Statements of Environmental Opportunity

The following analysis shows the projected impact of Statement of Environmental Opportunity on 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	Tranquility	Recreation	Biodiversity	Geodiversity
SEO 1: Conserve and manage the distinction between small rural settlements and the densely urban City of Bristol, the urban fringe transitional zone and the commuter settlements; and ensure that new development is sensitively designed to contribute to settlement character, reduce the impact of the urban fringe and provide well-designed green infrastructure to enhance recreation, biodiversity and water flow regulation.	↔**	↔**	↘*	↗*	○	↗*	↗**	↗**	○	○	↗**	↗**	○	↑***	↗**	↗**	↑***	↗**	↗**
SEO 2: Protect and manage the strong sense of history and many historical assets ranging from prehistoric barrows to the mining legacy, as well as the Avon Gorge and the many varied geological exposures within this geologically significant landscape, to enable recreation and access, education, tourism and continued enjoyment of the heritage of the area.	↔**	↔**	↗*	↗**	○	↗**	↗**	↗**	↗**	↗**	↗**	↗**		↑***	↑***	↗**	↗**	↑***	↑***
SEO 3: Conserve and sustainably manage the gentle clay vales and limestone ridges and downs of the rural agricultural landscape and enhance the network of semi-natural habitats, linking them together to create a coherent and resilient ecological network, enabling ecosystems to adapt both to climate change and for the benefits to landscape, biodiversity, water flow, water quality, soil quality, soil erosion, rural heritage and culture.	↗*	↗*	↗**	↗**	↗*	↗**	↑**	↑***	↑**	↑***	↑**	↑**	↔**	↑**	↗**	↑**	↗**	↑**	↗*
SEO 4: Protect and manage the landscape, heritage and biodiversity associated with the Avon River corridor, other river valleys and lakes, planning for a landscape-scale enhancement of wetlands, wet woodland and semi-natural grasslands along river flood plains for the benefits to biodiversity, climate regulation, water quality and flooding mitigation.	○	↗*	↑**	↗*	○	↗**	↑***	↑***	↑**	↑***	↗**	↗**	↗*	↗**	↗*	↗**	↗***	↑**	↗**

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

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

Landscape attributes

Landscape attribute	Justification for selection
Contrasting landscape of low lying shallow vales, limestone scarps and downland ridges strongly influenced by the complex and diverse geology that is reflected in the many geological SSSI and the diversity of vernacular building stones in use.	<ul style="list-style-type: none">■ Complex and diverse geology ranging from early Ordovician to Middle Jurassic in age, and comprised of limestones, mudstones, siltstones sandstones, conglomerates and coal, influenced by several phases of folding and faulting. The area played an import role in the history of the development of geology as a science as William Smith (the ‘father of English geology’) based some of his founding geological principles upon strata and features exposed within the area.■ 25 geological SSSI plus an additional 2 of mixed interest.■ Important fossil bearing strata are visible in some geological exposures for example: fossil fishes at Woodhill Bay; corals, brachiopods and crinoids in the Carboniferous Limestone; Coal Measure plants and insects at Writhlington; high dominance low diversity bivalve assemblages in Late Triassic sediments, underlying the south and the east of Bristol; Lower Jurassic sediments containing rich fauna including ammonites, nautiloids, bivalves, brachiopods, belemnites and marine reptiles such as ichthyosaurs.■ The mineralogical interests of the NCA lie mainly in small areas of sulphides mineralisation (copper, zinc and arsenic), and the extensive deposits of celestine (stronium sulphate) that occurs in the Mercia Mudstone Group.■ Local stone such as local ashlar which includes pale yellow Jurassic oolitic limestones, grey Carboniferous and Lias limestones used as building materials, or, in some locations in the north, red or brown sandstone.

Landscape attribute	Justification for selection
<p>Long historic timeline visible in the landscape, historical significance of access to the Severn Estuary through the Avon and its ports.</p>	<ul style="list-style-type: none"> ■ 21 Registered Parks and Gardens covering 1,723 ha, 117 Scheduled Monuments and 4,822 listed buildings. ■ Evidence of Neolithic activity in the long barrows and stone circle at Stanton Drew. ■ Iron-age hill forts, for example Cadbury Hill, and evidence of settlement of lower-lying clay vales. ■ Importance of the port at Sea Mills during the Roman period and evidence of villas either side of the Avon Valley and on the fertile soils north of the Mendip Hills. ■ Significant 'Dark Age' settlements on the eastern edge. ■ The 6th century Saxon Wansdyke cutting across the ridges south of Bristol and important centres at Pucklechurch, Chew and elsewhere by the later Saxon period. ■ Bristol historic port and buildings associated with trade with the colonies since the Tudor era, the wealth that it generated is evident in the parks and mansions that surround the city such as Dyrham Park, Tyntesfield, Dodington House, Blaise Castle and Ashton Court.
<p>Distinct limestone ridges characterised by important extensive ancient woodland and the internationally important and downs.</p>	<ul style="list-style-type: none"> ■ The higher ground and steep scarps of the limestone ridge extend from the Yeo Valley towards Thornbury. The frequently heavily wooded scarp falling steeply away westwards to the levels of the Severn Vale. ■ The limestone ridge cut by the spectacular Avon Gorge on the edge of Bristol, with its cliffs and quarry exposures of Carboniferous Limestone, its screes, species-rich grassland and ancient woodland habitats that support rare and unique species such as the Bristol onion and Bristol rock-cress and grow nowhere else in the UK, and rare whitebeams (<i>Sorbus</i> species) including <i>S. bristoliensis</i> and <i>S. wilmottiana</i> which are unique to the Avon Gorge. ■ The Avon Gorge is internationally recognised as a European Special Area of Conservation (SAC) under the Habitats Directive 1992 for its 'mixed woodland on alkaline soils associated with rocky slopes (Tilio-Acerion ravine forests) for which this is considered to be one of the best areas in the United Kingdom'. ■ Peregrine falcon and raven nest within the gorge. ■ The limestone to the south forms the distinctive landscape of the Failand Hills with their extensive sometimes panoramic views, which together with the gorge woodlands form the greatest expanse of ancient woodland in the NCA. ■ The Clifton Suspension Bridge, a Grade I-listed building and strong cultural symbol of the City of Bristol

Landscape attribute	Justification for selection
<p>Contrast between the more densely settled and varied landscape of low lying, shallow vales and the open unsettled limestone scarps and high open downland ridges.</p>	<ul style="list-style-type: none"> ■ Tremendously varied farmed landscape, ranging from large fields with intensive arable cropping to small pastures with dense hedges. ■ On the limestone areas, villages cluster around the scarp foot springs and locally in the lower parts of the combes, with farmsteads occurring on the ridge tops where they are mainly contemporary with enclosure in the 18th and 19th centuries, and also on sheltered sites lower down. ■ Gentle open landscape of the clay vales in the east, with few hedgerow trees, giving way to an intricate field pattern mixed with woodland on the surrounding higher land. Villages are more widespread in the clay vales as are scattered farmsteads and hamlets linked by a complex network of lanes and track ways. Many of the villages are tightly clustered around a church but settlements like Timsbury are more straggling. ■ In the former mining areas, the settlements are interspersed with rows of cottages and isolated houses strung out along the minor roads. Small towns like Paulton and Norton-Radstock, have been formed by the spread of the mining industry in contrast to the ancient settlements like Pucklechurch and Thornbury clustered around a church on higher ground. ■ A rolling landscape of rougher hill-top pastures and deep river valleys containing lush pastures. Many stone villages and hamlets, and farmsteads linked by narrow hedged lanes to the south-east, merging with the eastern part of the Mendip Hills. ■ Pattern of medieval hedge-bound irregular fields, in the valleys and on steeper slopes (predominantly in the south-east). ■ Traditional stone walls in the shallow broad valleys, farmed Coal Measures and on areas of downland.

Landscape attribute	Justification for selection
<p>Strong contrast between large urban conurbation and rural and historical parkland landscapes.</p>	<ul style="list-style-type: none"> ■ Striking Avon Gorge with urban conurbation of Bristol spreading down to the river at Clifton beneath the suspension bridge. ■ Development along the M4 and M5 corridors, together with the regional shopping centre and major office development north of Bristol, dominate the open, undulating countryside around them which has little tree cover. ■ Clifton Downs and the Failand Ridge with extensive views over the conurbation of Bristol and across the estuary to Wales, or back towards the Chew Valley. ■ On the edge of Bristol, Ashton Court is the grandest of the parks that has used the limestone landforms to create landscaped deer parks and provides a wide range of active recreation pursuits such as kite flying and mountain biking for the populations of Bristol and North Somerset. It is also host to an annual international balloon festival. ■ To the south and east, housing extends to Dundry Hill and is broken by fragments of farmland. While in the north and north-east, development is dispersed across a wide area and the motorways are prominent. Modern residential development, extending as far as Yate, is broken by open farmland.

Landscape attribute	Justification for selection
<p>Semi-natural habitats including neutral and calcareous grassland, wet grassland, open water, species-rich hedgerows, traditional orchards, veteran parkland trees and drystone walls of biodiversity significance.</p>	<ul style="list-style-type: none"> ■ There are 51 SSSI wholly or partly within the NCA covering 2,083 ha, 2 per cent of the area. Twenty-five of these are geological, the remainder mostly cover grassland (calcareous or neutral) and/or ancient woodland features. ■ Lower Woods SSSI near Wickwar is the most extensive ancient woodland in the area, creating a mosaic of ancient woodland and species-rich grassland, with the SSSI extending to 280 ha. Pedunculate oak and ash dominates, with hazel and field maple as an understory. Ground flora species include dog's mercury, bluebell, wood anemone and wood sorrel. ■ Small-leaved lime is a tree which is only ever found on ancient woodland sites and it is characteristic of many of the woods on the limestone ridges to the south and south-east of Bristol. ■ Damper willow and alder woodland is found fringing Blagdon and Chew Valley lakes. On the more acidic soils, such as at Bickley Wood, sessile oak and birch predominate. ■ Diverse landscape of woodland edge, hedgerows, grazed pasture and watercourses with many caves and old buildings providing hibernation sites, making the area highly important for greater and lesser horseshoe bats, particularly around Ashton Court, Tyntesfield, the Failand Ridge, Barrow Gurney, Dundry Hill and Lower Woods. ■ Particularly fine examples of neutral grassland (MG5, lowland meadow) around Chew Valley and Blagdon lakes, Ashton Court, Butcombe, Nempnett Thrubwell and Walton Common. ■ Wet grassland and wet woodland associated with the river flood plains and the biodiversity value of the rivers themselves. ■ Species-rich hedgerows and drystone walls act as corridors for biodiversity across the landscape, connecting semi-natural habitats, grassland being of particular relevance to the walls, which also support lichens, bryophytes, vascular plants and invertebrates, while hedgerows can form an important part of the woodland and grassland network including linking traditional orchard and wood pasture and parkland. Drystone walls can also be of landscape, geological, cultural, biodiversity and historical interest. Orchards are concentrated on the south facing slopes to the north of the Chew Valley. ■ Chew Valley Lake SPA, internationally important for shoveler ducks and nationally important numbers of gadwall, tufted duck and teal. Blagdon Lake, also important for overwintering wildfowl, is an SSSI, supporting a diverse invertebrate fauna, particularly snails and water beetles. Aquatic and emergent plants and the surrounding species-rich lowland meadow add to the nature conservation value of the area.

Landscape attribute	Justification for selection
Good provision of rights of way and access land.	<ul style="list-style-type: none">■ There are 2,161 km of public rights of way, 2 km of the Cotswold Way National Trail and parts of the Bristol to Brecon, Bristol and Bath Railway, Bristol-City-Triangular Walk, the Celtic Way, Severn Way, Monarch's Way, Frome Valley Walkway and Samaritans Way South-West (Bristol to Lynton) long distance paths within the NCA.■ Good provision of cycle paths; Bristol also recognised as Britain's first cycling city.

Landscape opportunities

- Maintain, restore and consolidate areas of semi-natural grasslands that have an important role in accentuating underlying geology and in maintaining a sense of locality, to create a functional and resilient grassland network. Protect and manage species-rich lowland calcareous and neutral grasslands (BAP lowland meadow) and wet meadows and pastures for the species they support. Road verges also play an important part in linking grasslands.
- Retention of semi-natural grasslands is also important in maintaining ridge and furrow, which is a distinctive landscape feature, and other buried archaeology and historic earthworks.
- Continue to encourage the conservation and active management of existing woodland including ancient woodland, mixed woodland blocks, and shelter belts and promote new planting in accordance with the objectives of the Bristol and Avon Community Forest for their contribution to the landscape, recreation and biodiversity. Bolster the woodland network by managing hedgerows appropriately to link woodland, with other wooded habitats such as traditional orchards and wood pasture and parkland.
- 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. Promote educational opportunities and visitor interpretation associated with the cultural features of traditional orchards.
- Manage and restore field boundaries including hedgerows, hedgerow trees and drystone walls, and drainage ditches in keeping with local styles and management traditions.
- Plan for increasing urban fringe pressures on agricultural land by active management and enhancement of green spaces in the urban fringe. This includes farms and agricultural land that all contribute to a network of green spaces and green corridors and to the conservation of landscape and biodiversity in the urban fringe.
- Enhance farmland for farmland birds and rare arable plants.
- Insensitive development and alterations in villages has affected rural character. Residential development pressure, along the M5 corridor and around the Bristol conurbation, has also had an impact. Promote village design statements and neighbourhood plans to help retain rural character.
- Actively manage and improve the quality of sustainable recreational opportunities and associated infrastructure to enable more opportunities for people to be inspired by the downs, country parks and open spaces.
- Manage the continued quarrying of the limestone ridges south of Bristol and plan for continuing pressure for expansion.
- Conserve and provide interpretation for the area's rich and complex industrial history, particularly features associated with the coal industry, rural mills colonial trading and industrialisation.

- Retain the distinctive parkland character of the NCA, with the retention, appropriate management and replacement of parkland trees within a pastoral setting, and maintain distinctive tree lines and groups.
- Conserve ancient and veteran trees in the parkland landscape for the benefit of fauna and flora that depend upon them and their heritage value. Plan for the provision of veteran trees of the future.
- Enhance and protect the river landscape, particularly the River Avon which has the potential to unite the landscape through which it runs. Develop enhancements through landscape-scale approaches to conservation.
- Conserve and protect geological sites and provide physical access and interpretation to improve the understanding of the significance of this area in the development of the history of geology and provide opportunities for sustainable recreation and tourism.

Ecosystem service analysis

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

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

Service	Assets/ attributes: main contributors to service	State	Main beneficiary	Analysis	Opportunities	Principal services offered by opportunities
Food provision	<p>Naturally fertile soils</p> <p>Significant areas of livestock grazing</p> <p>Some cereal farming</p>	<p>The NCA supports a wide range of farming, 71 per cent of the land falls within agricultural grades 1 to 3. The low lying clay vales and the fertile soils north of the Mendip Hills are used as a base by Yeo Valley foods (a national dairy producer).</p> <p>Figures from 2009 show that 46,251 ha is covered by commercial farming which is dominated by livestock farming. In terms of animal numbers, cattle lead at over 55,000, followed by sheep at over 41,000 and pigs just under 18,000. Farm type is dominated by livestock grazing at 331 farms, followed by dairy 112 farms, cereal 103 farms. Horticulture is also significant in the area (64 farms).</p>	Regional	<p>The fertile gentle accessible slopes of the low-lying clay vales are the most productive parts of this area.</p> <p>Arable farming in this NCA is largely for animal fodder though there is a concentration of other arable on the flatter lands from Yate and Chipping Sodbury, northwards towards Wickwar.</p> <p>The less accessible steep hillsides and very shallow soils are utilised as short grazed calcareous grasslands by sheep. Dairying is prevalent in the Yeo Valley.</p> <p>The economics of food production mean that the generally small size of holdings within this NCA is at risk of being bought out by larger companies, this may impact the way the landscape is farmed and may lead to impacts on biodiversity and other ecosystem services if more intensive management is used.</p> <p>Small farms are also being bought up by non-farmers and their land leased out to other farmers or for equiculture.</p>	<p>Work with the local farming community to safeguard future food production while enhancing key ecosystem services diversity by exploring management techniques and stocking levels that maintain viable levels of productivity and safeguard biodiversity, water quality, water regulation (flooding), soil erosion and quality, pollination services and genetic diversity.</p> <p>Encourage the purchasing of local produce to benefit climate regulation and local culture.</p>	<p>Food provision</p> <p>Biodiversity</p> <p>Regulating water quality</p> <p>Regulating water flow</p> <p>Regulating soil erosion</p> <p>Regulating soil quality</p> <p>Pollination</p> <p>Genetic diversity</p>

Service	Assets/ attributes: main contributors to service	State	Main beneficiary	Analysis	Opportunities	Principal services offered by opportunities
Timber provision	Areas of existing woodland	The NCA contains 6,636 ha of woodland (8 per cent of the total area), around a quarter of which (1,690 ha) is ancient woodland. There are 588 ha of coniferous planting.	Local	There is scope for increasing production from the private sector, particularly from broadleaf woodland. Much of this woodland is undermanaged. Bringing woodland into management as well as woodland creation are both key objectives. Increasing production is a target in this NCA but this is likely to be through privately owned woodland as there is only a small amount of Forestry Commission owned land and production here is unlikely to increase as all the woodland is already in management to produce a sustainable yield through the Forest Design Plans.	<p>Opportunities for expansion of woodland including conifer woodland (where appropriate) guided by plans such as the Forest of Avon Plan, Forestry Commission England Corporate Plan and AONB management plans.</p> <p>There is an opportunity to bring some existing woodland throughout the NCA back into management to provide timber though some non-intervention. Management benefits biodiversity, particularly deadwood species.</p>	<p>Timber provision</p> <p>Regulating soil erosion</p> <p>Biodiversity</p> <p>Regulating water flow</p> <p>Sense of place/ inspiration</p> <p>Tranquillity</p>

Service	Assets/ attributes: main contributors to service	State	Main beneficiary	Analysis	Opportunities	Principal services offered by opportunities
Water availability	Streams and rivers Reservoirs Abstraction Absorptive capacity of semi-natural habitat maintaining more even water release Precipitation over the Cotswolds and Mendip Hills	<p>The main rivers in this NCA are the Avon, the Frome, the Chew and the Congresbury Yeo. There are also three reservoirs: Blagdon Lake, Chew Valley Lake and Cheddar Reservoir (which lies on the boundary with the Somerset Levels and Moors NCA). These reservoirs are fed by rivers and streams emerging from the Mendip Hills making this area a net receiver of water from the neighbouring Mendip Hills NCA.</p> <p>The NCA overlies a mixture of limestone from the Cotswolds and thick, intensively-folded sequence of mudstone and sandstones. There are no major aquifers within the NCA itself but there are several limestone aquifers associated with the Mendips and the Cotswolds just outside of the NCA boundary.⁹</p> <p>The reservoirs supply 1.1 million people and businesses in the Bristol area.</p> <p>The Jurassic aquifers outside of the NCA are a major groundwater source for public water supply, particularly abstracted from the Malmesbury area to supply Bristol. Public water supply is very consumptive and a significant proportion of the water is not returned to the source of supply, while uses such as production of energy (for example. hydropower) and quarry dewatering (both abstractors in this NCA) are non-consumptive and water is returned to the water environment within the NCA.¹⁰</p>	Regional	<p>While most of the area is classed as having 'no water available' for additional abstraction, meaning that any new abstraction or an increase in an existing abstraction is very likely to have constraints to limit or stop water being abstracted during low flow situation, which may become more frequent with a changing climate.</p> <p>The Frome and a minor groundwater aquifer just south of Bristol have 'water available'.</p> <p>The area around Blagdon Lake and Chew Valley Lake is over licensed¹¹ and resources are stretched in the Congresbury Yeo at low flows, mainly due to public water supply abstractions. Some of these licenses are subject to hands-off flow conditions that require the abstractor to stop or reduce abstraction if flows in the river reach identified low flow conditions.¹²</p> <p>Further demands on the public water supply through likely predicted increases in population may further exacerbate over abstraction but demand increase from new developments may be off-set by increased efficiency in existing housing and industry. Continued over...</p>	<p>Well designed winter water storage reservoirs on farms could help alleviate the levels of abstraction for water used on farmland.</p> <p>Work with Bristol Water to continue to educate consumers about economical use of water.</p> <p>Slow the flow of water across the landscape to maintain more constant river levels through ponds, semi-natural habitat and more naturalised drainage and watercourses. Hedgerows across steeper slopes can also help to slow the flow of water from the land.</p> <p>Support measures to maintain and improve soil structure of tilled soils to increase permeability and water retention by the soil.</p> <p>Work with Bristol Water and other partners to deliver Drinking Water Protected Area actions and ensure agricultural community comply with the Nitrate Vulnerable Zone regulations.</p>	<p>Water availability</p> <p>Food provision</p> <p>Biomass energy</p> <p>Regulating water flow</p> <p>Regulating water quality</p> <p>Regulating soil erosion</p> <p>Regulating soil quality</p> <p>Recreation</p> <p>Biodiversity</p>

⁹ Bristol Avon Catchment Abstraction Management Strategy, Environment Agency (2005; URL: <http://publications.environment-agency.gov.uk/pdf/GESW1004BIJV-E-E.pdf>)

¹⁰ Bristol Avon Catchment Abstraction Management Strategy, Environment Agency (2005; <http://publications.environment-agency.gov.uk/pdf/GESW1004BIJV-E-E.pdf>)

¹¹ Brue, Axe and North Somerset Streams Catchment Abstraction Management Strategy, Environment Agency (2008; <http://publications.environment-agency.gov.uk/pdf/GESW0506BKVI-E-E.pdf>)

¹² Bristol Avon Catchment Abstraction Management Strategy, Environment Agency (2005; <http://publications.environment-agency.gov.uk/pdf/GESW1004BIJV-E-E.pdf>)

Service	Assets/ attributes: main contributors to service	State	Main beneficiary	Analysis	Opportunities	Principal services offered by opportunities
Water availability continued				<p>Continued from previous... To protect existing abstraction licences and the environment, it may be important to ensure all new developments are supplied with water within current abstraction limits rather than increasing abstractions or developing new sources.</p> <p>Chew Valley Lake is an internationally important wildlife site designated as an SPA and Ramsar Site as an important wildfowl habitat.¹³</p> <p>Blagdon and Chew Valley Lakes are eutrophic due to high levels of nutrients in the water. Both lakes are designated as Drinking Water Protected Areas. The catchments which drain to the lakes, and the catchments from which water is pumped/gravity fed to the lakes, have been identified as Safeguard Zones.</p> <p>The Environment Agency is working with Bristol Water, Natural England and other partners to develop Drinking Water Protected Area Safeguard Zone action plans to address the sources of nutrients entering the lakes. The area surrounding each lake is designated a Nitrate Vulnerable Zone under the Nitrates Directive.</p>		

¹³ Bristol Avon Catchment Abstraction Management Strategy, Environment Agency (2005; <http://publications.environment-agency.gov.uk/pdf/GESW1004BIJV-E-E.pdf>)

Service	Assets/ attributes: main contributors to service	State	Main beneficiary	Analysis	Opportunities	Principal services offered by opportunities
Genetic diversity	Orchard fruit varieties	Although not a major fruit producing area, some traditional orchards remain and there are local fruit varieties that originate from this NCA.		<p>Genetic diversity of orchard fruit varieties are important to maintain in order to safeguard food provision, and afford increased resilience to climate change and disease.</p> <p>Examples of local varieties from this NCA include the Bedminster pippin apple and the Bristol cross pear.ww</p>	<p>Maintain collections such as the national fruit collection at Brogdale Farm, Kent and the Perry Pear collection at Hartpury, Gloucestershire.</p> <p>Raise awareness of local varieties and link owners with suppliers.</p> <p>Encourage regeneration and planting of local varieties.</p>	<p>Genetic diversity</p> <p>Climate regulation</p> <p>Pollination</p> <p>Biodiversity</p> <p>A sense of place</p> <p>A sense of history</p>

Service	Assets/ attributes: main contributors to service	State	Main beneficiary	Analysis	Opportunities	Principal services offered by opportunities
Biomass energy	<p>Coppice woodland</p> <p>Existing woodland (6 per cent of the NCA)</p>	<p>Currently there is little biomass production in this NCA as most of the productive land area is used for food production.</p> <p>With a woodland cover of 8 per cent this NCA has some potential for the production of biomass by bringing existing woodland back under management and as a by-product of commercial timber production. Hedgerows also provide local opportunities for coppiced timber.</p>	Local	<p>There is some potential for the provision of biomass through bringing some areas of unmanaged woodland back under small-scale coppice management. This may also locally extend to coppiced wood from hedgerow management.</p> <p>There may also be some potential for miscanthus, and short rotation coppice in some areas of the NCA. However, 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.</p> <p>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.¹⁴</p>	<p>Opportunities for short rotation coppice and miscanthus exist in the NCA.</p> <p>There is scope to bring areas of woodland back into traditional coppice for small-scale wood fuel production and benefits to biodiversity. Some hedgerow management could also be included in this.</p>	<p>Biomass energy</p> <p>Climate regulation</p> <p>Biodiversity</p> <p>Water availability</p>

¹⁴ URL: www.naturalengland.org.uk/ourwork/farming/funding/ecs/default.aspx

Service	Assets/ attributes: main contributors to service	State	Main beneficiary	Analysis	Opportunities	Principal services offered by opportunities
Climate regulation	<p>Carbon-rich soils, peat soils at Gordano Valley</p> <p>Soil carbon and stable microbial community under permanent pasture</p> <p>Extensive hedgerow networks, traditional orchards, woodland and parkland</p>	<p>The mineral soils of this NCA are generally low in soil carbon especially where they have been under continuous arable cultivation. Carbon sequestration can be increased by organic matter inputs and by reducing the frequency/area of cultivation..</p> <p>There are significant peat deposits in the Gordano Valley, some of which falls into this area.</p> <p>The combination of woodland, parkland, traditional orchards and hedgerows plays an important part in carbon sequestration.</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>Trees and green infrastructure in the expansive urban environment of Bristol contribute to regulating the urban heat island effect.</p>	Local	<p>The potential for soil carbon sequestration in this NCA is low as there is no active peat deposition; however the peat deposits at 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 Gordano, however this would affect the features that the site is currently notified and managed for.</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, where permanent pasture is grazed by cattle, it can result in release of methane by the animals themselves. Other ruminants such as sheep also release methane but to a lesser extent per animal.</p> <p>Production of inorganic fertilizer is particularly energy intensive and large volumes of greenhouse gases are emitted during production. Soil testing enables the calculation of optimal fertilise application rates, thus reducing excess use of fertiliser, saving energy, money and benefiting water quality.</p> <p>Continued over...</p>	<p>Maintain carbon storage particularly peat soils at Gordano Valley.</p> <p>Maintain levels of carbon sequestration through sustainably managing the woodlands and hedgerows of the area.</p> <p>Prevent CO2 release by maintaining permanent pasture and ensuring it is managed within a sustainable regime.</p> <p>Encourage incorporation of organic matter into cultivated mineral soils to appropriate levels, avoiding overloading that might cause diffuse pollution.</p> <p>Maintaining traditional orchards and wood pasture and parkland, which 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>Incorporate street trees and green infrastructure into urban design.</p>	<p>Climate regulation</p> <p>Regulating water flow</p> <p>Regulating water quality</p> <p>Biodiversity</p>

Service	Assets/ attributes: main contributors to service	State	Main beneficiary	Analysis	Opportunities	Principal services offered by opportunities
Climate regulation continued				<p>Continued from previous...</p> <p>Increasing organic inputs into cultivated mineral soils would increase the overall carbon content of these soils, contributing slightly to carbon storage, soil condition and water retention.</p>		

Service	Assets/ attributes: main contributors to service	State	Main beneficiary	Analysis	Opportunities	Principal services offered by opportunities
Regulating water quality	<p>Hedgerows and buffer strips across steeper slopes</p> <p>Permanent grassland particularly low input</p> <p>Semi-natural habitats</p> <p>Appropriate tillage</p> <p>Good livestock management</p> <p>Buffer strips alongside watercourses</p> <p>Diffuse and point source pollution prevention</p> <p>Sustainable urban drainage</p>	<p>Part of the NCA falls within the North Somerset Moors Priority Catchment.</p> <p>The Congresbury Yeo has problems of sedimentation, phosphates, nitrogen enrichment and low dissolved oxygen which have resulted from downwash off the steep slopes of the Mendip Hills and Broadfield Down.¹⁵ The upper Congresbury Yeo catchment is included within a Nitrate Vulnerable Zone (NVZ).</p> <p>Where information is available ground water quality is poor, although there are areas to the south and the south-west where ground water quality is good.</p> <p>In terms of surface waters, there are stretches of the River Avon that have failed to achieve good chemical quality and the lower part of the catchment suffers from Water Framework Directive (WFD) ecological failures (primarily fish failures). Equally parts of the Frome within this NCA are classified as having 'bad' ecological status, failing for fish and phosphate in some waterbodies. This contrasts with tributaries in the upper reaches of the NCA boundary that are at 'good' ecological status, although the other smaller rivers of the NCA generally only have moderate ecological status, including tributaries of the Avon.¹⁶</p> <p>Grazing is restricted around the Chew and Blagdon reservoirs to prevent contamination of the public water supply.</p>	Regional	<p>Low flows result in deterioration of water quality due to increasing concentrations of nutrients, maintaining and expanding semi-natural habitat will help to slow the flow of water across the landscape, reducing the extremes of peak and low flow events, soil erosion and particulate reaching the watercourses. Semi-natural habitat also reduces the amount of diffuse pollution as they are low or no input areas, protecting aquifers and watercourses.</p> <p>Invasive non-native species such as Himalayan balsam are a problem and can result in exposed soil along the river banks resulting in erosion and increased particulates entering the watercourse.</p> <p>Due to the large urban area covering this NCA, run-off from roads will contribute to the amount of pollution entering the watercourses. Sustainable urban drainage (SUDS) incorporated into new developments can help reduce the amount of pollution reaching rivers as it is held in the particulate matter of the reed beds. SUDS can also provide benefits for biodiversity and contribute to green infrastructure.</p> <p>Continued over...</p>	<p>Maintain ecological flow levels in watercourses by managing abstraction, as described above, to avoid over abstraction resulting in low flow levels which will impact ecological status of watercourses.</p> <p>Expand the network of semi-natural wetland habitats adjacent to watercourses including; flood plain grazing marsh, fen and reedbeds, plus creation of grassland buffer strips, restoration of hedgerows across slopes within river catchments.</p> <p>Work with farmers, particularly across the North Somerset Moors catchment, to reduce sources of diffuse agricultural pollution, run-off and soil erosion into watercourses.</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>Work with landowners, the Environment Agency and water companies in addressing point source discharges.</p> <p>Continued over...</p>	<p>Regulating water quality</p> <p>Regulating soil erosion</p> <p>Biodiversity</p> <p>Climate regulation</p>

¹⁶ Water for Life and Livelihoods, Environment Agency (2009; <http://publications.environment-agency.gov.uk/pdf/GEM10910BSSM-E-E.pdf>)

¹⁵ Defra catchment priorities identified under the England Catchment Sensitive Farming Delivery Initiative (URL: www.defra.gov.uk/foodfarm/landmanage/water/csfd/documents/catchment-priorities.pdf)

Service	Assets/ attributes: main contributors to service	State	Main beneficiary	Analysis	Opportunities	Principal services offered by opportunities
Regulating water quality continued				<p>Continued from previous...</p> <p>Priorities, under the catchment sensitive farming initiative for the North Somerset Moors Priority Catchment, are to: protect drinking water supply and reduce levels of nutrients and pesticides in catch waters of Chew Valley Lake; reduce levels of diffuse agricultural pollution arising from livestock and arable farming; minimise sources of run-off and soil-wash entering watercourses; prevent pathways for run-off; and protect receiver watercourses.¹⁷ Although there is some scope for work within the NCA, some of the water quality issues rely on catchment sensitive farming in the part of the catchment outside of this NCA.</p>	<p>Continued from previous...</p> <p>Incorporate SUDS into new development to reduce pollution from run-off from urban areas reaching rivers.</p> <p>Work with local authorities and water companies to prevent foul sewer overflows reaching rivers.</p>	

¹⁷ Capital Grant Scheme – Funding Priority Statement 2012/13, Catchment 36: North Somerset Moors, Natural England (date unknown).

Service	Assets/ attributes: main contributors to service	State	Main beneficiary	Analysis	Opportunities	Principal services offered by opportunities
Regulating water flow	<p>Rivers and streams</p> <p>Existing semi-natural habitat</p> <p>Sustainable urban drainage</p> <p>Flood protection defences</p>	<p>While there is little or no risk of flooding across most of the NCA, largely due to the flood defence works which have been put in place, there are some areas where flood risk is higher, including parts of the River Avon and the coastal settlements such as Portishead and Clevedon. Problems of flooding largely relate to tide lock flooding and tidal flooding downstream.</p> <p>The NCA contain a large urban component (Bristol and its environs), meaning that excess water does not easily soak into the ground. The defences through Bristol include the Northern Storm Water Interceptor (NSWI), diverting flood flows from the Bristol Frome away from the City into the tidal Avon. There are also smaller diversion channels on the Ashton, Longmoor and Colliters Brooks and the Brislington Brook.</p> <p>The Floating Harbour in the centre of the City has a vital role in protecting the City from combined tidal and fluvial flooding, effectively acting as a large storage area. Tubbs Bottom detention dam was constructed to reduce the risk of flooding to areas downstream on the Bristol Frome. Similar approaches are being investigated in other parts of the NCA.¹⁸</p> <p>In the wider landscape areas of semi-natural vegetation, woodland, hedgerows etc all contribute to the slowing of run-off which helps mitigate flood water.</p>	Regional	<p>Much of the Avon catchment is in the neighbouring Cotswolds and Avon Vale NCAs meaning that habitat and river management to alleviate flooding would need to be carried out largely in these NCAs to slow the flow of water entering the river.</p> <p>The risk of surface water flooding may increase with more frequent extreme weather events and more regular heavy downpours. Managing the soil quality to maintain or improve its porosity, as well as soft landscaping and SUDS incorporated into new developments, can all help to alleviate surface water flooding.</p> <p>Management of the wider landscape, such as woodland planting, buffer strips, riparian vegetation, and reconnecting rivers with their flood plains can reduce run-off and aid water storage slowing the flow of water from the landscape into watercourses and reducing peak flow events.</p>	<p>Seek to restore semi-natural habitats, thus utilising natural processes to regulate surface water flow across the landscape, particularly wetland habitats including flood plain grazing marsh, fen, reedbeds and wet woodland in the flood plain.</p> <p>Reduce the speed of water flow through river/stream channels through re-profiling and naturalisation of watercourses.</p> <p>Realise opportunities for flood water storage where they are identified.</p> <p>Seek opportunities to incorporate grass buffer strips and restore hedgerows across slopes within river catchments.</p> <p>Improve the quality of cultivated soils to increase water retention and reduce run-off.</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>Regulating water flow</p> <p>Regulating water quality</p> <p>Biodiversity</p> <p>Regulating soil erosion</p> <p>Regulating soil quality</p>

¹⁸ Bristol Avon Catchment Flood Management Plan, Environment Agency (2005; <http://publications.environment-agency.gov.uk/pdf/GESW1109BOUS-e-e.pdf>)

Service	Assets/ attributes: main contributors to service	State	Main beneficiary	Analysis	Opportunities	Principal services offered by opportunities
Regulating soil quality	<p>Unimproved pastures</p> <p>Appropriate tillage</p> <p>Appropriate stocking levels</p>	<p>This NCA has 8 main soilscape types: slightly acid loamy and clayey soils with impeded drainage, covering 31 per cent of the NCA; slowly permeable seasonally wet slightly acid but base-rich loamy and clayey soils (14 per cent); freely draining slightly acid but base-rich soils (13 per cent); shallow lime-rich soils over limestone (11 per cent); freely draining slightly acid loamy soils (11 per cent); slowly permeable seasonally wet acid loamy and clayey soils (8 per cent); lime-rich loamy and clayey soils with impeded drainage (8 per cent); and loamy and clayey flood plain soils with naturally high groundwater (2 per cent).</p>	Regional	<p>The slightly acid loamy and clayey soils with impeded drainage (31 per cent) and the slowly permeable seasonally wet slightly acid but base-rich loamy and clayey soils (14 per cent) 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. Careful timing of activities is required to reduce the likelihood of soil compaction which will also be helped by an increase in organic matter levels.</p> <p>In the case of the freely draining slightly acid but base-rich soils (13 per cent), where calcareous layers (horizons) are near the surface these help provide some natural resilience and enhanced workability. Some component soils are at risk from topsoil compaction and poaching. Careful management of weak topsoils will help to maintain a good soil structure. Minimum tillage such as direct drilling can work well on some of these soils.</p> <p>Development of iron pans can occur in some soils. Where organic matter is low increasing organic matter inputs can help improve soil structure.</p> <p>Continued over...</p>	<p>Support measures which employ minimal tillage and organic matter incorporation into cultivated soils 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 cultivated soils to improve soil structure and conditions for soil fauna, increasing water infiltration.</p>	<p>Regulating soil quality</p> <p>Regulating soil erosion</p> <p>Regulating water quality</p> <p>Biodiversity</p> <p>Climate regulation</p>

Service	Assets/ attributes: main contributors to service	State	Main beneficiary	Analysis	Opportunities	Principal services offered by opportunities
Regulating soil quality continued				<p>Continued from previous...</p> <p>The lime-rich soils over limestone (11 per cent) are typically shallow and droughty but due to their calcareous nature have a degree of natural resilience. These and the freely draining slightly acid loamy soils (11 per cent) are valuable for aquifer recharge requiring the maintenance of good soil structure (enhanced by increased organic matter content) to aid water infiltration and require the matching of nutrients to needs to prevent pollution of groundwater.</p>		

Service	Assets/ attributes: main contributors to service	State	Main beneficiary	Analysis	Opportunities	Principal services offered by opportunities
Regulating soil erosion	<p>Hedgerows and buffer strips across steeper slopes</p> <p>Permanent grassland</p> <p>Semi-natural habitats</p> <p>Sustainable systems of arable cultivation</p> <p>Well managed livestock systems</p>	<p>The majority of soils in this NCA are at risk of erosion where management results in loss of stabilising vegetation. The soils with a clay content and impeded drainage and base-rich soils, together making up some 56 per cent of this NCA, are prone to capping and slaking increasing the risks of soil erosion by surface water run-off, especially on steeper slopes. They are easily compacted by machinery or livestock if accessed when wet and need to be managed carefully to reduce risks with careful timing of cultivations and maintenance of vegetation cover.</p> <p>Equally the freely draining slightly acid soils and shallow lime-rich soils are at risk of erosion on moderately or steeply sloping land where cultivated or bare soil is exposed. This is exacerbated where organic matter levels are low after continuous arable cultivation or where soils are compacted. Indeed the only soils not susceptible to erosion are the slowly permeable and flood plain soils.</p> <p>This susceptibility to erosion is reflected in the catchment of the Congresbury Yeo which falls within the North Somerset Moors Priority Catchment. Here bare and / or compacted soils created by intensive dairying, outdoor pig rearing, poultry and maize production, suffer from soil erosion leading to the sedimentation of watercourses.¹⁹</p>	Regional	<p>The permanent pasture across much of the landscape reduces the risk of soil erosion, although inappropriate stocking may cause compaction and result in increased overland water flow and subsequent increased erosion.</p> <p>Woodlands, dense hedgerows and permanent grassland or buffer strips across slopes and alongside watercourses can reduce the velocity of water as it flows across farmland, potentially reducing soil erosion and safeguarding soil quality.</p> <p>Appropriate fencing to prevent livestock trampling the riverbanks, and appropriate stocking levels to prevent poaching and capping could improve soil quality. These measures are recognised in the North Somerset Moors Catchment priority statement¹⁴ which supports measures which minimise soil-wash entering watercourses, prevent pathways for run-off, and protect receiver watercourses.</p>	<p>Work with landowners to produce sustainable systems of arable cultivation and well managed livestock to reduce poaching and soil exposure, particularly on steeper slopes using measures such as expanding areas of permanent grassland, woodland, dense hedgerows and buffer strips across steeper slopes and next to watercourses.</p> <p>Plant or restore hedges, in keeping with landscape character to impede cross-land water flow particularly during heavy rain.</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>Encourage landowners to make use of the Catchment Sensitive Farming capital payments for the North Somerset Moors priority catchment.</p>	<p>Regulating soil erosion</p> <p>Regulating soil quality</p> <p>Regulating water flow</p> <p>Regulating water quality</p> <p>Biodiversity</p>

¹⁹ Defra catchment priorities identified under the England Catchment Sensitive Farming Delivery Initiative (URL: www.defra.gov.uk/foodfarm/landmanage/water/csf/documents/catchment-priorities.pdf)

Service	Assets/ attributes: main contributors to service	State	Main beneficiary	Analysis	Opportunities	Principal services offered by opportunities
Pollination	<p>Woodlands</p> <p>Species-rich grasslands</p> <p>Species-rich road verges</p> <p>Gardens</p> <p>Traditional orchards</p>	<p>The woodlands/ orchards of the NCA and small remaining areas of flood plain grazing marsh, grasslands, road verges and remnant meadows will provide a nectar source for pollinating insects.</p> <p>Potentially the most important nectar source will be the very large numbers of domestic gardens which offer a rich foraging environment for pollinating insects. These lie relatively close to areas under agricultural production and provide both nectar and habitats for many insects.</p>	Local	<p>A strong pollinator population supports production of a wider variety of food products and supports food production in the future.</p> <p>Although there is a reasonable spread of flower-rich semi-natural habitat across the NCA, some of which are SSSI, there is scope to improve the condition of this habitat through appropriate management and to extend it where possible, including through environmental stewardship.</p> <p>Species-rich road verges provide a pollination network, linking pollinators to crops across the agricultural landscape. Less frequent cutting of road verges has helped improve their biodiversity value.</p>	<p>Improve the condition of and increase the area of semi-natural habitats, with particular emphasis on unimproved flower-rich grasslands, flood plain grazing marsh and traditional orchard.</p> <p>Encourage the use of nectar and forage mixes in arable land, and appropriate management of species-rich hedgerows, to increase the availability of nectar sources in close proximity to food crops requiring pollination.</p> <p>Work with, local authorities/ 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>Encourage nectar rich planting in gardens.</p>	<p>Pollination</p> <p>Food provision</p> <p>Biodiversity</p> <p>A sense of place</p>

Service	Assets/ attributes: main contributors to service	State	Main beneficiary	Analysis	Opportunities	Principal services offered by opportunities
Pest regulation	<p>Existing semi-natural habitat</p> <p>Agricultural field margins</p> <p>Species-rich hedgerows</p> <p>Woodland</p>	<p>The mixed farming nature of the area, with a spread of semi-natural habitats throughout the agricultural area of this NCA will support species that will aid pest regulation.</p>	Local	<p>Increasing diversity in species and structure of field margins will increase the ability for these areas to support populations of pest regulating species such as invertebrates, birds and mammals.</p> <p>There is scope to improve the condition of, and extend the amount of semi-natural habitat across the area. Linking semi-natural habitat to provide a sustainable functional network will help support sustainable populations of pest regulating species and enable them to move around the landscape.</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 crop.</p>	<p>Pest regulation</p> <p>Pollination</p> <p>Biodiversity</p> <p>Food production</p>

Service	Assets/ attributes: main contributors to service	State	Main beneficiary	Analysis	Opportunities	Principal services offered by opportunities
Regulating coastal flooding and erosion	Rocky shoreline	<p>This NCA has a short coast line, from Portishead to Clevedon, which is characterised by cliffs fronted by a rock platform, forming a narrow intertidal area, covered by intermittent mud and gravel deposits.</p> <p>This coastline has several conservation designations of international, national and local importance. In particular, it is part of the Severn Estuary SAC.</p> <p>The cliffed coast is largely undefended (although some local protection is in place), and the cliffs have a hard rock geology which is resistant to erosion and, as a consequence, erosion rates are generally low although there is local variation reflecting local geological and geomorphological factors.</p>	Local	<p>Coastal flooding and erosion do not significantly impact this NCA due to the rocky nature of the shoreline. The current coastal management policy is to hold the existing defence line around Clevedon with no active intervention along the rocky shore to Portishead.</p> <p>The Gordano valley is the most likely area to experience flooding. Climate change is likely to increase tidal flood risk in the Severn Estuary,²⁰ the tidal reaches of the Avon are at risk from tide locking.</p>	<p>Manage the coast in line with the existing policies to hold the existing defences as necessary, with no active intervention elsewhere.</p> <p>No additional opportunities exist due to the nature of the very short stretch of coastline attached to this NCA.</p>	Regulating coastal flooding and erosion

²⁰ Severn Estuary Catchment Shoreline Management Plan, Environment Agency (URL: www.severnestuary.net/secg/docs/public_per_cent20consultation/Sept10/12_Appendix_per_cent20l_per_cent20PART_per_cent20A_SEA.pdf)

Service	Assets/ attributes: main contributors to service	State	Main beneficiary	Analysis	Opportunities	Principal services offered by opportunities
Sense of place/ inspiration	<p>Alternating ridges and broad valleys</p> <p>Avon Gorge</p> <p>Country houses and associated parkland</p> <p>Views outwards to the Cotswolds and Mendips</p> <p>Maritime port and city harbourside</p>	<p>Sense of place is provided by the varied topography of alternating ridges and broad valleys, and views outwards to the Cotswold and Mendip Hills, with the Avon Valley running across the centre of the NCA and the City of Bristol (with its dramatic gorge and Grade I-listed Clifton Suspension Bridge) lying at its heart and dominating much of the area.</p> <p>In former mining villages, settlement is often dispersed with rows of cottages and isolated houses, with scattered farmsteads and hamlets elsewhere, while the use of local stone, including a variety of limestone, Lias and Pennant Sandstone, influences character at a local level.</p> <p>Large country houses are common, their wooded parkland providing relief from the open, rolling farmland, while the Chew Valley Lake and Blagdon Lake reservoirs are distinctive elements of the rural Yeo and Chew Valley landscapes to the south.</p> <p>At the far south the Victorian seaside resort of Clevedon with its grand houses and pier are evidence of an past age of prosperity and rapid industrialisation. Mill buildings add further character to rural areas, while the traditional industrial associations of Bristol, based on its port, are an evident characteristic.</p> <p>Continued over...</p>	Regional	<p>The NCA is of variable character contrasting the relative tranquillity of the rural clay vales with the busy city, suburban commuter towns and arterial road routes. Continuing piecemeal development, not necessarily in character with the vernacular of the area, threatens the character of some of the more rural villages, particularly in the Chew Valley.</p> <p>Development along the M5 corridor particularly at Cribbs Causeway and development at Bradley Stoke and Emersons Green has resulted in the loss of large areas of farmland changing the character of the area and having causal effects on biodiversity and ecosystem services such as water availability, flood resilience, green space for recreation and well being.</p>	<p>There are opportunities through forward planning (coordinated across all 4 unitary authorities) to protect the rural character of the area from encroaching urban or suburbanisation.</p> <p>Maintain the rural settlement pattern of small villages clustered around springheads or along the springline in limestone areas, linear mining villages or scattered vale villages, linked by a complex network of lanes, using local stone to retain settlement distinctiveness according to the variability of the underlying geology across the NCA.</p> <p>Maintain, restore and manage for biodiversity and recreation, the historic parklands with their veteran trees and landscape design that are all key features of the landscape of this NCA.</p> <p>Maintain, restore and expand the semi-natural habitats of native woodland and species-rich grasslands that are intrinsic to the rural character of this area.</p> <p>Protect the impressive views of the Avon Gorge and its setting, the Clifton Downs, from encroachment and development.</p> <p>Continued over...</p>	<p>Sense of place/ inspiration</p> <p>Recreation</p> <p>Geodiversity</p> <p>Biodiversity</p> <p>Regulating water quality</p> <p>Regulating water flow</p>

Service	Assets/ attributes: main contributors to service	State	Main beneficiary	Analysis	Opportunities	Principal services offered by opportunities
Sense of place/ inspiration continued		<p>Continued from previous...</p> <p>Development along the M4 and M5 corridors has led to extensive built development to the north and west of Bristol, giving these landscapes a modern, transitional character.</p> <p>The area is dominated in its centre by the City of Bristol with its many historical and cultural associations such as its Cathedral, University, merchant's houses and squares and impressive views, not least the Avon Gorge, while elsewhere in the NCA inspiration is provided by parklands, ancient woodlands, historic features, ridge-top views and tranquil valley landscapes.</p> <p>Bristol and the surrounding area have associations with a number of historical literary figures such as Wordsworth and Coleridge. JK Rowling, author of the "Harry Potter" novels was born just outside Bristol at Chipping Sodbury.</p>			<p>Continued from previous...</p> <p>Conserve historic buildings associated with the development of Bristol as a port and the mills, warehouses and factories associated with colonial import processing.</p>	

Service	Assets/ attributes: main contributors to service	State	Main beneficiary	Analysis	Opportunities	Principal services offered by opportunities
Sense of history	<p>Long timeline of historic features visible across the landscape.</p> <p>Associations with Brunel</p> <p>Bristol as a maritime trading port</p>	<p>The history of the landscape is evident in extensive prehistoric remains, including the stone circles and long barrow at Stanton Drew, the Stoney Littleton or Fairy Toot long barrow at Butcombe, the Neolithic and bronze-age barrows on high ground to the west and south of the NCA, and the iron-age hill forts such as Cadbury Camp, as well as Roman influences (the port at Sea Mills and villas either side of the Avon Valley and on the fertile soils north of the Mendip Hills).</p> <p>The Saxon-era earthworks of the Wansdyke cut across the ridges south of Bristol while Bristol itself reflects its importance as a trading port from medieval times onward – once the premier port of England. Tips and pits that once proclaimed the coal mining past of the wider area are now largely covered up, though the area's railways, canals and settlement pattern still reflect its industrial heritage.</p> <p>Aspects of history likely to be particularly evident to the general public include the area's prominent industrial/built features, notably strong associations with Brunel, including the Clifton Suspension Bridge, Bristol's Floating Harbour and the SS Great Britain permanently berthed in the Harbour, and Bristol Temple Meads Station and its strong associations with the genesis of the Great Western Railway.</p> <p>Continued over...</p>	National	<p>The area contains a wide range of visible history across both the rural and urban landscape. The historical features of the city of Bristol are well interpreted and accessible, though there is scope to provide improved interpretation of these and more rural features to develop wider understanding and appreciation of the area's heritage. For example completion of the Wansdyke ditch long distance footpath would provide many opportunities for historical interpretation.</p> <p>There are a number of historic buildings and scheduled ancient monuments currently on the English Heritage risk register including, for example, several sections of the Wansdyke that are at risk from arable ploughing.²¹</p>	<p>The protection of heritage assets should be ensured at every opportunity. Increase protection of above and below ground archaeology, e.g. medieval township field systems, ridge and furrow, parkland, standing stones, hill forts, industrial relics and ports for educational and recreational purposes.</p> <p>Work with land managers to protect ridge and furrow and below ground features through appropriate land cover such as permanent grassland.</p> <p>The restoration and conversion of vernacular buildings should be sympathetic, use local materials and preserve local distinctiveness.</p> <p>Opportunities to enhance the setting, interpretation and legibility of heritage assets should be identified and realised. There are opportunities to develop the rights of way network, create circular walks with interpretation and themed local events linked to the area's historic and industrial heritage of national importance, to aid understanding, enjoyment and a sense of well-being.</p>	<p>Sense of history</p> <p>Sense of place/ inspiration</p> <p>Recreation</p> <p>Geodiversity</p>

²¹ Heritage at Risk Register South West, English Heritage (2011; www.english-heritage.org.uk/publications/har-2011-registers/)

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Sense of history		<p>Continued from previous...</p> <p>The great Victorian warehouses of Bristol such as Wills tobacco stand as testament to the City's trading past, its associations with slavery and its long maritime history. There are also a wealth of large country houses and parklands which demonstrate the previous wealth of the city area.</p>				
Sense of tranquillity	<p>Rural landscape</p> <p>Parks and gardens</p> <p>Green infrastructure</p>	<p>Tranquillity has declined fairly significantly in the past fifty years, with 'undisturbed' areas falling from 53 per cent in the 1960s to 21 per cent by 2007.¹ Disturbance is most significant around Bristol and along the main arterial routes out of the City (M4, M5, A38, A37, A4), with the only real 'undisturbed' areas remaining in the Yeo and Chew Valleys in the south and the rural landscapes to the north of Yate.</p> <p>Bristol airport significantly impacts the tranquillity south of Bristol, and beyond the boundaries of the NCA. Nevertheless, in this highly populated NCA, a sense of tranquillity is likely to be much sought after and relative tranquillity will be found in areas of parkland and woodland, such as Ashton Court and Leigh Woods to the west of Bristol and in the many parks and squares of the City.</p>	Local	<p>Although there is significant disturbance to tranquillity over much of this NCA, the provision of comparatively tranquil spaces is extremely important to residents particularly of the main urban areas.</p> <p>Municipal parks and historic parklands can provide a break from the constant background noise of the urban environment. Green infrastructure planning can play an important part in providing a network of spaces that could be considered tranquil in comparison to busy urban areas.</p>	<p>Ensure that adequate green infrastructure provision is integral to all development planning in order to expand areas of relative tranquillity particularly within the urban environment.</p> <p>There are opportunities to retain the remaining sense of tranquillity on downland and parklands, undeveloped valleys, woodland and agricultural land by protecting them from inappropriate development.</p>	<p>Sense of tranquillity</p> <p>Sense of place/ inspiration</p>

Service	Assets/ attributes: main contributors to service	State	Main beneficiary	Analysis	Opportunities	Principal services offered by opportunities
Recreation	<p>2,161 km of public rights of way</p> <p>Cotswold Way National Trail and other long distance paths</p> <p>National Cycle Network and off-road cycling</p> <p>Historic parkland</p> <p>City of Bristol with maritime historic assets</p> <p>Access to water sports</p>	<p>Recreation is supported by The Forest of Avon Community Forest, the River Avon Trail, the Bristol to Bath Railway Walk, Monarch's Way and 1.9km of the Cotswolds Way.</p> <p>Overall there is a 2,200km network of rights of way at a density of 2.56 km per km² and around 1,000 ha of open access land covering 1.12 per cent of the NCA, which is particularly important in this highly populated NCA.</p> <p>Ashton Court and Leigh Woods provide recreational opportunities to the west of Bristol, while in the east of the City there are walks along the River Frome to the Oldbury Court Estate.</p> <p>In the south of the area, the Chew Valley Lake and Blagdon Lake reservoirs offer opportunities for fishing, sailing, walking and bird-watching. The rock formations also provide opportunities for climbing and caving.</p> <p>The City of Bristol is a major tourist destination known for Brunel's masterpiece, the Clifton Suspension Bridge, its maritime history, and its harbourside. Bristol was the UK's first 'cycling city' and the National Cycle Network enables people to access the surrounding countryside and further afield with ease. The NCA enjoying a high density of National Cycle Network routes including Route 3 to Lands End and Route 4 London to Fishguard.</p>	Regional	<p>This NCA is assessable to the large populations of Bristol and Bath and the surrounding settlements. It is also easily accessible by road or rail to people much further afield.</p> <p>Tourism is important to the area and events such as the balloon festival draw in additional numbers of visitors. Outdoor recreation reconnects or maintains people's connection with the landscape and ecosystems that supports them and encourages a valuing of their surroundings.</p> <p>Opportunities for access to the countryside throughout the area are also valuable for health and wellbeing, particularly mental health in an area with such an urban concentration and provision of access is currently available through a network of green spaces and the rights of way network.</p>	<p>There are opportunities to improve access throughout the area through implementation of Rights of Way Improvement Plans, developing multi-user and "access for all" paths, clear signposting and improving interpretation to provide increased understanding and enjoyment for all.</p> <p>Ensure access balances recreational enjoyment, with the protection of biodiversity, geodiversity and historic features.</p> <p>Work in partnership with local health boards to make the most of opportunities for health and mental wellbeing through the rights of way network, connecting green spaces, parkland and downland.</p> <p>Manage the historic and other touristic assets which bring people to the area to ensure they are protected, while still being accessible to be enjoyed by the public.</p>	<p>Recreation</p> <p>Sense of place/ inspiration</p> <p>Sense of history</p>

Service	Assets/ attributes: main contributors to service	State	Main beneficiary	Analysis	Opportunities	Principal services offered by opportunities
Biodiversity	<p>Internationally designated sites</p> <p>Nationally designated SSSI</p> <p>Local Wildlife Sites and nature reserves</p>	<p>5 per cent of the NCA is covered by BAP priority habitats (4,300 ha): 3,600 ha of this is BAP priority woodland (lowland mixed deciduous and wet woodland) with 900 ha of reedbeds and 600 ha each of lowland meadows and coastal and flood plain grazing marsh, all BAP priority habitats.</p> <p>2,000 ha of the NCA is designated as SSSI (2 per cent of the NCA area), there are 2 SPAs, 3 SACs and 1 Ramsar site and two National Nature Reserves, the Gordano Valley (part) and Leigh Woods. The majority of SSSI in the area are currently in favourable or recovering condition.</p>	International / national	<p>The area contains particularly important internationally designated ancient woodlands associated with the limestone ridge and Avon Gorge that support many rare and threaten species such as Bristol rock cress and the populations of unique whitebeam species. Protection, management and balancing the needs of the species with recreational pressures are crucial for the survival of these species. There are a variety of issues in the gorge which need careful management in order to protect areas of species-rich limestone grassland, rare plants as well promoting the growth of young whitebeams.</p> <p>Graffiti on the rock faces and possible impact of air pollution are also issues in the Avon Gorge. Graffiti removal is difficult as it may result in pollution issues and damage to sensitive rare plants and grassland habitats.</p> <p>Nitrogen deposition and nitrogen oxides from air pollution may be causing eutrophication of the Avon Gorge woodlands²² and could potentially lead to the loss of sensitive species.</p> <p>Many of the SSSI across the NCA are designated for woodland or species-rich grassland. Appropriate land management will help to maintain and improve the condition of these sites in addition to benefiting a range of other ecosystem services.</p>	<p>Maintain and improve the condition of protected sites by working with landowners both of the sites and surrounding land, to protect sites and increase buffering and connectivity.</p> <p>Work with site owners including the National Trust and Network Rail to explore methods for sensitively managing graffiti on the rock faces of the gorge.</p> <p>Pollution from nitrogen deposition and nitrogen oxides are suspected to be having detrimental effects on the SAC. There is an opportunity to carry out air pollution monitoring to confirm whether this is the case and if so, inform action.</p>	<p>Biodiversity</p> <p>Geodiversity</p> <p>Regulating water quality</p> <p>Regulating water flow</p> <p>Regulating soil erosion</p> <p>Recreation</p> <p>Sense of place/ inspiration</p>

²² Appendix 5: Analysis of Air Quality, in: Habitats Regulations Assessment of the Draft Regional Spatial Strategy for the South West: Final Report, Prepared for the South West Regional Assembly by Land Use Consultants (February 2007)

Service	Assets/ attributes: main contributors to service	State	Main beneficiary	Analysis	Opportunities	Principal services offered by opportunities
Geodiversity	<p>Geological SSSI</p> <p>Local geological sites</p> <p>Accessible fossil beds</p> <p>Local stone used in building</p>	<p>There are 25 nationally designated geological SSSI in this NCA, plus two of mixed interest, reflecting the wide ranging geological interest and geological importance of this area. Many are man-made exposures from mining, quarrying or road/rail cuttings, but there are also natural features such as the Avon Gorge and coastal exposures. Fossil beds are prominent across the areas.</p>	National	<p>The geological SSSI provide important access to geodiversity, enabling the interpretation, understanding and continued research into the geodiversity of the NCA.</p> <p>Exposure of these features also makes a positive contribution toward sense of place and sense of history, both geological history and the industrial history of the area. Accessible fossil exposures are particularly good for instilling a sense of history in young children.</p>	<p>Maintain the largely good condition of geological SSSI in this area and work with landowners to improve the condition where required.</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>Promote the importance of this NCA in the history and development of geology and improve intellectual access and understanding of the geological features of the area.</p> <p>Work with partners to explore methods for sensitively managing graffiti on the rock faces of the gorge.</p>	<p>Geodiversity</p> <p>Sense of place/ inspiration</p> <p>Sense of history</p>

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Catalogue Code: NE400

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