National Character Area profile:

107. Cotswolds

Supporting documents

Introduction & Summary | Description | Opportunities | Key facts and data | Landscape change | Analysis

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NATURAL ENGLAND

Introduction

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

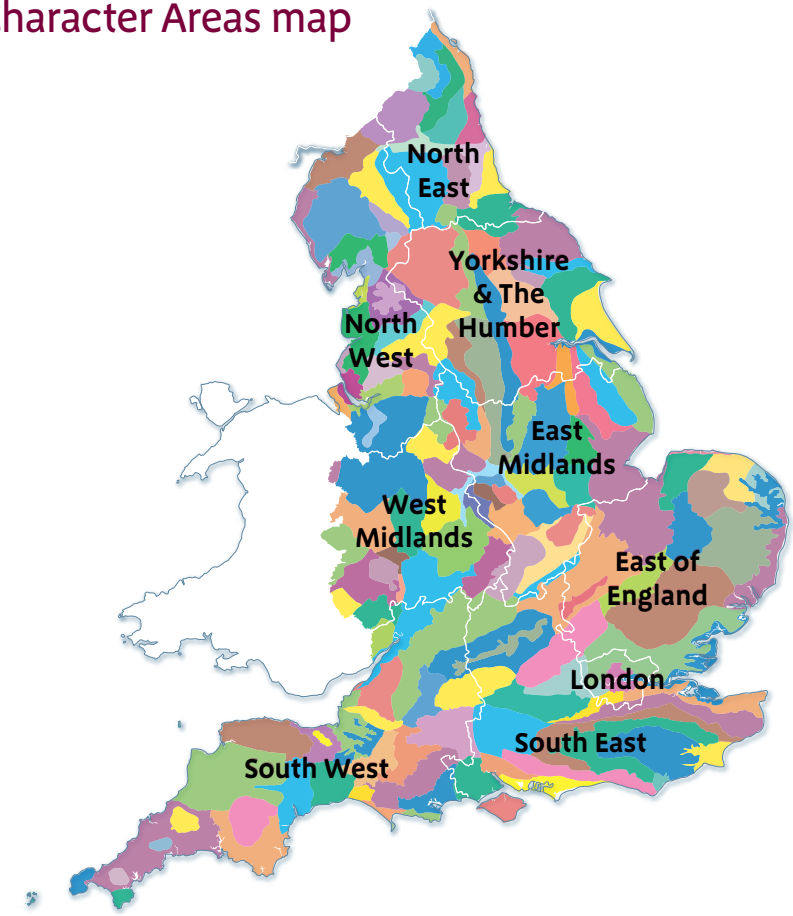
NCA profiles are guidance documents which can help communities to inform their decision-making about the places that they live in and care for. The information they contain will support the planning of conservation initiatives at a landscape scale, inform the delivery of Nature Improvement Areas and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

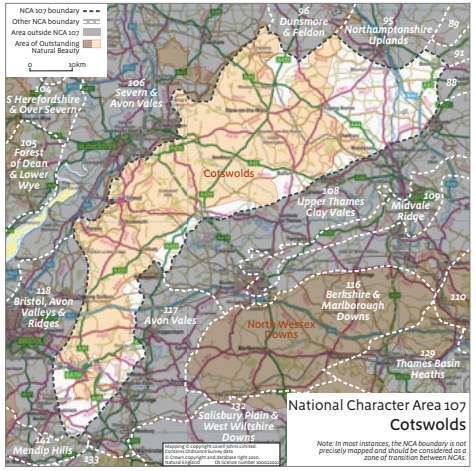
Summary

The Cotswolds form the best-known section of the predominantly oolitic Jurassic Limestone belt that stretches from the Dorset coast to Lincolnshire. The dominant pattern of the Cotswold landscape is of a steep scarp crowned by a high, open wold; the beginning of a long and rolling dip slope cut by a series of increasingly wooded valleys. The scarp provides a backdrop to the major settlements of Cheltenham, Gloucester, Stroud and Bath and provides expansive views across the Severn and Avon Vales to the west. Smaller towns and villages nestle at the scarp foot, in the valley bottoms and on the gentler valley sides at springlines. Scattered hamlets and isolated farmsteads are found on the higher ground. The limestone creates a strong sense of place and unity which carries through to the buildings and walls which have been built using local limestone for centuries. The distinctive character of the area is reflected in its designation as the Cotswolds Area of Outstanding Natural Beauty, with sixty five percent of the NCA being covered by this designation.

Nationally important beech woods feature in the landscape and are a notable feature on the scarp edge and in a number of the incised valleys. Mixed oak woodlands are concentrated on the upper slopes of valleys and on the flat high wold tops. Woodlands can contain a wide and notable range of calcicole shrubs and ground flora. Parkland and estates are characteristic of the area. Farming is mixed, with much of the high wold dominated by arable on thin, brashy soils prone to erosion. Pasture is predominant in the valleys, and in particular on steeper slopes and on more clayey soils. Meadows and tree-lined watercourses are found along the valley bottoms.

Important habitats include unimproved limestone grassland along the scarp, for example Rodborough Common Special Area of Conservation (SAC) and wet meadows with alder and willow and springline flushes. Two further SAC are also designated: Cotswold Beechwoods SAC and Bath and Bradford-on-Avon Bats SAC. Steeply-incised stream and river valleys cut through the north-west-facing scarp, flowing westwards towards the Severn. The watercourses of the dip slope provide the headwaters of the Thames and flow eastwards within broad shallow valleys, and these rivers and underlying aquifer are an important supply of high-quality water for populations within and around the area.

The area has a rich history, with nationally and internationally important evidence of prehistoric, Roman, medieval and later settlement in the form of archaeological sites, historic buildings and the wider historic landscape. Roman roads are prominent, including the Fosse Way which extends from north to south through the whole area. It is a notable visitor destination and has a longstanding reputation as the 'quintessential English landscape'.



Click map to enlarge; click again to reduce

Statements of Environmental Opportunities:

- **SEO 1:** Protect and enhance the highly distinctive farmed landscape, retaining the balance between productive arable, pastoral and wooded elements and the open, expansive views particularly from the scarp, high wold and dip slope.

- **SEO 2:** Safeguard and conserve the historic environment, cultural heritage and geodiversity that illustrate the history, evolution, foundations, land use and settlement of the Cotswolds landscape, and enable access to and interpretation of the relationship between natural processes and human influences.

- **SEO 3:** Protect, maintain and expand the distinctive character of the Cotswolds and the network of semi-natural and arable habitats, including limestone grassland, beech woods and wetlands along streams and rivers, to enhance water quality, strengthen ecological and landscape connectivity, support rare species and allow for adaptation to changes in climate.

- **SEO 4:** Safeguard and manage soil and water resources, allowing naturally functioning hydrological processes to maintain water quality and supply; reduce flooding; and manage land to reduce soil erosion and water pollution and to retain and capture carbon.

Cotswolds field pattern seen at Longborough.

Description

Physical and functional links to other National Character Areas

The Cotswold scarp, rising to 330 m, provides long, expansive views westwards over the Severn and Avon Vales to the Forest of Dean and Wales, to the Malvern and Shropshire hills and the nearby outliers such as Bredon Hill. From the dip slope, long easterly views can still be seen across the Vale of the White Horse to the North Wessex Downs and the Chilterns. Unlike the scarp, the eastern side of the National Character Area (NCA) merges gently with the neighbouring NCAs. The scarp forms the backdrop to the Severn and Avon Vales and in particular the setting for Cheltenham, Gloucester, Stroud and Bath, a World Heritage Site (WHS).

Most of the principal rivers in the NCA are tributaries of the Thames and flow south-eastwards into the Upper Thames Clay Vales, providing strong ecological and functional links. Rivers in the south and west flow into the River Avon and then the Severn Estuary. The area is underlain by a limestone aquifer, and both this and the rivers are a key supply of high-quality water for this and the surrounding areas, including the Cotswold Water Park.

The Cotswolds provide drinking water for populations as far away as Birmingham and London, but also provide outdoor recreation and learning, and many other services. The Cotswolds are also internationally renowned and popular with overseas visitors and as a domestic short-break and day-trip destination. There is an extensive network of public rights of way, particularly footpaths, including the start of the 184-mile Thames Path National Trail, the majority of the 102-mile Cotswold Way National Trail and parts of the National Cycle Network, which connect beyond the Cotswolds. The A46 and A429 run the length of the Cotswolds along the route of the former Roman road, the Fosse Way. The A41 follows the route of Akeman Street, another former Roman road, from east to west. These Roman roads connected Exeter to Lincoln and St Albans and Cirencester respectively. The M4 and A40 cross the area from east to west linking it to major cities and communities, as do the M40 in the north-east near Banbury and the Oxford to Worcester and London to Bristol, Bath and South Wales railway lines.

The Cotswolds area is famed for its building stone, used extensively within the NCA but also much further afield, for example in Oxford and London.

Limestone grassland at Swellshill.

Key characteristics

- Defined by its underlying geology: a dramatic limestone scarp rising above adjacent lowlands with steep combes, and outliers illustrating the slow erosion of escarpments. The limestone geology has formed the scarp and dip slope of the landscape, which in turn has influenced drainage, soils, vegetation, land use and settlement.
- Open and expansive scarp and high wold dipping gently to the south-east, dissected by river valleys.
- Arable farming dominates the high wold and dip slope while permanent pasture prevails on the steep slopes of the scarp and river valleys with pockets of internationally important limestone grassland.
- Drystone walls define the pattern of fields of the high wold and dip slope. On the deeper soils and river valleys, hedgerows form the main field boundaries.
- Ancient beech hangers line stretches of the upper slopes of the scarp, while oak/ash woodlands are characteristic of the river valleys. Regular blocks of coniferous and mixed plantations are scattered across the open high wold and dip slope.
- Large areas of common land, important for unimproved calcareous grassland, are characteristic of the scarp and high wold around the Stroud valleys and along the crest of the scarp to Cleeve Hill.
- The majority of the principal rivers flow south-eastwards forming the headwaters of the Thames with the exception of rivers in the west which flow into the River Avon and then the Severn Estuary.
- Rich history from Neolithic barrows, iron-age hill forts and Roman roads and villas to deserted medieval villages, grand country houses, cloth mills and Second World War airfields. The field patterns largely reflect both the medieval open field system, with fossilised areas of ridge and furrow, and later planned enclosures.
- Locally quarried limestone brings a harmony to the built environment of scattered villages and drystone walls, giving the area a strong sense of unity for which the Cotswolds are renowned. Bath stone is also famous and has been used for building since Roman times, both locally in the principal buildings and streets of Bath and more widely, for example for Buckingham Palace in London. Parkland, gardens and historic designed landscapes are features particularly of the dip slope and broad lowland, such as Lawrence Johnston's garden at Hidcote, and Heather Muir's garden at Kiftsgate, parkland at Stanway, Chastleton and Blenheim Palace.
- Prominent natural and built features in the landscape include the City of Bath WHS, Brailes Hill, Broadway Tower, Cleeve Hill, the Tyndale monument, Freezing Hill, Kelston Round Hill and Blenheim Palace WHS.

The Cotswolds today

The Cotswolds area extends from Mells in Somerset to Brackley in Northamptonshire. It is a distinctive landscape of national significance; 65 per cent of the area is designated as an Area of Outstanding Natural Beauty (AONB). The Cotswolds are part of the oolitic limestone outcrop that stretches from Dorset to Lincolnshire. The steep western scarp is the edge of the harder, more resistant limestone lying on top of predominantly softer mudstones which form the landscape to the west of the rolling high wold and the long, descending eastern dip slope. All this creates a rich and diverse landscape, unified by the underlying geology. A visual harmony is derived from the scale and simplicity of the landform and from the widespread use of the distinctive oolitic limestone as a building material.

The north-west-facing scarp slope is dissected by enclosed valleys and dominates the vales of Evesham, Gloucester and Berkeley. The crest of the scarp is punctuated by many notable features such as beech hangers and iron-age hill forts, and structures such as Broadway Tower and the Tyndale monument. Ancient woodlands are a key component of the landscape and often crown the upper slopes of the scarp and enclose the valley sides. The beech woods of the scarp are of particular importance for their nature conservation interest. Cotswold Beechwoods Special Area of Conservation (SAC) has been designated for its botanical interest and at 585 ha forms the core of a much larger woodland area. Pasture occupies the lower slopes and valley floors, often divided by overgrown hedgerows and fingers of woodland. Commons, such as Cleeve and Selsley, are found along the middle section of the scarp between Winchcombe and Dursley. Rodborough Common is designated an SAC for its semi-natural dry grasslands.

The unimproved grasslands contain nationally rare species, including pasqueflower and Cotswold pennycress, alongside typical calcicole species such as musk orchid, rock rose, bastard toadflax and thyme and associated butterflies such as the Duke of Burgundy butterfly and the chalkhill blue, Adonis blue, large blue and small blue butterflies.

The large-scale, open landscape of the high wold is characterised by expansive views and arable cultivation, intersected by limestone walls and hedgerows, particularly in the valleys and alongside quiet lanes. There are lush, narrow, sheltered valleys including dry valley systems which contrast with the wider high wold. Woodlands on the high wold are characteristically of small to moderate size and geometric, many comprising plantations, copses and shelterbelts. Only small hamlets and isolated farmsteads are found on this higher ground.

The lowlands of the eastern side include rivers, such as the Windrush and Evenlode, flowing eastwards in broad shallow valleys. These rivers provide the headwater tributaries of the Thames, many flowing through the Cotswold Water Park and contributing to its network of wetlands. Flood plain meadows, including remnant watermeadows, are found in this landscape. The rivers of the south and west of the area flow into the River Avon and then into the Severn Estuary.

Humans have long influenced the landscape. Visible ancient examples include Neolithic chambered tombs, as at Belas Knap, stone circles such as the Rollright Stones, and hill forts such as Sodbury Camp. Former Roman roads, in particular the Fosse Way and Akeman Street, cross and run the length of the Cotswolds, and there are well-preserved Roman villa sites at

North Leigh and Chedworth. Field patterns are influenced by the former medieval open field system overlain by subsequent piecemeal and planned enclosure which resulted in many of the drystone walls and hedgerows seen in the landscape today. Evidence of industry can be seen in the former cloth mills along the Stroud valleys, the canals, principally the Kennet and Avon canal, and railways – both disused and operational – which bisect the area. In addition to those archaeological monuments surviving as earthworks or structures, there are also many thousands of buried archaeological sites reflecting the intensity of past human use of this landscape.

A walk or ride through the arable landscape reveals the surprising richness of wildlife, particularly farmland birds such as skylark, yellowhammer and corn bunting, and arable plants including shepherd's needle. Many roadside verges are important for their grassland species including, in spring, white and cream of cow parsley, followed by the blue of meadow cranesbill, the purples of scabious and, around Bath, the rare Bath asparagus. The Bath and Bradford-on-Avon Bats SAC supports 15 per cent of the UK's greater horseshoe bat population along with Bechstein's bat and the lesser horseshoe bat. Woodchester Park is particularly notable for bats and historic designed landscape.

The local Cotswold stone is a unifying element of the landscape, used in buildings, drystone walls, cottages, grand houses and churches, all built in a locally distinctive style. The high quality of the domestic architecture is particularly notable, with steep roofs of graded limestone slates, parapeted gables with finials, stone mullions, rectangular dripstones and dormer windows, and four-centred arches over doorways. Refinement, simple elegance and quality pervade. The colour of the stone varies across the Cotswolds due to variation in the iron content, ranging from the brown ironstones of the north-east, through to the grey, almost white stone of Northleach and Painswick, to the honey-coloured stone found in and around Bath.

The principal Cotswold towns and cities – Stroud, Cirencester and Bath – lie on the edge of the area. Bath is internationally known and designated as a WHS for its Roman and Georgian architecture. The scarp and dip slope landscape around Bath is less pronounced, breaking up into a series of hills and valleys often referred to as combes. The smaller market towns and villages tend to lie in the valley bottoms, occasionally along the valley sides and at the scarp foot on springlines. Stow-on-the-Wold is an exception as a hill top town. Settlement patterns vary from compact to dispersed and ribbon forms, with some lying round a central green. Away from these sheltered town and villages, which are usually never far from water, the higher ground is often sparsely populated, with only a few hamlets and isolated farmsteads. On the open, high wold and dip slope the oldest and most recent roads sweep across the landscape in almost straight lines; however, along the valleys the typical road is a winding lane linking villages. The combination of high-quality landscape, tranquillity and an excellent rights of way footpath network has made the Cotswolds a popular destination for quiet outdoor recreation.

The Cotswold escarpment at Stinchombe, Gloucestershire.

The landscape through time

The whole area is underlain by the Lias Group, formed in a muddy sea, which is exposed in the valleys, except where there have been extensive landslips. The oolitic limestones were deposited between 100 and 170 million years ago when the area was under a clear warm tropical sea. Two types dominate: the Great and the Inferior Oolites. Both are prized building materials. The Inferior Oolite forms the scarp, while the younger Great Oolite forms most of the high wold and dip slope. The strata dip gently, with younger rocks found in the south-eastern extremities of the area, and Oxford Clay and Cornbrash found around the north-eastern edges. The geology is particularly important for the study of stratigraphy, or rock layers, and William Smith, the 'father of English geology', made some of his key observations of stratigraphy in the Cotswolds. The area is also important for palaeontology, the study of fossils and fossil environments, and the first scientifically described dinosaur fossils were discovered here at Stonesfield.

Virtually every settlement within the area has an associated, now nearly always disused, quarry. Thousands of delves – shallow pits from which stone has been taken for walls, infilling, slates, sheds and other small-scale operations – are found across the area, alongside larger worked quarries, some active for many years. Stone has remained an important building material and places like Taynton Limestone Quarry near Burford are listed in Domesday Book; the last extraction of stone took place in 1939. Stone from Taynton was used by Sir Christopher Wren in London for churches and St Paul's Cathedral.

There is evidence of over 6,000 years of human occupation and land use. Although Mesolithic remains have been found, archaeological evidence suggests that the large-scale clearance of the lime-dominated woodland and settlement did not begin until the Neolithic. Visible remains can still be found from this period in the form of causewayed enclosures and long barrows such as at Belas Knap. Other notable features of the prehistoric period include bronze-age stone circles or henges, such as the Rollright Stones near Chipping Norton, and iron-age hill forts, with 17 strategically located along the crest of the scarp.

Roman influences are prominent in the landscape; Roman roads, settlements and the remains of villas can be found throughout the area. Cotswold stone has been used for construction since at least the Neolithic, but it was the Romans who developed the materials for buildings, both for the grand civic centres of Bath, Gloucester and Cirencester and for villas, villages and town houses. Roman roads have had a lasting influence on the area, and of particular note is the Fosse Way which runs the full length of the Cotswolds. The Romans are thought to have introduced the long wool breed of sheep which was the ancestor of the Cotswold sheep, commonly known as the Cotswold Lion.

Saxon settlement saw the establishment of much of the human infrastructure of the area; most place names in the Cotswolds are of Saxon origin. W.G. Hoskins considered 'the landscape of the Cotswold uplands ... was even in Saxon times much as we know it today'. The presence of water was an important factor, and many villages were established along the springlines on both scarp and dip slopes. The principal land uses have long been agriculture, particularly sheep grazing. In the north-east, where the soil was overlain with poor-draining clay, woodland cover was preserved as the royal hunting forest of Wychwood near Charlbury.

Reference to Domesday Survey of 1086 shows that many present-day villages were already in existence at that time, surrounded by very large

open fields subdivided into strips. Much of the land was owned by extensive ecclesiastical and feudal estates, some of these based outside the Cotswolds. There were few large woods in the Cotswolds except those clinging to the steep uncultivated slopes along the escarpment and within valleys. Irregular and species-rich hedgerows along the slopes, and often well-preserved ridge and furrow patterns, are evidence of the clearing of land for agriculture (often promoted by these landowners). Market centres such as Stow, Moreton-in-Marsh, Chipping Campden and Northleach developed in the same period, many being planned as new settlements. Some settlements developed around areas of common land.

Population decline, beginning in the mid-14th century and resulting from climate change, poor harvests and plague (including the Black Death of 1348), precipitated significant change in the Cotswolds. Sheep farming became a major occupation, especially on the established ecclesiastical estates, and wool and cloth production became a mainstay. Wool market towns such as Stow-on-the-Wold and the medieval planned towns of Northleach and Chipping Campden grew and prospered on the back of the wealth generated by the wool trade. One of the longest worked groups of medieval quarries came from this period of growth and stretched from Painswick to Nailsworth to meet the need for building stone for the rapid growth in market towns. Cloth was mechanically finished in fulling mills powered by the fast-flowing streams in the area and new mills were established at Wickwar, Dursley, Wotton-under-Edge and Stroud, also generating growth and prosperity.

After the Dissolution of the Monasteries and on the back of the wealth generated by wool production, many fine country houses and parks were established including Blenheim Palace, now a WHS, Compton Wynyates, Sherborne Park, Dyrham Park, Badminton and Cirencester Park. This wealth also contributed to the development of a distinct architectural tradition within settlements and across the rural landscape. The 16th-century expansion of wool production led to enclosure across the Cotswolds to create sheepwalks and folding, a process which often went hand-in-hand with the shrinkage of settlements and the establishment of fine houses with small estates.

Further enclosure of farmland and downland for cropping and pasture followed, mostly on a piecemeal basis, in tandem with the creation of new farmsteads and the building of large barns but principally driven by Parliamentary enclosure in the late 18th century and early 19th century (concentrated in the central and eastern wolds). Thousands of miles of

Mumfords Vineyard near Bath.

drystone walls and hedgerows appeared in the landscape along with avenues, shelterbelts, plantations and turnpike roads. The newly enclosed fields became famous for the quality of their barley, used for malting and livestock feed. Dairy farming and cheese-making also rose in prominence, although wool production remained important.

Mixed fortunes shaped the Cotswolds until the Second World War. The cloth industry expanded from the 17th to 19th centuries in the valleys around Dursley, Stroud, Chalford and Painswick. Taking advantage of local water power and deposits of fuller's earth, large multi-storey stone mill buildings were erected to card, spin, weave and finish the cloth, such as Bliss Mill at Chipping Norton. Communities expanded with modest terraced houses for workers built along hillsides, while mill owners erected fashionable grand houses.

By 1850 the wool industry was in decline as the Industrial and Agricultural Revolutions shifted competitive advantage to other parts of the country, and increasingly to mills in the north of England. The area also saw lower levels of investment in agriculture than did other chalk and limestone areas of England. In the late 19th century, leading figures in the Arts and Crafts Movement were attracted to the Cotswolds: William Morris purchased Kelmscott Manor in Oxfordshire and C.R. Ashbee established the Guild of Handicrafts in Chipping Campden. The Arts and Crafts Movement left its most profound mark on the landscape in the restoration of the area's churches and in its distinct 'Cotswold style' of domestic architecture which inspired new buildings by national figures such as Detmar Blow and Guy Dawber and also fostered local talent such as Ernest Gimson and Norman Jewson. By the 1930s, places such as Bourton-on-the-Water had become popular with tourists, bringing much needed income, while a heightened awareness of the beauty of the area shaped new developments, such as the facing in local stone of the RAF bases of Hullavington and Little Rissington.

During the Second World War, the area was strategically important. Many wartime airfields were created by clearing the landscape of nearly all natural and manmade features; while some, like Kemble, remain in use, many more have been given back to farming, though they are still evident in the form of very large, featureless fields. After the war farms prospered anew as home-produced meat and cereals were in demand and new techniques and heavy mechanisation meant that profitable farming once again became possible. This brought more changes to the landscape with the construction of large agricultural sheds to house machinery, the widening of field entrances and the removal of field boundaries. Mechanised road traffic and improvements to the road network opened up the area to tourism and commuting. The M5 running parallel to the scarp, the M4 cutting across the southern part of the area, and the M40 touching the north-eastern edge of the NCA, provided fast links to London, Bristol, Birmingham and the West Midlands.

Early in the 20th century J.B. Priestley identified this area as one that 'needed protection for the good of future generations'. Its value was recognised more formally in the wartime and post-war reports on landscape protection. In 1966 part of the area was designated as an AONB, and this was extended in 1990 to cover 65 per cent of the NCA. With such a large area of the NCA designated as a protected landscape there has been relatively little change in the last decade. The name 'Cotswolds' is a recognisable brand nationally and internationally as representing the quintessential English landscape. This reputation is leading to visitor pressure in some places such as Bourton-on-the-Water and Castle Coombe.

Ecosystem services

The Cotswolds 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 service are summarised below. Further information on ecosystem services provided in the Cotswolds NCA is contained in the 'Analysis' section of this document.

The complexity of interactions across these ecosystem services and across adjoining character areas means that the summary provided here requires further refinement and analysis of evidence at a more local scale.[4]

Provisioning services (food, fibre and water supply)

- **Food provision**: The principal agricultural production for this NCA remains arable cropping and sheep rearing, although dairy, beef and poultry all form a part of the mix, alongside horticulture in the north of the area. Mixed farming is predominant, although an increase in farm size and a move towards less mixed farming and more arable cultivation are growing trends.

- **Water availability:** This NCA provides a key catchment for good quality drinking water for populations within this area and large conurbations in neighbouring NCAs. The large limestone aquifer which underlies the area is of strategic importance for this water supply. Hotter, drier summers affect flow in limestone rivers and many of the rivers and parts of the aquifer are classified as having no more water available for abstraction. Rivers, particularly those which flow south and eastwards are strategically important as the headwaters of the Thames. It is essential to manage abstraction to ensure that water remains available further downstream.

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

- **Regulating soil erosion:** The main soils of this area are free draining, base rich and relatively shallow. When these are protected by semi-natural habitats such as limestone grassland, or managed through good soil husbandry, erosion rates can be low. However, when exposed or when vegetation cover is lost, they can be highly prone to erosion, compaction and wind blow, which can have an adverse effect on many other services.

- **Regulating soil quality:** Historically, soils in this area provided good conditions for sheep grazing on the limestone grassland. More recently there has been an increase in arable cropping, taking advantage of the good quality soil. This can leave soils prone to thinning, compaction and nutrient run-off, especially from the application of artificial fertiliser which can, over time, reduce the value of this service. Sedimentation can damage salmonid fisheries and increase the maintenance of drainage features.

- **Regulating water quality:** The area is important as a source of good quality drinking water for populations in the Cotswolds and in neighbouring areas with larger population centres downstream such as Oxford. This water is abstracted from a strategically important underlying limestone aquifer and from the area's principal rivers, particularly those

[4] The evidence, sources and analysis for these summaries can be found in the supporting document 'Analysis supporting statements of environmental opportunity'. Where there are currently gaps in data, these will be addressed through further evidence gathering as part of this work.

which run south and eastwards forming the headwaters of the Thames. The majority of the rivers in the NCA are classed as having good chemical and ecological quality, except for the upper Evenlode, mid Windrush, the rivers Coln and Glyme and the Ampney Brook. Some smaller tributaries of the Thames in the south of the catchment also have problems associated with diffuse pollution. Around half of the area's groundwater is classed as being of poor quality, particularly in the north and west, due to pollutant inputs. Nitrate and pesticide pollutants are of particular concern for aquifer waters, and phosphates are high in some rivers, reducing not just water quality but biodiversity and fisheries interest.

- **Regulating water flow:** In general this is not an area of high flood risk, although there are areas susceptible to localised flooding. Limestone forms the parent material within the majority of catchments, allowing precipitation to infiltrate to the groundwater, from where it can be released at a slower rate back into rivers, helping to mitigate flood risk but sometimes leading to low flows. Areas to the north-east around Banbury and to the north of Bath are susceptible to localised flooding. During periods of heavy rain – such as in July 2007 – rivers which supply the headwaters of the Thames can cause flooding of communities along the valleys and further downstream in the Thames catchment. Water company groundwater abstractions for drinking water supply can affect spring flows and reduce river levels in this area. To mitigate this, water abstracted from aquifers deep underground is discharged into the rivers to increase flow.

Cultural services (inspiration, education and wellbeing)

- **Sense of place/inspiration**: Sense of place is especially strong in the Cotswolds NCA with a unifying harmony provided by the use of local limestone in buildings and drystone walls. It is an area of biodiversity value in the form of beech woods and limestone grassland. The dramatic scarp slope fretted by valleys provides panoramic views and a sense of inspiration and openness. The rural nature of the Cotswolds has strong associations with the Arts and Crafts Movement and the area is often thought of as the quintessential English landscape, drawing and inspiring many thousands of visitors each year.

Workman's Wood, Cotswold Commons and Beechwoods NNR.

- **Sense of history**: The area has a rich history with clearly visible evidence of human occupation, from Neolithic long barrows, bronze-age henges, iron-age hill forts, Roman towns (Bath and Cirencester), villas and roads, to impressive 17th- and 18th-century estates and parklands (for example, Blenheim Palace), and a legacy of industrial archaeology, with wool mills (such as at Chipping Norton) and canals. Field and road patterns and quarrying all sit alongside this visible record to reveal a long history of land use and settlement.

- **Tranquillity:** The area has long been associated with a sense of rural peace, particularly in the undeveloped valleys, along the scarp and within woodlands and parklands. The expansion of some urban centres and the road network are eroding this tranquillity in places, reducing the level of this service.

- **Recreation:** There is an extensive network of public rights of way especially for those on foot, combined with open access, with the start of the 184-mile Thames Path National Trail, the majority of the Cotswold Way National Trail and parts of the National Cycle Network. The network is less comprehensive for other users such as horse riders. There are many popular visitor destinations, especially some of the villages such as Bourton-on-the-Water and Stow-on-the-Wold and Roman remains around Cirencester, while the City of Bath is a world-renowned destination. There are two National Nature Reserves (NNRs) within the NCA: Cotswold Commons and Beechwoods NNR and Wychwood NNR – both important for nature conservation. The former is also important as an educational and recreational resource.

- **Biodiversity:** The Cotswolds has a rich biodiversity and is particularly important for its internationally renowned beech wood hangers, and nationally important limestone grassland and associated species such as the Duke of Burgundy butterfly, the large blue butterfly and many farmland birds. It is also important for species such as greater horseshoe bat, holding 15 per cent of the UK's population. The network of habitats, in particular beech hangers and limestone grassland, along the scarp edge are a good foundation for an ecological network running north to south. The rivers that run west to east, including the Evenlode, Windrush and Coln, and their associated habitats also serve as an important ecological network. Both networks could be enhanced to increase their biological value and to aid biodiversity in adapting to changes in climate.

- **Geodiversity:** Geology is a unifying theme across the NCA, providing much of its character and interest. The use of local stone in buildings and stone walls gives a visual harmony to the built environment. Quarrying remains important, particularly for the supply of stone for local use to maintain the character of new developments and for the repair and maintenance of older, notable buildings and structures. The wealth of opportunity for the study of geology and geomorphology, and in particular stratigraphy, fossils and the history of geology, also makes this an important educational service. And the resultant soils significantly influence agriculture, land use and water resources.

Statements of Environmental Opportunity

SEO 1: Protect and enhance the highly distinctive farmed landscape, retaining the balance between productive arable, pastoral and wooded elements and the open, expansive views particularly from the scarp, high wold and dip slope.

For example, by:

- Protecting the contrasts in character between scarp, high wold and dip slope by using their defining characteristics to inform new development, woodland creation initiatives and land management, particularly through the use of agri-environment schemes.
- Identifying key views into and out of the Cotswolds, particularly along the scarp and main settlements such as Stroud, Bath, Cheltenham and Gloucester. Using this to mitigate development in or around these key views which could otherwise be intrusive and increase disturbance. Where new development is appropriate, ensuring that it is integrated into and informed by the existing high quality and distinctive landscapes, increasing the area and networks of semi-natural habitats and avoiding light pollution in areas below the scarp.
- Assisting the maintenance of distinctive farming patterns across the area, in particular grazing, such as with the Cotswold Lion sheep.
- Managing and restoring the nationally important parklands, estate landscapes and ancient orchards, highly characteristic of the south-eastern dip slope, that support a wealth of biodiversity, genetic diversity and pollinating invertebrates, especially where these are vulnerable to changes in agricultural practices.
- Maintaining, enhancing and restoring drystone walls, and the skills to do this, and the resulting field patterns of land use on the high wold, reinforcing a clear sense of place and history and retaining these important landscape features that also provide a rich wildlife habitat.
- Maintaining and reinstating hedgerow management, including laying and coppicing existing hedgerows, and new hedgerow tree planting where appropriate on the dip slope and scarp, to retain these important landscape features for the future and safeguard their role in supporting the biodiversity of the area; assisting in the reduction of soil erosion by slowing cross-land movement of soils, nutrients and water (encouraging coppice residues to be used as a source of low-carbon fuel).

SEO 2: Safeguard and conserve the historic environment, cultural heritage and geodiversity that illustrate the history, evolution, foundations, land use and settlement of the Cotswolds landscape, and allow access to and interpretation of the relationship between natural processes and human influences.

For example, by:

- Encouraging arable reversion to grassland and sensitive scrub removal where current land cover and use threaten the integrity of important earthworks and remains, both buried and visible, including Neolithic long barrows and henge monuments, bronze-age round barrows on the high wolds, prominent hill forts on the scarp ridgeline, extensive Roman remains, including villas in the lower valleys, medieval settlements and field systems.
- Maintaining the nucleated settlement pattern of small towns and villages in valleys and at the foot of the scarp along the springline, further characterised by fine churches, country houses and estate villages. Ensuring that the wealth of heritage assets, including above ground and buried archaeological features such as iron-age hill forts, earthwork remains, ridge and furrow patterns, Roman remains, abandoned villages, mills and parks and traditional stone farm buildings found across the area, are protected from inappropriate and damaging activities, and are effectively and traditionally managed where necessary.
- Conserving and interpreting archaeological earthworks and sub-surface archaeology, while recognising the potential for undiscovered remains.
- Using an understanding of the area's traditional and historical architecture, and its distinct patterns of settlement, to inform the appropriate conservation of historical buildings, and to plan for and inspire any environmentally beneficial new development which makes a positive contribution to local character.
- Restoring and conserving the medieval field patterns, the open commons and piecemeal enclosures strips on the scarp, the large rectilinear fields of the wolds and the smaller enclosed pastoral fields of the valleys and dip slope. Particular attention should be given to the protection and management of the nationally important ridge and furrow patterns (for example at Todenham, Chastleton, Weston-sub-Edge and Tysoe), maintaining a sense of history and reinforcing the open vistas and panoramas that give this landscape its distinctive character.
- Maintaining and reinstating management of small woodlands, windbreaks and copses to retain these 19th-century features as an important part of the landscape, seeking opportunities to complement this pattern with new planting, where appropriate, for the benefits this will bring for water regulation, carbon capture and storage, biodiversity and landscape character.
- Conserving and managing historic parklands to retain their important contribution to landscape character, including establishing new generations of trees, appropriate management of ancient and veteran trees and retention of deadwood fauna and flora.
- Promoting access to the natural environment across the area; making the most of natural, historical, inspirational and tranquil places available to all, particularly incorporating sustainable multi-user access to and from the Cotswold Way National Trail and other routes such as the Thames Path.

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SE02 continued

- Managing and enhancing nationally important and locally characteristic oolitic limestone exposures important for the study and understanding of stratigraphy and palaeontology, especially those created by past quarrying and railway cuttings, and improving access and interpretation where possible.
- Encouraging the continued use of local stone as a building material in existing and new drystone wall field boundaries, new developments and conservation projects to further conserve and enhance the scenic beauty of the area and to provide a rich habitat for a range of wildlife.
- Maintaining the diversity of geology and traditional buildings that contributes to the National Character Area (NCA) by using, promoting and encouraging locally-sourced materials and skills for walling and building repair and construction.
- Ensuring sensitive siting of quarries and consideration of the reopening of delves for the supply of local building stone where appropriate and where this would have a minimal impact on landscape, biodiversity and tranquillity.
- Conserving, managing and enhancing the nationally and locally important geological and geomorphological sites and features which represent the characteristic Jurassic Limestone sequences of the area, many of which are exposures in disused quarries and railway cuttings.
- Seeking to ensure that this resource is available as an accessible scientific and educational resource to study stratigraphy, palaeontology and the relationship between geology, landscape, mineral extraction, industrial history and building stone.

Belas Knapp, a particularly fine example of a Neolithic long barrow.

SEO 3: Protect, maintain and expand the distinctive character of the Cotswolds and the network of semi-natural and arable habitats, including limestone grassland, beech woods and wetlands along streams and rivers, to enhance water quality, strengthen ecological and landscape connectivity, support rare species and allow for adaptation to changes in climate.

For example, by:

- Protecting species-rich grasslands in favourable condition through extensive grazing, restoring limestone grassland and unimproved pastures across the whole area, and seeking opportunities to expand and buffer the network. Also by providing stepping stones along scarp and river corridors to enhance interconnected grassland habitat networks important for species such as Adonis blue, chalkhill blue and large blue butterflies and bringing additional benefits for soil management and water quality.
- Promoting sustainable farming practices to create a farmed landscape which is more permeable and able to provide for the movement and support of species.
- Protecting and enhancing and seeking to re-introduce sustainable management of ancient woodland across the area and in particular the hanging beech woods associated with the scarp, such as the Cotswold Beechwoods Special Area of Conservation (SAC), aiming to incorporate these into a wider habitat network by looking for opportunities to create a mosaic of habitats with limestone grassland, as well as scrub and field margins, that will help to protect populations of species such as the Duke of Burgundy butterfly.
- Targeted planting of woodland buffers to existing woodland or new woodland copses, and regenerating and restoring existing woodland, informed by strategies such as the Forestry Commission's ancient woodland opportunity mapping and the Cotswolds Area of Outstanding Natural Beauty (AONB) tree planting guidelines, paying due attention to the open character of the landscape in places such as the high wold and the opportunities presented by valleys and river networks. Seeking opportunities to link woodland with other habitats such as parkland to create functional networks.
- Managing springline habitats, fens, wet flushes, winterbornes and wet meadows such as Middle Barton Fen and the river systems and associated flood plains on the dip slope so that associated biodiversity value, water quality and quantity benefit and carbon capture and storage potential are fully realised.
- Promoting the conservation of farmland birds and arable weeds; ensuring that a network of corridors is provided for the movement of species across farmland; retaining the cultural value of flocking and singing birds.
- Maintaining and improving the quality and expanding a network of integrated public green spaces and rights of way for biodiversity, geodiversity, recreation and health benefits.
- Seeking and realising opportunities to reinstate hedgerows, and hedgerow trees, where they have been lost, especially for the benefit of species such as bats in the Bath and Bradford-on-Avon Bats SAC, butterflies and other invertebrates and farmland birds, and to enhance landscape character.

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SE02 continued

- Ensuring the reversion of significant areas of arable land on the high wolds, guiding locations according to opportunities to assist biodiversity adaptation to changes in climate; improvements in groundwater quality, and in particular nitrate and phosphate issues; aquifer recharge; and managing grasslands in favourable condition through extensive grazing.
- Managing and restoration of ancient semi-natural beech woodland and small mixed oak woodlands on the scarp and valley slopes and dip slope, exploring coppicing and pollarding as means of increasing management and resilience to changes in climate; expanding and re-linking woodland in selected locations, particularly on scarp and dip slope, to increase the resilience of this habitat to changes in climate and assist in controlling cross-land flows of water and also controlling soil erosion and nutrient leaching.
- Maintaining the intricate rural road network characterised by semi-natural grassland verges and ensuring that verges are sympathetically managed for their biodiversity value.

River Churn at Rendcomb, Gloucestershire.

SEO 4: Safeguard and manage soil and water resources, allowing naturally functioning hydrological processes to maintain water quality and supply; reduce flooding; and manage land to reduce soil erosion and water pollution and to retain and capture carbon.

For example, by:

- Continuing to support farming at a sustainable level with grazing and cropping levels that provide food, lead to improved soil quality, reduce soil erosion, benefit biodiversity and reinforce a sense of place and current patterns of land use.
- Increasing the amount of farmland managed under principles established by the Catchment Sensitive Farming programme and the Farmland Bird Initiative and the associated benefits this will bring for water flow management and regulation, water quality, prevention of soil erosion and increased biodiversity.
- Maintaining and restoring hedgerow boundaries characteristic of the valleys and scarp and associated field patterns, especially where these help control cross-land flows, prevent soil erosion and nutrient leaching.
- Creating woodland in appropriate locations to help reduce the impact of flooding and for the benefit of water quality.
- Restoring and enhancing remnant wetland habitats, including springline marsh at the foot of the scarp and rare patches of valley mire and fen meadow in the valley bottoms, for the benefit of flood storage, water quality, landscape diversity and biodiversity.
- Creating grassland buffer strips verges running across slopes to provide a buffer to soil erosion and nutrient run-off in areas of arable production, including the catchments of the River Windrush in the north and the Avon in the south.
- Continuing opportunity to plan for the creation or extension of new broadleaved woodland and grassland habitat mosaics to provide the landscape setting to the main settlements on the periphery of the NCA (Cheltenham, Cirencester, Gloucester, Stroud, Banbury and Bath) to provide robust attractive new landscapes strengthening the ecological network throughout this NCA and adjacent NCAs.
- Enabling the recommendations of relevant implementation measures under the Water Framework Directive and Catchment Flood Management Plans.

The River Windrush, which flows south-eastwards with the other principle rivers of the area to form the headwaters of the Thames.

Additional opportunities

1. Manage the recreational and tourism opportunities to enhance enjoyment and understanding of the landscape's inspirational, diverse, open, tranquil and 'rural' qualities.

For example by:

- Maintaining and improving multi-user paths and connectivity between settlements, both within and connecting with those outside the area; the scarp, wooded valleys, parklands and other assets utilising and extending the existing network of public rights of way including links to and from the Cotswold Way National Trail.
- Developing new permissive access to historical sites and other areas of interest as part of a cohesive network of inspiring access provision.
- Promoting sustainable tourism initiatives that target a broad range of visitors and reduce car dependency, accommodating high visitor numbers while conserving the landscape and its inherent tranquillity.
- Developing multi-user routes and improved route connectivity characterised by good quality surfacing and signage and providing sustainable transport options wherever possible to enable more people of varying abilities to enjoy the natural environment.
- Maintaining the Cotswold Way and Thames Path National Trails and their corridors to the highest standards of management and visitor experience to provide the focus for both environmental connectivity and a corridor of interest of cultural, historic and environmental significance.
- Developing improved interpretation of the rich cultural heritage associated with Cotswold authors, artists and designers who have been inspired by the Cotswold landscape.
- Supporting the role of the Cotswolds Conservation Board's activities to improve wider partnership in delivery and management across the AONB and the NCA, such as improving access, signage and interpretation to ensure a high-quality visitor experience.

Walkers enjoying the network of footpaths.

2. Plan for the creation of new landscapes around settlements on the periphery of the area and in appropriate development within the area. Reinforce the existing landscape structure as part of any identified growth of urban areas, hard infrastructure and other settlements, ensuring that quality green infrastructure is incorporated enhancing health, access, recreation, landscape, biodiversity and geodiversity.

For example by:

- Planting new woodland, using native broadleaved species, between and within new developments to filter views and preserve the tranquillity of the area.
- Promoting the use of sustainable building design and construction, using traditional materials and styles wherever possible, incorporating renewable energy generation and water recycling technologies.
- Exploring the role of short rotation coppice and other biomass crops within the framework of new development; keeping fuel sources close to demand.
- Creating reedbeds as part of developments to filter potentially polluted water before it is discharged to rivers.
- Providing access opportunities and natural open spaces close to where people live linked to wider multi-modal routes.
- Including school and community food gardens and orchards within the landscape framework and new developments, promoting the use of local Cotswold varieties such as Blenheim Orange apples.
- Ensuring that extensions to settlements, such as residential developments under consideration around Bath, Cirencester, Gloucester, Cheltenham and Banbury, are designed to ensure their visual and functional integration with the surrounding landscape and the existing urban edge. Key views to and from settlements should be retained.
- Providing access to quality green space through well-designed green infrastructure which will benefit health and wellbeing and provide habitat that increases the permeability of the urban landscape to biodiversity.
- Ensuring that new developments provide biodiversity enhancement rather than just mitigation.
- Creating sustainable urban drainage systems and surface water management plans that can create new wetland features close to urban areas and new development, becoming part of a green infrastructure network.
- Conserving the area's richly varied traditional architecture and farmsteads, vernacular and historical buildings in Cotswold stone, timber framing and deep-red brick, encouraging the use of appropriate styles and locally distinctive materials, ensuring that the repair, restoration and/or conversion of vernacular buildings are carried out with due regard to this historical interest using local and appropriate materials, styles and detailing.

Supporting document 1: Key facts and data

Total area: 288,170 ha

1. Landscape and nature conservation designations

The Cotwolds NCA contains 188,089 ha, or 65 per cent of the area, of the Cotswolds Area of Outstanding Natural Beauty (AONB).

Management Plans for the protected landscape can be found at:

- 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)	Percentage of NCA
International	n/a	n/a	0	0
European	Special Protection Area (SPA)	n/a	0	0
	Special Area of Conservation (SAC)	Cotswold Beechwoods SAC; Rodborough Common SAC; Bath and Bradford on Avon Bats SAC	807	<1
National	National Nature Reserve (NNR)	Cotswold Commons and Beechwoods NNR; Wychwood NNR	655	<1
National	Site of Special Scientific Interest (SSSI)	A total of 118 sites wholly or partly within the NCA	4,171	1

Source: Natural England (2011)

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

The vast majority of Cotswold Commons and Beechwoods NNR is also designated as SAC. All of the NNR and SAC land is also designated SSSI.

There are 876 local sites in the Cotswolds NCA covering 12,934 ha which is 4 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 at: http://www.lnr.naturalengland.org.uk/Special/lnr/lnr_search.asp
- Maps showing locations of Statutory sites can be found at: http://magic.defra.gov.uk – select 'Designations/Land-Based Designations/Statutory'

1.2 Condition of designated sites

SSSI condition category	Area (ha)	Percentage of SSSI land in category condition
Unfavourable declining	119	3
Favourable	2,407	57
Unfavourable no change	136	3
Unfavourable recovering	1,554	37

Source: Natural England (March 2011)

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

2. Landform, geology and soils

2.1 Elevation

The lowest point in the Cotswolds is 10 m above sea level, the highest point, near Cheltenham, being 332 m in height. The mean height is 148 m.

Source: Cotswolds Natural Area Profile, Cotswolds Countryside Character area description

2.2 Landform and process

There is great variety of landform and a number of distinct landscapes can be identified. The north-west facing scarp reaches its highest point just north of Cheltenham. Steeply incised stream and river valleys cut through the scarp, flowing westwards towards the River Severn. To the south and east the limestone dips beneath wetter clays which form broad valleys around the main rivers and streams which flow east and south-east and feed the tributaries of the upper Thames.

Source: Cotswolds Natural Area Profile, Cotswolds Countryside Character area description

2.3 Bedrock geology

The predominant rock type in the NCA is the Middle Jurassic limestones. These are split into the Inferior Oolite Group and the Great Oolite Group, the latter lying on top of the former. The limestones are made up of lime-rich mud, fragments of fossil shell and ooliths (which are small, up to 2 mm diameter round particles). These ooliths characterise much but by no means all of the limestone layers, but have given their name to the 'oolitic limestones'. The limestone rocks of the Cotswolds hills were formed in the Jurassic in shallow tropical seas. The major western scarp exposes limestone from the early to middle Jurassic – the classic oolitic "Cotswold stone" was formed in the middle Jurassic. The geology of the area also includes Lias mustones/clays and marlstones, especially around Moreton-in-Marsh, Cornbrash (limestones) and Oxford Clay (clays).

Source: Cotswolds Natural Area Profile, Cotswolds Countryside Character area description

2.4 Superficial deposits

The superficial deposits of the Cotswolds comprise varied unconsolidated beds that include glacial, fluvial (including alluvium and river terrace deposits) and a mixed group of periglacial deposits known as "Head". These are scattered widely across the area but their heaviest concentrations occur in the Vale of Moreton and in the area around Cirencester, where they are extensively worked for their gravels.

Source: Cotswolds Natural Area Profile, Cotswolds Countryside Character area description, www.glosgeotrust.org.uk/cots_geology.shtml

2.5 Designated geological sites

Tier	Designation	Number
National	Geological Site of Special Scientific Interest (SSSI)	37
National	Mixed interest SSSI	13
Local	Local Geological Site	186

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

Many of the Cotswold soils are derived directly from the parent rock and tend to be alkaline and of low fertility. Thin, well-aerated, brashy soils derived from limestone are common on the steeper slopes, particularly to the west. More fertile, deeper, clayey soils of alluvial origin are present along the valley floors and on lower-lying land to the south and east.

Source: Cotswolds Natural Area Profile, Cotswolds 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	Percentage of NCA
Grade 1	809	<1
Grade 2	12,179	4
Grade 3	225,663	78
Grade 4	36,946	13
Grade 5	1,163	<1
Non-agricultural	5,972	2
Urban	5,347	2

Source: Natural England (2010)

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

Farmland in late spring, Cutsdean, Gloucestershire.

3. Key waterbodies and catchments

3.1 Major rivers/canals

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

Name	Length in NCA (km)
River Evenlode	44
River Windrush	42
River Avon	38
River Coln	32
River Cherwell	25
Oxford Canal	22
River Churn	22
River Glyme	21
River Leach	20
Kennet and Avon Canal	16
River Stour	14
River Swere	12
Sor Brook	9
River Dorn	7
River Frome	6
River Great Ouse	4
River Isbourne	4
River Thames	2

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.

Steeply incised stream and river valleys cut through the north-west facing scarp flowing westwards towards the River Severn. To the south and east wetter clays form broad valleys around the main rivers and streams which flow eastwards and form the tributaries of the Thames.

3.2 Water quality

The total area of Nitrate Vulnerable Zone (NVZ) is 264,585 ha, or 92 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 at: **http://maps.environment-agency.gov.uk/wiyby/wiybyController?ep=maptopics&lang=_e**

4. Trees and woodlands

4.1 Total woodland cover

The NCA contains 31,831 ha of woodland, 11 per cent of the total area, of which 10,348 ha is ancient woodland. A small portion, 277 ha, of The Forest of Avon Community Forest, one of twelve Community Forests established to demonstrate the contribution of environmental improvement to economic and social regeneration, falls within this area.

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

Farmland at Yanworth showing characteristic stone wall and field trees.

4.2 Distribution and size of woodland and trees in the landscape

At the western edge of the Cotswolds dense beech woods and tree clumps contribute to an imposing skyline. Around Bath, Stroud and Winchcombe the landform is characterised by deep and wide valleys often accentuated by densely-wooded ridge crests. Tree-clad streams often wind down the steeper slopes.

Source: Cotswolds Natural Area Profile, Cotswolds Countryside Character area description

4.3 Woodland types

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

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

Woodland type	Area (ha)	Percentage of NCA
Broadleaved	23,728	8
Coniferous	3,975	1
Mixed	2,140	1
Other	1,988	1

Source: Forestry Commission (2011)

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

Woodland type	Area (ha)	Percentage of NCA
Ancient semi-natural woodland	6,446	2
Ancient re-planted woodland (PAWS)	3,901	1

Source: Natural England (2004)

5. Boundary features and patterns

5.1 Boundary features

Hedged fields divide up much of the scarp's pastures. Around Bath, Stroud and Winchcombe fields are often small with overgrown hedgerows, but on the ridge tops the landscape is usually open arable divided by drystone walls.

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

5.2 Field patterns

Floated water meadows, for example of early 19th-century date on the Sherborne estate and assarted fields (both medieval and post-medieval in date) concentrated in the Stroud valley, are notable historical field patterns. Over 29 per cent of the AONB comprises small irregular fields signifying piecemeal enclosure of earlier open fields with distinctive curved profiles relating to medieval plough strips, generally from the 16th century, but documented from the 13th century. These are concentrated on the scarp in Wiltshire and Warwickshire, in valleys to the north and east of Stroud and valleys between Moreton-in-Marsh and Bourton-on-the-Water. Regular enclosure of former open fields, about 16 per cent of the area, of 18th century or later date, not respecting earlier boundaries, is concentrated in the central and eastern portions of the high wold. Less regular enclosures of this date, with boundaries echoing medieval headlands of open fields, are found across the area and particularly to the south in Wiltshire. 18th- and 19th-century regular enclosure of former open pasture, covering about 13 per cent of the area, is concentrated in the central and eastern portions of the high wold. More regular and large-scale enclosure of similar date, either of former open fields or of long-term pasture, including open fields laid down to grass from the medieval period, is most common to the centre and east of the area.

Source: Cotswolds 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 total farmed area in 2009 was 238,358 ha, comprising 2,534 holdings. The number of mixed farms within the NCA fell from 259 to 170 between 2000 and 2009. There was a 39 per cent decrease in the number of dairy farms within the same period, dropping from 186 to 114 holdings. The number of specialist poultry farms rose from 43 to 55 – a 28 per cent increase. There were 826 arable or horticultural holdings in 2000 and 809 in 2009.

Source: Agricultural Census, Defra (2010)

6.2 Farm size

In 2009 there were 678 units (186,963 ha) of more than 100 ha in the NCA, and 301 units (466 ha) of 5 ha or less. There were 681 holdings of greater than 5 ha and less than 20 ha, 191 holdings of greater than 20 ha and less than 50 ha accounting for 16,210 ha of the area and 383 holdings of greater than 50 ha and less than 100 ha accounting for 27,197 ha.

Source: Agricultural Census, Defra (2010)

6.3 Farm ownership

2009: Total farm area = 238,358 ha; owned land = 159,591 ha
2000: Total farm area = 232,134 ha; owned land = 159,741 ha

Source: Agricultural Census, Defra (2010)

6.4 Land use

There was an 8 per cent increase in the land used for oilseeds between 2000 and 2009, up from 17,449 ha to 18,828 ha. There was a 23 per cent increase in the land used for cash roots and a 42 per cent increase in the land used for growing stock feed in the same time period. There was a 9 per cent decrease in the land used for cereals, from 83,424 ha to 75,952, but a 33 per cent increase, from 9,539 to 12,650 ha, in the land used for "other" cereal farming.

Source: Agricultural Census, Defra (2010)

6.5 Livestock numbers

In 2009 there were 96,000 cattle, a decrease from 111,000 in 2000, 272,000 sheep a decrease from 374,700 in 2000 and 45,000 pigs down from 84,000 in 2000.

Source: Agricultural Census, Defra (2010)

6.6 Farm labour

The number of principal farmers dropped from 3,564 in 2009 to 3,282 in 2000, while the number of salaried managers increased from 222 to 256.The number of full-time workers dropped by 17 per cent from 1,113 to 926 in the same period. The numbers of part-time workers dropped by 2 per cent from 572 to 563 and the number of causal/gang workers dropped by 20 per cent.

Source: Agricultural Census, Defra (2010)

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

7. Key habitats and species

7.1 Habitat distribution/coverage

Lowland beech and yew woodland is prominent on the skyline of the scarp. There are small areas of coastal and flood plain grazing marsh, and many areas of lowland calcareous grassland. In addition the NCA contains important arable habitats; these support nationally important assemblages of arable birds and arable plants.

Source: Cotswolds Natural Area Profile

7.2 Priority habitats

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

Pasque flower found as part of the limestone grassland flora.

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

Priority habitat	Area (ha)	Percentage of NCA
Broadleaved mixed and yew woodland	15,937	<1
Lowland calcareous grassland	2,984	1
Coastal and flood plain grazing marsh	1,225	<1
Lowland meadows	654	<1
Lowland heathland	93	<1
Reedbeds	50	<1
Fens	26	<1
Purple moor grass and rush pasture	14	<1
Lowland dry acid grassland	6	<1

Source: Natural England (2011)

- Maps showing locations of priority habitats are available at: http://magic.defra.gov.uk select 'Habitats and Species/Habitats'

7.3 Key species and assemblages of species

- Maps showing locations of some key species are available at: http://magic.defra.gov.uk select 'Habitats and Species/Habitats'
- Maps showing locations of S41 species are available at: http://data.nbn.org.uk/

8. Settlement and development patterns

8.1 Settlement pattern

The principal towns lie on the edge of the area. Small towns and villages lie at the scarp foot, in the valley bottoms or on the gentler valley sides. Small hamlets and isolated farmsteads are found on the higher ground. Settlements are linked by a complex network of roads.

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

8.2 Main settlements

The main towns are Bath, Stroud and Cirencester. The total estimated population for this NCA (derived from ONS 2001 census data) is: 400,892.

Source: Cotswolds Countryside Character Area description; Countryside Quality Counts (2003), Natural England (2012)

8.3 Local vernacular and building materials

The Cotswolds are famous for the ever-present honey-coloured oolitic limestone used in walls, houses, mansions and churches.

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

9. Key historic sites and features

9.1 Origin of historic features

The area has an abundance of prehistoric monuments relating to the ebb and flow of settlement from the Neolithic onward. The uplands were substantially cleared of woodland in the third millennium BC, covering the major period of constructing long barrows which often provided foci for communities living in the adjacent lowlands and vales. Extensive and abundant evidence for settlement in the Roman period is present, notably at Bath (Aquae Sulis) and at Cirencester - which took the place of Bagendon as capital (civitas) of the Dubonni tribe.

The present predominant pattern of nucleated settlement developed in the 10th to 12th centuries, replacing an earlier more dispersed pattern of hamlets and farmsteads. Market centres developed in the 12th and 13th centuries, many, for example Stow-on-the-Wold, Moreton-in-Marsh, Chipping Campden and Northleach, were planned as new settlements in the 13th century.

By the late 11th century the area was extensively settled and there was little woodland. Much of the land was in large estates.

The 14th century witnessed abandonment and contraction of settlements, including some being replaced by sheep walks.

The distinctive style of the Cotswold multi-gabled manor house appeared during extensive rebuilding in late 16th and early 17th centuries, continuing after the adoption of classical styles into the mid 18th century and later.

Source: Draft Historic Profile, Cotswolds Countryside Character Area description

9.2 Designated historic assets

This NCA has the following historic designations:

- 88 Registered Parks and Gardens covering 9,177 ha.
- 2 Registered Battlefields covering 412 ha.
- 538 Scheduled Monuments.
- 15,968 Listed Buildings.

Source: Natural England (2010)

More information is available at the following address:

- www.english-heritage.org.uk/caring/heritage-at-risk/
- www.english-heritage.org.uk/professional/protection/process/national-heritage-list-for-england/

An example of the locally distinctive quarried stone used for domestic architecture at Snowshill, Gloucestershire.

10. Recreation and access

10.1 Public access

- 3 per cent of the NCA, 6,834 ha, is classified as being publically accessible.
- There are 4,777 km of public rights of way at a density of 1.7 km per km2.
- There are 2 National Trails within the NCA. The Cotswolds Way runs across most of the scarp and the Thames Path starts in the NCA.

Sources: Natural England (2010)

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

Access designation	Area (ha)	Percentage of NCA
National Trust (Accessible all year)	932	<1
Common Land	1,536	<1
Country Parks	81	<1
CROW Access Land (Section 4 and 16)	2,518	1
CROW Section 15	1,466	<1
Village Greens	71	<1
Doorstep Greens	2	<1
Forestry Commission Walkers Welcome Grants	2,941	1
Local Nature Reserves (LNR)	100	<1
Millennium Greens	5	<1
Accessible National Nature Reserves (NNR)	655	<1
Agri-environment Scheme Access	218	<1
Woods for People	3,903	1

Sources: Natural England (2011)

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

11. Experiential qualities

11.1 Tranquillity

Based on the CPRE map of Tranquillity (2006) a large proportion of the Cotswolds are tranquil, especially in the north of the area. The areas around Bath and smaller some settlements, and along transport routes are less tranquil.

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

Tranquillity	Score
Highest value within NCA	44
Lowest value within NCA	-82
Mean value within NCA	<1

Sources: CPRE (2006)

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

11.2 Intrusion

The 2007 Intrusion Map (CPRE) shows the extent to which rural landscapes are 'intruded on' from urban development, noise (primarily traffic noise), and other sources of visual and auditory intrusion. This shows that a patchwork of areas away from settlements and transport routes are undisturbed by noise or light pollution. A breakdown of intrusion values for this NCA is detailed in the table below.

Intrusion category	1960s (%)	1990s (%)	2007 (%)	Percentage change (1960s-2007)
Disturbed	15	30	44	29
Undisturbed	84	69	54	-30
Urban	1	1	2	1

Sources: CPRE (2007)

Notable trends from the 1960s to 2007 are the increase in disturbance along transport routes and near settlements.

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

Cotswold Lion.

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 Forest Inventory, Forestry Commission (2011)
- Countryside Quality Counts Draft Historic Profiles, English Heritage (2004)*
- Ancient Woodland Inventory, Natural England (2003)
- BAP Priority Habitats GIS data, Natural England (March 2011)
- Special Areas of Conservation data, Natural England (data accessed in March 2011)
- Special Protection Areas data, Natural England (data accessed in March 2011)
- Ramsar sites data, Natural England (data accessed in March 2011)
- Sites of Special Scientific Interest, Natural England (data accessed in March 2011)
- Detailed River Network, Environment Agency (2008)
- Source protection zones, Environment Agency (2005)
- Registered Common Land GIS data, Natural England (2004)
- Open Country GIS data, Natural England (2004)
- Public Rights of Way Density, Defra (2011)
- National Trails, Natural England (2006)
- National Tranquillity Mapping data, CPRE (2007)
- Intrusion map data, CPRE (2007)
- Registered Battlefields, English Heritage (2005)
- Record of Scheduled Monuments, English Heritage (2006)
- Registered Parks and Gardens, English Heritage (2006)
- World Heritage Sites, English Heritage (2006)
- Incorporates Historic Landscape Characterisation and work for preliminary Historic Farmstead Character Statements (English Heritage/Countryside Agency 2006)

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

Supporting document 2: Landscape change

Recent changes

Trees and woodlands

- Evidence suggests that during the period between the 1960s and 1970s ancient woodland was lost or replanted with conifer. There was some planting of coniferous woodland for timber and shelterbelts on the high wold and dip slope to provide shelter for increasing arable activity. Strategically located, this also benefited game management and shooting interests. Some restoration of ancient woodland planted with conifers has taken place.

- Countryside Quality Counts data for the period 1999 to 2003 indicate that the area of woodland is expanding through new tree planting such as that under woodland grant schemes. From 1999 to 2007, new woodland increased by 3,610 ha in the area of the AONB. Much of this new woodland is in the form of small scattered blocks of mixed broadleaves.

- The proportion of woodland sites covered by a woodland grant scheme increased from 37 to 50 per cent and ancient woodland in particular, having a positive effect on the condition and character of woodland.

- The Cotswolds has been identified as one of 12 national priority areas for woodland conservation and reinstatement of management to restore the internationally important ancient beech woodlands, and nationally important mixed and oak woods and parks[5] in response to deteriorating condition.

[5] Preliminary nature conservation objectives for Natural Areas – Woodland and Forestry , English Nature Research Report 239, Reid, C.M. and Kirby, K.J (1997).

Boundary features

- Boundary features are an important aspect of the Cotswolds and overall the resource of 16,604 km of hedgerows, stonewalls and other boundary features has been largely retained. The management of drystone walls and their condition, especially on the high wolds, has been in long-term decline, a reflection of the conversion from sheep grazing to arable cropping and the rising costs of stone and labour.

- Between 1999 and 2003 there was extensive investment in boundary management with 6 per cent of boundary features brought into management under agri-environment schemes. In 2003, 8 km of hedgerow and 32 km of drystone wall were restored. There continues to be an increase in positive environmental management for boundary features with 7,272 km of hedgerow and 340 km of drystone wall currently managed through agri-environment schemes.

- From 2002 to 2007, 20 km of drystone wall within the AONB area was restored under 'Caring for the Cotswolds' grants, and from 2010 to 2012, 7 km was restored under the Gas Pipeline Walling Grant Scheme.

Agriculture

- Land use trends show a mixed pattern with a decrease in 9 per cent in land used for cereals from 83,424 ha in 2000 to 75,952 ha in 2009. However there has been an increase in oilseed rape from 17,449 ha in 2000 to 18,828 ha in 2009 and an increase of 33 per cent in other cereal farming from 9,539 to 12,650 ha between 2000 and 2009. There was a 23 per cent increases in the land used for cash roots and 42 per cent increase in the land used for growing stock feed in the same time period.

- The total number of holdings has increased since 1990 although census data indicates that there was a significant decrease in mixed farms in the area from 259 to 170 between 2000 and 2009. Over this period there has been a small decrease in arable holdings, a 39 per cent decrease in the number of dairy farms and a 28 per cent increase in poultry farms. Despite a decline in dairy farm numbers there has been an increase in beef and sheep farms since 2002, reflecting those leaving the dairy sector but retaining cattle and sheep.

- Census data indicates that farm size has changed slightly. The number of medium-sized holdings has declined while there has been a small increase in the number of larger farms over 100 ha in size reflecting a general trend towards fewer and larger units. This is reflected in data for the AONB which shows that 70 per cent of the area is managed by 14 per cent of the registered land holdings, highlighting the trend towards bigger and fewer farms.

- Sixty-five per cent of the area is under an agri-environment scheme; above the national average. This includes management of calcareous grassland and neutral/acid pasture and reversion of arable land to permanent grassland. Some 94 per cent of SSSI are in favourable or unfavourable recovering condition. The north-west facing scarp slope was the focus for the Environmentally Sensitive Area Scheme.

- The Cotswolds are identified as a priority area for farmland birds, in particular six rarer species: grey partridge, lapwing, turtle dove, yellow wagtail, tree sparrow and corn bunting. These species have declined over recent years, but measures have been put in place through the South West Farmland Birds Initiative to help redress this loss. This has seen significant small-scale landscape changes, including the introduction of wild seed field margins, changed cropping patterns and hedgerow management, with 3,848 ha of key arable options for birds put in place.

- The agricultural labour force has continued to fall with a significant 45 per cent fewer farm workers in 2007 compared with 1990.

Settlement and development

- There is evidence of high demand for residential development within the Cotswolds, and an increase in second home ownership in many villages. This reflects the desire of many to settle in an area renowned for its relative affluence, rural tranquillity, accessibility and high-quality landscape.

- Chipping Norton and Chalford are examples of the peri-urbanisation of smaller towns and villages within the area.

- Many traditional stone farm buildings have been converted to residential use. In particular the rate of barn conversions is high; with a high density of conversion per numbers per area when compared to other areas.

- The AONB's Landscape Characterisation indicates that there has been a loss of long straw thatch, in particular, and replacement with 'alien' materials such as reed thatch and slate.

- There are pressures for the development of recreational features in the area, and especially on the scarp face, such as golf courses, riding stables and camping sites.

- The Cotswolds is a popular tourist destination and there has been localised pressure for development of facilities at tourist 'honey pots' to meet this demand, alongside associated congestion, erosion of footpaths, bridleways and viewing points.

Semi-natural habitat

- Much of the species-rich limestone grassland has been lost or has declined in quality, particularly along the scarp face as a result of scrub encroachment, a decline in grazing and lack of management of common land. In particular there has been a conversion of permanent pasture for sheep grazing to arable cultivation on the high wold and dip slope. In 1983, 2 per cent of the land was unimproved pasture compared with 40 per cent prior to the Second World War.

- Work over the last decade to improve the condition of SSSI in the area has shown considerable progress with 94 per cent now in favourable or unfavourable recovering condition.

- The Cotswolds Hills Environmentally Sensitive Area (ESA) covered 85,000 ha of the NCA. It covered a high proportion, nearly 2,000 ha, of the remaining unimproved Jurassic limestone grassland in Europe. Management of species-rich grassland across the NCA has been the subject of some effort and 1,212 ha are being maintained, 2,378 ha are being restored and 410 ha created under agri-environment schemes.

- Extensive agreements are in place for pasture management, restoration and the enhancement of wet grassland on the dip slope and valley bottoms along the headwaters of the Thames. This includes 66 ha of wet grassland being maintained, 137 ha being restored and 3 ha created under agri-environment schemes.

Historic features

- The density of historic parkland remains a key feature in this landscape. In 1918, about 6 per cent of the area was historic parkland making this area nationally important. By 1995 it was estimated that 37 per cent had been lost. About 47 per cent of the remaining parkland is covered by Historic Parkland Plans and about 45 per cent is included within an agri-environment scheme.

- The rate of barn conversions is high in this area in part due to the demand for housing. About 66 per cent of historic farm buildings remain unconverted, and most are intact structurally.

- Data shows that in 2003 archaeological features included in ESA agreements constituted more than 26 per cent of the total number reflecting the high concentration of archaeological remains in this area.

- Agri-environment schemes are providing important opportunities to improve the management of archaeological sites within the area.

Rivers

- The River Basin Management Plans which cover this area, four in total, indicate that surface water quality is generally good. Most rivers have shown improvements over the last few years. However, phosphate concentrations are a concern on the rivers Evenlode, Glyme and Ampney Brook.

- Due to the permeable nature of the catchment much of it experiences periodic low flows, particularly during summer months, which in some locations have been exacerbated by abstraction for public water supply. Works to address this in the past have resulted in reducing abstraction at a number of locations. Flow and ecological monitoring are undertaken to assess the benefits of reduced abstraction to rivers such as the Churn and Ampney Brook.

- Rivers such as the Evenlode display heavy degradation of river channels which affects the quality of the habitat, their setting and leads to hydromorphological issues.

- There are 51 river water bodies and two lakes in the catchments which fall inside this NCA. Water quality has generally improved across the catchments. Under the Water Framework Directive water bodies are artificial or heavily modified. Of the rivers in the area, 37 per cent currently achieve good or better ecological status/potential, including the Shill Brook, Kencot Brook and Sherborne Brook. Of the rivers assessed for biological status, 28 per cent are rated as good or high, 30 per cent as poor, and 10 per cent as bad. Failures are due to enrichment, principally phosphate, or fish numbers. Of the rivers in the Cotswolds, 31 per cent are predicted to improve for at least one element by 2015.

- The Jurassic Limestone aquifer which underlies the area is valued as a high quality source of drinking and agricultural water. Over-abstraction and excessive levels of nitrates and pesticides are a concern and arise from changes in land management such as increases in arable cultivation and demands for urban extension. Ground water is good to poor quality in the Upper Thames Catchment.

Minerals

- In the post-war period a number of large-scale mechanised quarries have been established in response to demand for crushed aggregate and cut stone for building. However, the number of working quarries is now small and delving as a means of abstracting local building stone has all but disappeared. Production is now largely confined to only the highest quality construction and repair work.

- Cotswolds limestone is still quarried for pulverised and reconstituted facing blocks and to produce limestone aggregate mainly for local use and is limited. Only small new quarries have opened in recent years for building or tiling stone.

- The character of stone varies considerably across the NCA, and local sources are required to maintain local distinctiveness. In 2003 the former Cotswolds AONB Partnership published a study, “Local Distinctiveness and Landscape Change”. This identified the reducing local supply of stone (other than crushed rock) as a threat to the maintenance of the locally distinctive built environment.

Drivers of change

Climate change

- Climate change trends suggest increased storminess, periods of drought and the increased prevalence of pests and diseases.

- Changes in climate may have a significant impact on the area's internationally important beech woodlands. Effects will vary due to location and soils where there may be loss of the shallow-rooting beech to wind throw and drought-stress. The nationally important mixed/oak woods and trees within parks may be lost through 'sudden oak death' and increased stress on veteran trees. Conversely, warmer winters could promote increased tree growth, as well as the suitability of new non-native species or native species of a different provenance, further affecting woodland composition.

- Other semi-natural habitats may also deteriorate, including remnant fragments of unimproved limestone grassland with the spread of invasive and woody species as a result of higher temperatures, along with a reduction in species diversity as a result of warmer winters and more frequent drought conditions. However, there is the potential for the migration of new species to these sites such as the Glanville fritillary moving north which could see species diversity maintained.

- Important wetland habitats such as fragmented mires and fen-meadows may suffer from increasing drought conditions brought on by hotter drier summers and potentially an increased demand for irrigation lowering groundwater levels.

- A longer growing season with increasing temperatures may also encourage the expansion of arable production, but with greater variability in quantity and quality including total crop failure on the thin brash soils, putting more easily cultivated areas of pasture under pressure. Higher temperatures may also encourage the introduction of new crops, for example vineyards, into the landscape, as well as different crop timings, which could offer opportunities for diversification and long-term sustainability. The thin light limestone soils may be vulnerable to damage, such as that caused by increased erosion through wind-blow and run-off, along with nutrient loss and decreased soil microbial activity. Over-abstraction of the aquifer is already an issue and may become a greater problem with lengthy dry periods.

- A longer growing season could see an increase in timber and biomass production, although, as with crop production, there will be potential stress which could affect product quality. Impacts from increased drought conditions may cause stress on trees and storminess, causing wind damage uprooting, and increased fire risk. A changing climate could increase pest prevalence and this has the potential to affect large stands of trees.

Other key drivers

- Development pressures and urban extension are likely to continue particularly around larger settlements such as Bath and Cheltenham and smaller market towns such as Chipping Norton, alongside continued conversion of traditional farm buildings in more rural areas.

- Demand for recreational opportunities and tourism on already strained 'honey pot' locations such as Bourton-on-the-Water and Bath will continue. This will place additional strain on road networks, localised erosion of key footpaths such as parts of the Cotswold Way National Trail, development to meet tourism need, water usage and resultant landscape and wildlife impacts.

- There is likely to be pressure for increased agricultural production and in particular arable conversion on the high wold and for an increase in novel crops such as soya, sunflowers and grain maize and biofuels such as miscanthus and oil seed rape. Increased agricultural production may impact on the quality of the soils.

- There is likely to be a continuing trend in conversion of medium-sized farm units into smaller horse paddocks and associated facilities with a resultant impact on wildlife and landscape, particularly around towns and villages or of them being amalgamated into larger farmed units.

- The Cotswolds is home to nationally significant populations of many rare species and tracts of priority habitats. It has a relatively diverse landscape and topographic variation that sits on a north-south axis. This means that it is well placed for initiatives to enhance ecological connectivity and ecosystem functioning. Much of the NCA could act as a key ecological corridor to facilitate climate change adaptation at a regional and national scale.

- Mineral extraction will continue to influence the area, not least in the supply of local stone for local development and restoration projects. Potentially small-scale local quarries as opposed to further expansion of the larger operations and a resurgence of the formerly widespread "delving" tradition, particularly for low-grade walling stone, could be investigated where appropriate.

- There is likely to be an increasing demand for abstraction of water from rivers and the aquifer, particularly if there is a trend towards drier hotter summers, changes in agricultural practice and increases in development and numbers of people living within or downstream of this area. While the regulatory regime should protect ecological flow needs, these conditions could exacerbate low flows already experienced in rivers such as the Evenlode and Glyme. Managing and extending locally important wetland habitats – water meadows, fens, springline flushes and rivers – would help to form a strengthened and more climate change-resilient network. Managing habitats to reduce flow through sensitive abstraction and to aid aquifer recharge will also help reduce flood risk and improve water quality.

- Protecting beech woods, unimproved calcareous grassland, and parkland, geological and historical features throughout the NCA will remain important, benefitting nationally important species (such as Duke of Burgundy butterfly, Cotswolds pennycress, red hellebore and the greater horseshoe bat), notable landscape features, and geodiversity resources.

- Woodland management and small-scale creation may result as there may be increasing demand for local woodfuel and timber. Urban tree planting may increase to mitigate heat island affects in towns and cities and to help soften new development.

- Individual hedge-row trees are important in the Cotswolds dip slope landscape, many of which are ash and vulnerable to ash dieback. Their loss could have a significant impact on this landscape setting.

- There are also pressures for commercial recreational activities that may adversely impact upon the tranquillity of rural areas.

Walking the Cotswold Way from Broadway Tower with expansive views over the Severn and Avon Vales NCA.

Supporting document 3: Analysis supporting Statements of Environmental Opportunity

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

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

Cotswold escarpment at Cleeve Hill Common - the highest point on the scarp and showing the oolitic limestone geology.

Statement of Environmental Opportunity	Ecosystem Service																	
	Food provision	Timber provision	Water availability	Genetic diversity	Biomass provision	Climate regulation	Regulating water quality	Regulating water flow	Regulating soil quality	Regulating soil erosion	Pollination	Pest regulation	Sense of place/Inspiration	Sense of history	Tranquillity	Recreation	Biodiversity	Geodiversity
SEO 1: Protect and enhance the highly distinctive farmed landscape, retaining the balance between productive arable, pastoral and wooded elements and the open, expansive views particularly from the scarp, high wold and dip slope.	↑ ***	↑ ***	↘ **	↑ ***	↗ **	↗ *	↘ *	↗ *	↘ *	↘ *	↗ *	↗ *	↑ ***	↗ ***	↗ **	↔ ***	↗ *	↔ ***
SEO 2: Safeguard and conserve the historic environment, cultural heritage and geodiversity that illustrate the history, evolution, foundations, land use and settlement of the Cotswolds landscape, and enable access to and interpretation of the relationship between natural processes and human influences.	↘ *	↗ *	↔ ***	↗ *	↗ *	↗ *	↔ ***	↔ ***	↔ ***	↗ **	↗ ***	↗ ***	↑ ***	↑ ***	↗ ***	↗ ***	↗ ***	↑ ***
SEO 3: Protect, maintain and expand the distinctive character of the Cotswolds and the network of semi-natural and arable habitats, including limestone grassland, beech woods and wetlands along streams and rivers, to enhance water quality, strengthen ecological and landscape connectivity, support rare species and allow for adaptation to changes in climate.	↘ *	↑ ***	↗ ***	↗ **	↑ ***	↗ ***	↗ ***	↗ ***	↗ ***	↗ **	↑ ***	↑ ***	↗ ***	↗ ***	↑ ***	↗ ***	↑ ***	↗ **
SEO 4: Safeguard and manage soil and water resources, allowing naturally functioning hydrological processes to maintain water quality and supply; reduce flooding; and manage land to reduce soil erosion and water pollution and to retain and capture carbon.	↗ **	↗ **	↑ ***	↔ ***	↗ **	↑ ***	↑ ***	↑ ***	↑ ***	↑ ***	↗ **	↗ **	↗ **	↗ **	↗ **	↗ **	↗ **	↔ ***

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

Landscape attributes

Landscape attribute	Justification for selection
The dramatic landform of high scarp and dip slopes defined by the geology of the Jurassic oolitic limestone group.	■ The limestone rocks of the Cotswolds were formed in shallow tropical seas during the Jurassic Period and are an exposed section of the outcrop which stretches from Dorset to Lincolnshire. The major western scarp exposes limestones from the Lower to Middle Jurassic era; the classic oolitic 'Cotswold stone' was formed in the Middle Jurassic. Landform is closely linked to this Jurassic geology including the scarp face, high wold and dip slope. ■ There are currently 50 SSSI containing geological and geomorphological interest and features. In addition, there are 186 local sites of geological interest, highlighting the importance of this area for its international educational value to understanding of geology, stratigraphy, geomorphology and palaeontology. ■ Underlying the limestone is an important aquifer for water supply to this and neighbouring NCAs and urban populations.
Buildings and drystone walls utilising locally quarried stone.	■ The Cotswolds are famous for the ever-present honey to whitish coloured oolitic limestone used in walls, houses, mansions and churches, and drystone walls which bring a sense of harmony and unity to the built environment. ■ Distinctive style of vernacular architecture dominated by the use of oolitic limestone with buildings predominantly from the 17th and 18th centuries set in a rural landscape. ■ Low drystone walls are prominent on the high wold, enclosing large arable fields and adding to a sense of openness and harmony across the area.
A long history of human occupation evident in the numerous heritage assets to be found across the landscape.	■ The story of human occupation is told by the many, and often protected, heritage assets to be found; prehistoric barrows and stone circles; iron-age hill forts; early settlements; Roman villas and settlements, such as Bath, and roads, such as the Fosse Way; deserted medieval villages, cloth mills in Stroud and Chipping Norton and notable historic field patterns. ■ A number of large estates scattered across the area, such as Blenheim Palace, a World Heritage Site, Sherborne Park and Dyrham Park; testify to the wealth generated by sheep and the wool industry in the area. This industry has also influenced much of the built and industrial architecture to be found; a defining element in settlements such as Stroud built on the back of this wealth. ■ The Cotswolds contain 538 Scheduled Ancient Monuments, a wealth of Listed Buildings, 88 registered Historic Parks and Gardens covering 9,177 ha, 2 registered battlefields and a vast amount of undiscovered buried archaeological assets.

Landscape attribute	Justification for selection
Diversity of views resulting from the complex landform.	■ The western scarp affords panoramic views across adjacent lowlands, framing views outwards and across the NCA itself, with glimpsed views through wooded valleys. ■ The Cotswold scarp, rising to 330 m, provides far reaching expansive views westwards over the Severn Estuary and Avon Vales to Wales, the Malvern Hills and Shropshire Hills, and eastward across and into the Cotswolds. The scarp provides a dramatic backdrop to Bath, Stroud and Cheltenham and dominates views from and within the Severn and Avon Vales NCA. ■ The high wolds, although not as elevated as the scarp, provides extensive uncluttered easterly views across the Vale of White Horse to the North Wessex Downs. ■ The eastern side of the NCA merges gently with the neighbouring NCAs and views are more intimate as the landscape becomes more rounded and with river valleys winding their way into the headwaters of the Thames.
An almost continuous wooded scarp line dominated by internationally important beech woodland.	■ At the western edge of the Cotswolds, dense beech woods and tree clumps contribute to an imposing skyline, including the Cotswold Beechwoods SAC, the most westerly extensive block of this type of woodland. ■ Around Bath, Stroud and Winchcombe, the landform is characterised by deep, valleys, often accentuated by densely-wooded ridge crests, these woods support species such as Duke of Burgundy butterfly, are floristically rich and are important for molluscs. ■ Steeply-incised wooded stream and river valleys cut through the north-west-facing scarp, flowing westwards towards the Severn Estuary. ■ Woodland network helps support the Bath and Bradford-on-Avon Bats SAC which supports 15 per cent of the UK's greater horseshoe bat population alongside Bechstein's bat and lesser horseshoe bat.
Sheep-grazed limestone grassland, particularly prominent on the scarp and high wold but scattered throughout area.	■ Scattered remnants of unimproved limestone grassland form a patchwork which supports important plant and butterfly species, such as chalkhill blue, Adonis blue and large blue, remain, particularly on the scarp and high wold. Rodborough Common SAC which is the most extensive area of calcicole grassland which is more or less confined to the Cotswolds. ■ Wool production has been important in the Cotswolds in both the Roman and medieval periods. The Cotswold breed of sheep, known locally as the Cotswold Lion, has a long history on the Cotswolds, and was possibly bred from the long wool sheep introduced by the Romans. By the mid 20th century there was just one large breeding flock and a handful of small flocks left but since then numbers have slowly grown and it remains a symbol of the Cotswolds and well adapted to the limestone grasslands found here. ■ Open commons and open large areas known as sheep walks are noteworthy, but where pastures are more common they are divided by hedgerows or small patches of scrub. These are often smaller irregular fields indicating past piecemeal enclosure – generally from the 16th century, but documented from as early as the 13th century – of earlier open fields, with distinctive curved boundaries relating to medieval plough strips. Examples are concentrated on the scarp, in valleys to the north and east of Stroud and the central valleys between Moreton-in-Marsh and Bourton-on-the-Water. ■ Roadside verges are often botanically diverse and form an important network of calcicole grassland to complement a network of sheep grazed grasslands. They are a colourful component of the Cotswold landscape throughout spring and summer.

Landscape attribute	Justification for selection
High open wolds with large fields mainly under arable cultivation divided by dry stone walls.	■ A series of open rolling plateaux separated by intimate river valleys collectively known as the high wolds. ■ On the high wold the landscape is usually open arable cultivation dominated by drystone walls. ■ Regular enclosure of 18th century or later date of former open fields, not respecting earlier boundaries or field patterns. ■ Thin well-aerated, brashy soils derived from limestone are common on the steeper slopes, particularly to the east. ■ Farmland birds have a strong association with the high wold, due to the mix of arable and pastoral farming activity. Species such as grey partridge, lapwing, turtle dove, tree sparrow and corn bunting have suffered 50 per cent declines in population since the 1970s, but initiatives in the area to increase food availability in an arable setting have ensured populations remain a key feature of landscape.
Steep-sided valleys dissect the rolling dip slope characterised by small hedgerow-enclosed fields with tree-lined rivers and wet meadows, and parklands.	■ Lush, wetter, more vegetated landscape contrasting with the drier exposed high wold. ■ To the south and east, broad valleys with wetter clay soils form around the main rivers and streams which flow eastwards and form the tributaries of the River Thames. These rivers form an important ecological network running west to east across the NCA. ■ Fields are more regular as a result of large-scale enclosure in the 18th and 19th centuries, either of former open fields or of long-term pasture, including open fields laid down to grass from the medieval period, are common to the centre and east of the area with grazing systems more prevalent. ■ In the south of the area on the dip slope lowland from Sherston down to and including the Kennet and Avon Canal corridor, hedgerows are principally made up of hazel. Elsewhere, most hedgerows were originally planted with hawthorn. This influences the different styles of hedge-laying traditional to the area. ■ This landscape merges seamlessly with the landscapes of adjoining NCAs on the eastern edge and in particular the Upper Thames Clay Vales and in the far north-east the Bedfordshire Claylands.

Landscape attribute	Justification for selection
A largely rural area with a distinctive settlement pattern of small towns and villages, with principal towns and cities lying at its edges.	■ Principal towns, such as Bath, Stroud and Cirencester, lie at the edges of the area with smaller towns and villages at the scarp foot on springlines, in the valley bottoms, or on the gentler valley sides largely dictated by water availability. ■ Extensive and abundant evidence of settlement in the Roman period, notably at Bath (Aquae Sulis) and at Cirencester, which later became an important centre for the wool trade in the Middle Ages. Bath is a World Heritage Site designated for its importance as a Roman thermal spa, and for the elegant, fashionable architecture and cultural activities of the late 18th and early 19th centuries. ■ The present pattern of nucleated settlement developed between the 10th and 12th centuries. The well known market centres developed during the 12th and 13th centuries on the back of wealth generated by the wool trade. Many, for example, Stow-on-the-Wold, Moreton-in-Marsh, Chipping Campden and Northleach, were planned as new settlements in the 13th century. ■ A number of large estates are scattered across the area, such as Blenheim Palace, a World Heritage Site, and Sherborne Park; testifying to the wealth generated by the sheep and wool industry in the area. ■ Distinctive style of vernacular architecture dominated by the use of oolitic limestone. ■ Settlements are linked by a complex network of roads. The oldest, often of Roman origin, drove roads and salt ways, and the more recent roads resulting from parliamentary enclosure sweep across the landscape in almost straight lines. The typical Cotswolds road however, is a winding lane linking villages along the valleys and rising steeply over the high ground. Small hamlets and isolated farmsteads are found on the higher ground and estates are found throughout.
Extensive network of public rights of way and areas of access land sit alongside a strong network of small villages and market towns.	■ There are 4,777 km of public rights of way in this area including 151 km of The Cotswold Way National Trail which runs along most of the scarp. The Thames Path also starts in this area. There is a relatively high concentration of named walking routes including the Macmillan Way, Gloucestershire Way, Wychavon Way and Wychwood Way. ■ National Cycle Network Routes 45 and 48. ■ 2,500 ha of open access land including common land. ■ The Cotswolds is often thought of as the quintessential English landscape, as originally promoted by the Arts and Crafts Movement for its lack of industrialisation and development after the 1800s. This image together with the extensive network of public rights of way continues to draw both domestic and international visitors to enjoy places like Bourton-on-the Water, Stow-on-the-Wold and Burford for their timeless quality.
A landscape of great tranquillity and calm with a rural feel of peace and quiet.	■ Levels of intrusion in this area are low away from settlements and main transport routes and are undisturbed by noise or light pollution. ■ Tranquillity and escapism are associated with the open, sparsely-settled areas of the high wold, as well as its woodlands and those of the valleys, while inspiration is drawn from the area's numerous historic estates, local vernacular and archaeological features.

Landscape opportunities

- Recognise the importance of using local stone to retain vernacular building style and stone walls and manage quarries to supply materials while retaining geodiversity, biodiversity and landscape features.

- Conserve and enhance local setting, distinctiveness and views provided by the diverse landform and in particular; across the tree lined scarp with spectacular views out of the NCA and across it, which provides a backdrop for settlements such as Cheltenham, Bath, Stroud and Gloucester; the contrasting internal views found in the more open arable dominated high wold; the framed views within the more intimate wooded valleys, ancient pasture fields, and historic settlements of the dip slope in the east.

- Protect from damage and appropriately manage the area's rich cultural heritage, both buried and exposed, most notably bronze and iron-age remains, hilltop enclosures and earthworks, Roman towns, settlements and villa sites, water mills and other industrial heritage assets, estates, planned landscapes and parkland. Further consideration should be given to where this activity most benefits biodiversity, geodiversity, recreation, sense of place, wider cultural heritage. Enhance visibility, access to and interpretation of features to raise awareness of their importance, and provide opportunities for education and sustainable tourism.

- Actively manage and where appropriate extend and link areas of ancient woodland, particularly the beech woodland along the scarp, wooded valley slopes and the oak/ash woodland north of Bath, to reinforce and enhance landscape character and the setting of parks and settlements. Woodland management and creation should contribute to a resilient network of habitat to buffer the SAC woodlands and provide foraging ground for bats. There may be limited scope for the creation of woodland. New woodland should reflect the setting, shape and size of existing woodlands/ plantations and consider landscape impacts.

- Positively manage, reinforce and restore the historical field patterns across the area and restore hedgerows on the scarp and eastern edges of the area and stone walls, with local stone, on the high wold, to restore distinctive field patterns and lost boundaries.

- Manage and extend the remnants of limestone grassland on the scarp and wold and pastures on the eastern edge through grazing, with local breeds where possible such as the Cotswolds sheep, to maintain the intimate character of the landscape, to enhance the condition and to buffer and extend the grassland network, and to help species such as Adonis blue, large blue and chalkhill blue butterflies thrive. Aim to strengthen and make the grassland network more climate change resilient, which will aid aquifer and river recharge.

- Protect and manage roadside verges as an important part of the wider network of limestone and species-rich grasslands for their biodiversity and cultural value.

- Manage thin brashy soils on the scarp and high wold to ensure they remain productive, improving soil quality, associated biodiversity and capacity for aquifer recharge and carbon storage.

- Plan for a continuing source of mature and veteran trees on the western side of the NCA and within parkland sites, such as Cornbury Park and Blenheim Palace, so that these nationally important cultural components of the landscape are retained and the structure of historic landscapes is retained. The presence of mature and maturing trees should also benefit nationally important invertebrate populations, lichen communities and fungi.

- Plan to conserve and enhance the wetter more vegetated landscapes of the eastern side of the area. Extend the network of semi-natural habitats along river corridors, including flood meadows, grazing marsh, unimproved grassland and other wetland habitats. As part of landscape enhancement, create more resilient ecological networks and flood storage zones along rivers, with sensitivity for the integrity of historic flood meadow management, characteristic of the river flood plain.

- Recognise and protect the network of commons particularly along the scarp, as landscape, biodiverse and cultural elements.

- Plan for recreation and enhance the rights of way network for the benefit of local populations and visitors. Realise opportunities presented by development and green infrastructure planning linking the heart of urban areas outward while sensitively taking account of other environmental features. Incorporate multi-user access for the surrounding populations.

- Ensure new developments provide opportunities for a high standard of design, local distinctiveness and a contribution to green infrastructure.

- Ensure development, changes in land management and farm diversification do not impact adversely on the dark skies and tranquillity of the area.

Early spring farmland at Yanworth, showing traditional stone walls and sheep grazing that is characteristic of the Cotswolds.

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	Livestock production and arable production	Food production is a key provisional service with 83 per cent of the area under registered farms. The soil types are well suited to arable farming systems, affording high yields of cereal crops. In 2009 an estimated 76,000 ha within this NCA was under cereal production, with other crops such oilseed rape and linseed on the increase and roots, beans, peas a smaller part of the mix. The area supports 96,000 cattle, predominantly for beef, retains some dairying and supports 272,000 sheep, making this an important meat producing area.	Regional	The area has a long history of food production. Cereals and livestock are both important across the area and their distribution is intimately linked to landform with livestock found on valley sides and the escarpment and cereals on the high wold. Mixed farming was more prevalent but arable cropping has increased. Livestock, and in particular sheep farming, has a strong cultural association with the Cotswolds and contributes to sense of place and history, in particular the long wool sheep so characteristic of the Cotswolds known as the Cotswold Lion. Horticulture is an important and locally significant activity in the northern Cotswolds. Changes in cropping patterns in response to climate change may see more novel crops introduced. A challenge within this area will be to maintain levels of permanent grassland as both cereal crop prices and CAP reform make its conversion markedly more attractive. If large-scale conversion does take place this is likely to impact on water quality, and in particular groundwater quality. The nationally important limestone grasslands currently afford some carbon sequestration.	Work with the local farming community to safeguard future food production while enhancing key ecosystem services such as biodiversity, water quality and regulation, soil quality and enhancing soil quality but reducing erosion, pollination and genetic diversity. Work with local land managers to maintain the diverse and mixed enterprises across the area and in particular the retention of permanent pasture/grassland. Seek opportunities to retain and enhance a network of limestone grassland through arable reversion.	**Food provision** **Biodiversity** **Regulating soil erosion** **Regulating water quality** **Sense of place** **Genetic diversity** **Regulating soil quality**

Service	Assets/attributes: main contributors to service	State	Main beneficiary	Analysis	Opportunities	Principal services offered by opportunities
Timber provision	Existing woodland Hedgerows	The relatively high woodland cover of this area (11 per cent of the total area) is relatively underutilized as a timber source. Eight per cent of this is broadleaf – much of it beech. Some of this beech wood has been designated as SAC and SSSI for its biodiversity interest through designation, for examples Cotswolds Beechwoods SAC. One per cent is conifer established between 1960 and 1980. There are 10,348 ha of ancient woodland situated on the scarp of slopes, or in steep valley sides to the south and on the dip slope. There is limited capacity for the production of hard and soft timber but there exists potential to increase the production of local timber by bringing existing unmanaged or undermanaged woodlands back under management.	Local	There are limited opportunities for woodland creation and care is needed so as not to result in a significant change in the character of the area or to reduce areas of other important habitats, particularly limestone grassland. Most existing deciduous woodland is located on scarp slope and steep valley sides and largely inaccessible for commercial timber provision. However some short-term provision may arise from the removal of conifer plantations, with subsequent reversion to broadleaf woodland limiting further provision. Bringing existing deciduous woodland into traditional management, where possible, would create a local supply of timber or woodfuel. Increased biodiversity and soil stability may result from positive, targeted management.	There may be limited opportunities for woodland creation on the scarp and some valley sides helping to reduce flows of water and limit soil erosion; however, their use for timber production is likely to remain limited. There may also be limited opportunity for local timber provision through reinstatement of woodland management techniques within some existing woodlands. Incentives such as woodland grant scheme could be used to help encourage this. Sites supporting other semi-natural habitats, important species and heritage assets will need to be avoided. Manage traditional hedgerows for the provision of timber for local wood-fuel supply.	**Timber provision** **Biodiversity** **Climate regulation** **Regulating water flow** **Regulating soil erosion** **Sense of place /inspiration** **Biomass energy**
Water availability *continued on next page*	Extensive limestone aquifer Fens and flushes sensitive to low flows Winterbournes and slads Important salmonid fish communities Moderately high rainfall rate	Almost all of the NCA lies over a limestone aquifer made up of the unconfined Great and Inferior Oolites. This provides groundwater to the rivers and is of strategic importance for public water supply. This NCA has the headwaters of the River Thames, and a number of other rivers which form tributaries of the Thames, including the Coln, the Churn, the Leach, the Windrush and the Evenlode. All of these rivers rise as limestone springs on the dip slope of the Cotswolds and flow eastward joining the Thames further downstream in the adjacent Upper Thames Clay Vales NCA.[6] There are a large number of abstractions from both rivers and groundwater sources within this NCA. Surface water sources supply more than half of the total licensed volume but the majority of this volume	National	The limestone aquifer underlying the NCA is of strategic importance for public water supply and supplies major conurbations surrounding the Cotswolds including Bath, Gloucester and Cheltenham. Because of its nature this aquifer is sensitive to over abstraction and pressures such as increasing demand from urban growth and as rainfall patterns fluctuate with climate change there is potential that it may become over abstracted during drier summer months. This would potentially affect water supply and the ecological capacity of rivers, flushes and fens and in particular important salmonid populations. Regulatory regimes should ensure ecological flow needs are met but continued vigilance is required.	Ensure appropriate on-farm management of water supply and conservation through measures such as farm reservoirs, field drains and through cropping patterns. Seek to slow water flow across landscapes through natural drainage patterns and the use of features such as hedgerows. Seek to maintain the ecological flow levels in rivers and ground water through management of abstraction, particularly in periods of low flow. Seek to ensure groundwater flows are sufficiently high to support seasonal patterns in winterbournes	**Water availability** **Regulating water flow** **Biodiversity** **Regulating water quality** **Regulating soil erosion**

[6] The Cotswolds Catchment Abstraction Management Strategy, Environment Agency (2007) (accessed February 2013; URL: http://publications.environment-agency.gov.uk/pdf/GETH1007BNME-E-E.pdf)

Service	Assets/attributes: main contributors to service	State	Main beneficiary	Analysis	Opportunities	Principal services offered by opportunities
Water availablility *continued*	Limestone grassland and lowland pasture	is returned to its source at or close to the point of abstraction after being used for fish farming. The response to recharge within the limestone is rapid (in a matter of days) and river flows increase almost simultaneously. Equally the effects of abstraction on stream flow can be rapid and significant, most notably during periods of summer low flows, but depends on the localised circumstances and how much is taken. There is potential surface water capacity available for abstraction in the River Evenlode, the River Leach, and the Thames headwaters and groundwater currently available from the Upper Windrush unconfined limestone and the Upper Coln unconfined limestone aquifers. However, most of the area is classed as having 'no further water available' for abstraction from both surface water and groundwater while the central part of the aquifer is already 'over licensed', with further pressures associated with the growth of surrounding towns and cities, especially Bath in the south and Gloucester and Cheltenham on the north-west boundary of the NCA.[7] There are wetland SSSI in the NCA that are dependent on groundwater springs and flushes such as Middle Barton Fen, Ravensroost Wood, Wychwood Forest, Brassey Reserve and Windrush Valley. The Cotswolds area has hundreds of sites that have been designated as locally important for wildlife. Many of these are associated with the clean, groundwater-fed rivers and springs rising from the limestone. There is a thriving fishery resource in the catchment. All of the Cotswolds rivers except the upper Thames are designated Salmonid Fisheries under the Freshwater Fish Directive and Native brown trout water under the Environment Agency National Trout and Grayling Strategy[8] all highlighting the importance of maintaining ground and surface water levels in this sensitive NCA.		Pasture, flood plain grazing marsh and limestone grassland habitats, particularly on the valley sides and scarp slope can intercept large volumes of water and help reduce rates of surface flow and increase infiltration rates aiding recharge of the groundwater and filtering out pollution. With an increase in arable cropping this service may reduce and it's important to ensure strategic sites are retained to continue to provide this services. Surface water accounts for nearly half of abstraction licences in the catchment, but there is potential capacity in the system from the River Evenlode, the River Leach, and the Thames headwaters to respond to rising demand, however most of catchment is at capacity or over abstracted, which can compromise water supply for both public consumption, ecological flow levels in rivers and aquifer recharge. Where the underlying limestone bedrock is particularly permeable, sections of rivers and their tributaries exist as dry valleys for many months. In prolonged periods of wet weather the increased surface run off and raised water table results in the re-establishment of the flow of these watercourses. They are known locally as slads or winterbournes and care is needed to maintain these functioning temporary wetland systems for their capacity to help manage flows in peak times and for their landscape and biodiversity value.	through controlling abstraction and ensuring morphological integrity of the winterbourne is maintained. Seek to put in place measures which improve soil quality and condition and alleviate compaction to improve percolation and alleviate water flow issues. Seek to put in place measures such as relocation of gates and associated gapping up, watercourse fencing, cross drains, sediment ponds and traps, livestock and machinery tracks and associated livestock fencing, pesticide handling and biobed options, roofing of manure, slurry and silage storage and livestock gathering areas and help reduce runoff from yards, tracks and gateways to alleviate water flow issues. Identify strategic grasslands and ensure their retention and favourable management particularly on valley sides and the scarp slope to aid water interception and retention.	

7 The Cotswolds Catchment Abstraction Management Strategy, Environment Agency (2007) (accessed February 2013; URL: http://publications.environment-agency.gov.uk/pdf/GETH1007BNME-E-E.pdf)

8 The Cotswolds Catchment Abstraction Management Strategy, Environment Agency (2007) (accessed February 2013; URL: http://publications.environment-agency.gov.uk/pdf/GETH1007BNME-E-E.pdf)

Service	Assets/attributes: main contributors to service	State	Main beneficiary	Analysis	Opportunities	Principal services offered by opportunities
Genetic diversity	Existing flocks of Cotswolds Sheep Blenheim Orange	The local breed of Cotswold sheep known as the Cotswold Lion is still found locally and numbers are recovering after a long period of unpopularity. By the mid 20th-century there was just one large breeding flock and a handful of small flocks left but since then numbers have slowly built back up due in part to the success of agri-environment schemes. The Blenheim Orange apple variety was discovered in about 1740 in Woodstock, Oxfordshire, growing against the wall of Blenheim Park. It has remained a popular apple tree and is said to be one of our finest and most valuable apples.	Local	The Cotswold Lion has breed features which continue to make it a commercial option for local graziers, and for siring. However it is likely to be for its commercial value as a local product for both its meat and wool that it offers most potential and as a distinctive product that can be marketed preferentially at the farm gate and at farmers' markets and farm shops. In particular the breed's history as a wool producer would suggest direct marketing for woollen products would be viable. Culturally the Cotswold Lion is a continued asset as an emblem of the area and its cultural identity. Its long historic association with grazing of the Cotswolds and its underpinning of the success of the wool trade in England in the 18th and 19th centuries adds a tangible connection to the past and current agriculture. The AONB use the breed as their distinctive brand and for the title of their local quarterly newspaper. Numbers of this breed remain fragile and its long connection with the area makes it ideal to maintain the limestone grasslands of the Cotswolds; however fluctuating popularity and flock size may well be an issue in maintaining feasible numbers. The Blenheim Orange, an Oxfordshire apple variety, has a strong association with the eastern fringes of the NCA around Woodstock. It is now widely planted as a garden fruiting tree, and it is important to maintain local plantings due to its association with the area.	Seek to maintain viable flocks of Cotswold Lion sheep and the genetic basis of the breed and seek expansion in numbers to secure its future in the Cotswolds. Develop the brand for meat and wool from the Cotswold Lion and develop a demand for local market of quality product. Continue to raise the profile of the breed and its historical significance to the area through branding and advocacy. Promote its use as a grazing animal in local grazing schemes and in particular for conservation grazing. Ensure Blenheim Orange remains viable within the Woodstock area and encourage local orchard planting and management.	**Genetic diversity** **Sense of place / inspiration** **Biodiversity** **Food provision** **Sense of history**

Service	Assets/attributes: main contributors to service	State	Main beneficiary	Analysis	Opportunities	Principal services offered by opportunities
Biomass energy	Existing woodland and hedgerows	A few small areas of energy crops, primarily miscanthus have been planted since 2000. Both the NCA's 11 per cent woodland cover and an extensive hedgerow network are an underutilised resource. Oilseed rape production within the NCA is used in biodiesel production.	Local	Thin brashy soils, high arable crop prices, high water demand of both miscanthus and short rotation coppice mean that uptake of energy crops has not been high in this area. No suitable end user is apparent, which also limits opportunity. Defra energy crop maps show potential for miscanthus in this area as medium to low and short rotation coppice as medium. It may be possible to produce some biomass fuel as a result of bringing woodlands into management, particularly traditional, coppice management of deciduous woodland. Much of the deciduous woodland in the area is on steep valley sides making it unviable for commercial biomass production and is of high landscape and biodiversity value. Converting conifer plantations to deciduous woodland would generate some short-term supply of biomass. Biomass is available from the area, possibly at a significant local level, from the routine management of hedgerows, particularly the production of small-section beech on the dip slope.	Bring local woodlands into traditional coppice management, generating a local supply of biomass energy. Similarly the arisings from hedgerow management could supply a local demand.	**Biomass energy** **Biodiversity** **Sense of place / inspiration** **Timber production** **Regulating soil erosion** **Regulating soil quality**

Service	Assets/attributes: main contributors to service	State	Main beneficiary	Analysis	Opportunities	Principal services offered by opportunities
Climate regulation	Existing woodland Existing organic soils under flood plain grazing marsh, permanent pasture, limestone grassland and woodland.	Across this NCA the mineral soils generally have low carbon content, typically 0 to 5 per cent, especially where under continuous arable cultivation. However, soils of flood plain grazing marsh (up to 1,300 ha) will contain much higher carbon levels. Areas under permanent pasture, limestone grassland and the organic soils under woodland cover are also likely to retain higher volumes of carbon. Woodlands will also play an important role in sequestering atmospheric carbon and in storing it in living plant material, as will the small areas of reedbeds and fen.	Local	There is limited soil carbon content in the soils of the Cotswolds. Mineral soils on the dip slope and high wold under arable cultivation offer limited potential, although frequency of cultivation, cropping patterns and inputs can affect their sequestration potential. The escarpment and valley sides in the south around Bath, west around Wotton-under-Edge and Stroud, and on the dip slope are dominated by woodland, limestone grassland and permanent pasture have enhanced carbon levels. The river valleys of the Windrush and Evenlode, Vale of Bourton and Moreton and the rivers of the Head of the Thames all have associated wet meadows, pasture and woodland and associated soils which store modest amounts of carbon. Although the area has a relatively high woodland cover (11 per cent) which has some sequestration potential, there is limited opportunity for extensive new areas of woodland planting so overall woodland contribution is limited to extending and buffering existing sites.	Seek opportunities to expand the area of woodland adjacent to existing ancient semi-natural woodland sites to realise the potential for further, long-term carbon storage associated with woodland management. Seek opportunities to increase the potential carbon storage abilities of mineral soils under arable production through increasing organic matter inputs and by introducing break crops into arable rotations. Introduce minimum tillage to reduce carbon loss. Seek to expand the area of permanent pasture, wet meadow and limestone grassland to further the ability of the habitats and the underlying soils to sequester increased volumes of green house gases from the atmosphere. Consider planting trees in urban settlements to aid local climate regulation.	**Climate regulation** **Regulating soil quality** **Regulating water quality** **Timber production** **Biomass energy**

Service	Assets/attributes: main contributors to service	State	Main beneficiary	Analysis	Opportunities	Principal services offered by opportunities
Regulating water quality	Rivers Lowland Calcareous grassland Lowland pastures Floodplain and grazing marsh Fens Reedbeds	Around half of the area's groundwater is classed as being of poor quality, particularly within the north and western parts of the NCA, with predominantly good groundwater quality in the southern half. All of the rivers within the character area are classed as good in terms of their chemical quality and most rivers are classed as having good ecological quality other than the upper Evenlode and the mid Windrush which have moderate ecological quality and the River Coln and some small tributaries of the Thames in the south-west of the catchment which have 'poor ecological quality.[9]	National	Ecological status failures within the water bodies in this NCA are, in the majority for phosphate and fish. Nitrate and pesticide pollution, from agricultural inputs are of particular concern for groundwater in the north and western parts of the area and some surface waters. This is particularly problematic due to the highly porous nature of the rocks which form the aquifer in this area. This area is known for its high quality drinking water and increasing nitrate and pesticide levels can result in higher treatment costs for drinking water. This can be a particularly long-term problem for groundwater where pesticides can persist for many years. Phosphate concentrations are a concern on the rivers Evenlode, Glyme and Ampney Brook. This results in enrichment of the water and reduction in its conservation value and in particular salmonid species and in drinking water.	Seek to support initiatives which give tailored farm advice about agricultural inputs and soil and water management to help address water quality issues within the area, such as catchment sensitive farming. Seek to put in place measures such as relocation of gates and associated gapping up, watercourse fencing, cross drains, sediment ponds and traps, livestock and machinery tracks and associated livestock fencing, pesticide handling and biobed options, roofing of manure, slurry and silage storage and livestock gathering areas and help reduce runoff from yards, tracks and gateways to alleviate water quality issues. The EA have actions in place to address these failures, some of which are for water bodies which need to meet Good Ecological Status by 2015.	**Regulating water quality** **Regulating water flow** **Water availability** **Biodiversity**

[9] Water for life and livelihoods, Defra/Environment Agency (2009) (accessed February 2013; URL: http://publications.environment-agency.gov.uk/pdf/GETH0910BSWB-E-E.pdf)

Service	Assets/attributes: main contributors to service	State	Main beneficiary	Analysis	Opportunities	Principal services offered by opportunities
Regulating water flow	Wet meadows River valleys Limestone grassland Lowland pasture Woodland Hedgerows Fens Reedbeds	Flooding is generally not an issue within the NCA, although localised pockets of high risk do occur, such as to the south of Banbury in the north-east from the Cherwell and flooding of Bath from the Avon. However, the area forming the headwaters of the Thames, does contribute to flooding of the Thames further downstream and outside of the NCA, examples of which include the heavy rains in the summer of July 2007. Groundwater influences river flows. As identified in the Catchment Flood Management Plan the underlying limestone allows water to soak into the ground and as a consequence this water is released at a slower rate into the rivers than would be experienced in clay catchments. Short intense summer storms can also overwhelm smaller rivers and streams and urban drainage systems in this area. Low flow can be an issue due to the nature of the catchment. The Tetbury Avon and Sherston Avon, the two tributaries at the head of the Bristol Avon, have stream support boreholes to alleviate low river flows. Semi-natural features such as natural river systems, grasslands woodland and hedgerows, all play a role in this area in intercepting and slowing water flow. Those situated on valley slopes adjacent to arable areas and along river corridors are of particular value.	Regional	The Environment Agency Thames Catchment Flood Management Plan (2009) identifies this area as at low risk of flooding due in part to the nature of the porous limestone geology and extent of semi-natural habitat features which help retain water and slow release into rivers. Where this capacity has been reduced through compaction of soils, loss of grasslands habitats which can intercept large volumes of water, or through other land use factors, action is taken to help manage run-off. There is a localised flood risk around Banbury and Bath and urban areas downstream outside of this catchment on the Thames. Improving the management of water and control of floodwaters in this area, for example on the River Evenlode and Wychcombe, may provide benefit to help reduce this risk. These are unlikely to be on a strategic scale to resolve flood risks but may improve the natural corridor of the river at a local level. The Environment Agency has already investigated the Avon upstream storage idea in Wiltshire to protect Bath and Bristol but this was found not to be feasible. Measures to optimise river capacity where desirable should be identified. Increasing flood plain capacity and connectivity is desirable through riverine habitat restoration and management and the use of buffer strips, hedgerows and carefully sited tree planting, that could reduce overall flood risk will be beneficial in locations in the upper catchment that provide overall flood risk reduction or environmental benefits especially in the upper Thames, near Cirencester, on the River Churn and upstream of Woodford in the Roding catchment. [10] Adjacent wetland creation such as those within Cotswold Water Park is also beneficial in increasing storage capacity. There is some scope to reinstate/create water meadows and wet pasture and other wetland habitats to alleviate local flooding in the Avon around Bath and the Cherwell around Banbury, and on the Head of the Thames. For example there is already a Flood Alleviation Scheme in place at Banbury which operates through enhanced upstream floodplain storage. Water company groundwater abstractions for drinking water supply can impact spring flows and reduce river levels in this area. To mitigate this, further water, abstracted from aquifers deep underground, is discharged to these rivers to increase flow.	Seek opportunities to expand areas of wetland habitats including wetlands, water meadows and wet pastures along valley bottoms and in river corridors to help increase water retention capacity and slow water release to river systems. Seek opportunities which allow rivers to follow natural courses and re-engage with their flood plains to help retain and enhance water flow capacity Seek opportunities to slow down water flow through good soil management and appropriate habitat creation such as field margins, copse planting, hedgerows and small wetlands. Enable the recommendations of the Bristol Avon Catchment Flood Management Plan.	**Regulating water flow** **Water availability** **Regulation water quality** **Regulating soil quality** **Regulating soil erosion** **Biodiversity**

[10] Thames Catchment Flood Management Plan, Environment Agency (2009) (accessed February 2013; URL: http://publications.environment-agency.gov.uk/pdf/GETH1209BQYL-e-e.pdf)

Service	Assets/attributes: main contributors to service	State	Main beneficiary	Analysis	Opportunities	Principal services offered by opportunities
Regulating soil quality	Thin brashy lime-rich soils on the high wold and dip slope Deeper soils formed by alluvium and clay deposits in valley bottoms	This NCA has 7 main soilscape types: shallow lime-rich soils over limestone, covering 51 per cent of the NCA; lime-rich loamy and clayey soils with impeded drainage (14 per cent); slowly permeable seasonally wet slightly acid but base-rich loamy and clayey soils (11 per cent); freely draining lime-rich loamy soils (9 per cent); slightly acid loamy and clayey soils with impeded drainage (8 per cent); freely draining slightly acid but base-rich soils (4 per cent); and loamy and clayey flood plain soils with naturally high groundwater (1 per cent).	Regional	The shallow lime-rich soils over limestone (51 per cent) found on the high wold and dip slope are typically drought prone but their calcareous nature affords a degree of natural resilience to loss of quality. It is important to retain their high porosity when considering aquifer recharge. This requires the maintenance of good structural conditions to aid water infiltration and good nutrient management and soil husbandry to prevent pollution of the underlying aquifer. Historically these soils provide ideal sheep grazing and limestone grasslands, especially on the steeper slopes of the escarpment where the soil is thin. More recently there has been an increase in arable cropping of some of these areas and a subsequent increase in application of artificial fertilisers and management which could lead to an increase in their friability through lack of organic content and loss of structure and eventual loss of quality and possible erosion. The lime-rich loamy and clayey soils with impeded drainage (14 per cent) found in valley bottoms are calcareous soils with some natural resilience and enhanced workability. These soils are at risk of topsoil compaction and poaching. Their prevalent use is for permanent pasture for summer grazing but they are frequently used for arable farming. The slowly permeable seasonally wet slightly acid but base-rich loamy and clayey soils (11%) 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.	In shallow lime-rich soils, seek to improve soil structure and quality by increasing organic matter content through management interventions such as using break crops, changing crop rotation patterns and by increasing areas under grassland cover. On lime rich loamy soils exercise careful management of weak topsoils to help maintain a good soil structure. Minimum tillage such as direct drilling can work well on some of these soils. Where organic matter is low, increasing organic matter inputs can help improve soil structure. Seek management in seasonally wet soils to help reduce problems of compaction and / or capping for example by reducing access to these fields in wet winter months.	**Regulating soil quality** **Regulating soil erosion** **Regulating water flow** **Biodiversity** **Climate regulation**

Service	Assets/attributes: main contributors to service	State	Main beneficiary	Analysis	Opportunities	Principal services offered by opportunities
Regulating soil erosion	Lime-rich light textured shallow soils Free-draining base-rich soils Acid loamy soils and clayey soils with lower permeability Small woodland copses Permanent pasture and limestone grassland Stone walls and hedgerows	There is a risk of soil erosion across the dominant soils in this NCA, namely, the lighter textured (less clayey) soils and shallow variants found particularly on the scarp and high wold. These are sometimes unstable and prone to loss through erosion. The freely-draining slightly acid but base-rich soils and the slightly acid loamy and clayey soils with impeded drainage are prone to capping/slaking, leading to an increased risk of erosion, particularly on valley sides and bottoms. The more clayey soils, such as the slowly permeable, seasonally wet, slightly acid but base-rich loamy and clayey soils that make up a small part of this NCA have a low risk of soil erosion.	Regional	The shallow lime-rich soils of the area support limestone grassland and permanent pasture for sheep farming which minimises the risk of soil erosion. Increasing trends towards arable cultivation increases soil friability and exposure, increasing the risk of erosion, particularly on slopes of scarp and valleys where cultivated or where bare soil is exposed along footpaths and tracks or as a result of outdoor pig rearing. Because of the thin brashy nature of these soils, lack of organic inputs and their friability can mean they lose fertility, soil moisture content and have an increased erosion risk through both water and wind erosion. This can lead to an increase in run-off and sedimentation in some rivers. Reducing the velocity and quantity of water running across slopes and valley sides through the use of field margins and boundary features such as hedgerows would reduce erosion and subsequent sedimentation of rivers. Increasing soil organic content will both help with structure and moisture content, also helping to reduce erosion risk. The slightly loamy acid soils are easily compacted by machinery or livestock if accessed when wet, increasing the risks of soil erosion by surface water run-off, especially on steeper slopes. Good soil husbandry management should be adopted, alongside the use of field margins and hedgerows, to prevent its subsequent loss into river systems and downstream sedimentation problems in sensitive limestone rivers. It is important to retain grassland in these high risk areas as they help retain soil organic content and stability. There is some risk from a change in cropping patterns and increase in arable. Identification of high risk locations and working with land managers to mitigate this will be key factors in addressing the risks.	Seek and realise opportunities for introducing permanent grassland, woodland and restoring field boundaries (hedgebanks) along scarp edge and valley sides in areas particularly prone to soil erosion or adjacent to main rivers and their tributaries. Maintain permanent pasture across the escarpment and high wold and valley sides and encourage management for increased water holding capacity and higher water levels. Manage arable land in ways that build up organic matter and avoid compaction, and introduce good soil husbandry and management such as cross-field ploughing and reducing wet weather access.	**Regulating soil erosion** **Regulating soil quality** **Biodiversity** **Regulating water flow** **Regulating water quality** **Food production**

Service	Assets/attributes: main contributors to service	State	Main beneficiary	Analysis	Opportunities	Principal services offered by opportunities
Pollination	Semi-natural grasslands including limestone grassland, field margins and roadside verges Novel arable crops such as flax Hedgerow network	A network of 3,000 ha of existing limestone grassland, lowland meadows and pasture provides a good source of nectar for pollinating insects. These are distributed across the area, but are primarily found along the scarp meaning the network coverage is patchy on the high wold and dip slope, where there is little benefit for those cropping oil seed rape, root crops, peas and beans. Novel crops such as flax and lupin, while seasonal, do add to this network. Arable cropping on the high wold and dip slope is primarily for cereals and as such is wind pollinated.	Local	Cereal cropping benefits little from pollination and is the primary land use on the high wold. However a relatively good network of flower-rich habitat along the scarp currently exists and provides a provisional network of valuable pollinator habitat that is worth both preserving and extending as cropping patterns on the Cotswolds have both fluctuated and changed with oil seed rape, roots, peas and beans all being a part of the mix. Where the network of semi-natural habitat is poor across the high wold and dip slope, and where there would be most benefit to oilseed rape, root crops, peas and beans, this limits the ability for pollinators to supply this service. Increases in habitat for pollinators such as the creation of areas of semi-natural habitat, hedgerow improvement and increases in field margins, linking to the network on the scarp will increase the delivery of this service. These measures would create important corridors and habitat mosaics for pollinator species. A strong pollinator population supports production of a wider variety of food products and supports food production in the future.	Seek opportunities to increase nectar provision within the agricultural landscape through promotion of diverse field margins and creation of more semi-natural habitats. Create networks of habitat through changes in management and improvements to hedgerows, road verges and field margins. Networks will support greater diversity of food production into the future.	**Biodiversity** **Regulating water quality** **Food production** **Climate regulation** **Regulating soil erosion** **Pollination**
Pest regulation	Existing semi-natural habitats including limestone grassland and lowland meadows Field margins and hedgerows Roadside verges	A network of 3,000 ha of existing limestone grassland, lowland meadows and pasture provides a good network of semi natural habitat for pest-regulating species. These are distributed across the area, but are primarily found along the scarp meaning the network coverage is patchy and fragmented on the high wold and dip slope. Stone walls and field boundaries do add to the network and are in relatively good condition, although can be species-poor.	Local	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. There are opportunities to improve the network of semi-natural habitats across the NCA through appropriate management of existing habitats and creation of new areas of habitat.	Take opportunities to increase and manage appropriately semi-natural habitats. Seek opportunities to increase diversity of structure and composition within areas of semi-natural habitat to support a variety of pest regulating species. Seek opportunities to increase field margins, species-rich hedgerows and beetle banks to encourage a network of habitats for pest-regulating species close to areas of agricultural production.	**Pest regulation** **Pollination** **Biodiversity** **Food production**

Service	Assets/attributes: main contributors to service	State	Main beneficiary	Analysis	Opportunities	Principal services offered by opportunities
A sense of place/ inspiration	A sense of harmony provided by the distinctive oolitic limestone used throughout from buildings to stonewalls Quintessential English landscape Diverse and dramatic limestone scenery from scarp to high wold and incised valleys Hanging beech woods and limestone grassland Area of Outstanding Natural Beauty (AONB) Strong field patterns with either stonewalls or hedgerows Parklands and manor houses Time depth of evident historic interest	Sense of place is especially strong and provided by the highly distinctive local oolitic limestone used in buildings throughout the area (including characteristic fine village churches, country houses and estate villages) and boundary walls on higher ground, with a diverse Jurassic Limestone scenery that is defined by a prominent, north-west facing scarp and a series of elevated open plateaux separated by intimate river valleys (known as the Wolds). The steep north-westerly scarp is fretted by incised valleys and further characterised by highly distinctive 'hanging' beech woodlands and surviving remnants of limestone grassland, with settlements lying along the springline at the scarp foot. The scarp edge is marked by open commons, iron-age hillforts and other earthworks, while to the north-east an undulating wolds landscape of wide views, large rectilinear arable fields and areas of sheep-grazed permanent pasture surrounded by drystone walls and shelter belts is broken by lush, enclosed and settled valleys, where the characteristic oolitic limestone is replaced by the equally distinctive reddish-brown ironstone and where hedgerows become the more characteristic form of field enclosure. To the south lies the highly distinctive city of Bath with its Georgian architecture, perching on the sides of the Avon valley. Parklands surrounding fine manor houses that nestle within valleys are another distinguishing feature of the area. Senses of inspiration and escapism are strongly associated with the Cotswolds, reinforcing its prominence as a visitor destination. Inspiration is provided throughout by the area's distinct use of local limestone, creating a unified and apparently 'historic' landscape with fine traditional buildings ranging from prominent churches and country houses to picturesque cottages and drystone walls. This is further supported by the area's distinctive topography ranging from the dramatic north-west scarp that affords long views over surrounding areas to the rolling valleys within which towns and villages nestle harmoniously. The Cotswolds have been the setting and inspiration for the work of Laurie Lee's Cider with Rosie, J. M. Barrie's Peter Pan and novels by Joanna Trollope. Jane Austen's knowledge of Bath and the Cotswolds are reflected in her novels Northanger Abbey and Persuasion, and the war poems of Edward Thomas. Gustav Holst, composer of the The Planets was born in Cheltenham and was a church organist in the Cotswolds. Chipping Campden is the type area for morris dancing throughout the world and the start of the Cotswold Way National Trail.	International	The Cotswolds have a very strong and distinctive character, recognised by designation of 60 per cent of the area as an AONB. The area is very popular with residents of adjacent conurbations for recreation and relaxation, including the Cotswold Way National Trail, and with national and international visitors for its quintessential English landscape as promoted by the Arts and Crafts Movement in the 1880s. Village design statements, parish plans and historic landscape character assessments all help to identify and raise awareness of characteristic features, contributing to the planning decision-making process.	There is scope to protect the contrasts between the scarp, high wold and dip slope and the character of each. Opportunities exist to retain and restore patterns of drystone walls and hedgerows and the vernacular architecture of settlements, manor houses, churches and barns. Utilise opportunities to ensure that development respects local settlement patterns and building materials, and to avoid the loss of historic evidence through insensitive development. Land management practices should be sympathetic and enhancing of the biodiversity and rich cultural heritage found here. Encourage and support the production of village design statements.	**A sense of place/ inspiration** **Recreation** **Sense of history**

Service	Assets/attributes: main contributors to service	State	Main beneficiary	Analysis	Opportunities	Principal services offered by opportunities
A sense of history	Time depth of evident historic interest Prehistoric features Roman settlements and roads including Bath World Heritage Site Common vernacular style and unity to all structures through widespread use of local building materials Distinctive field patterns including medieval field patterns, ridge and furrow and use of stone walls Parkland and Manor Houses and estate villages including Blenheim Palace WHS Market towns, traditional villages with churches and houses Delves and small quarries	The history of the landscape is evident in an abundance of prehistoric monuments, including Neolithic long barrows (such as Belas Knap and Hetty Pegler's Tump), late Neolithic henge monuments (including Condicote Henge and the Rollright Stones) and standing stones, bronze-age round barrows and iron-age hillforts on the scarp edge (for example Bredon Hill and Meon Hill). There is extensive evidence of Roman settlement, notably at Bath and at Cirencester, with other Roman settlements clustered around the Fosse Way and Roman villas concentrated in the lower valleys. Medieval field pattern of assarted fields is evident in the Stroud Valley and irregular piecemeal enclosure of medieval strips is found on the scarp and locally elsewhere, with nationally important ridge and furrow patterns surviving at Todenham, Chastleton, Weston Subedge and Tysoe. Particularly evident history are the area's market towns of medieval origin (such as Moreton-in-Marsh and Chipping Campden), and the traditional villages, with their fine stone churches and houses, reflecting the area's past importance in broadcloth production, and all of common vernacular style built from limestone that brings a unique sense of unity to the built environment of this NCA. Most notable among these settlements is the City of Bath, which is a World Heritage Site for its outstanding Roman remains and Georgian architecture. The historic wealth of this area is further reinforced by the area's fine manor houses and historic parklands with landscapes ranging from formal late 17th-century to picturesque 19th-century and early 20th-century Arts and Crafts, while 19th- century estate villages are another distinctive element.	National	This area is well known for its rich history, visually prominent across much of the area. The main emphasis is on protecting the range and diversity of these features, exposed and unexposed, and on providing interpretation to develop wider public understanding and appreciation of the area's heritage. Pasture improvement and arable intensification, especially ploughing, are a threat to areas of ridge and furrow, buried archaeology and other historic earthworks, especially on the high wold where cropping is more prevalent. Lack of management of field boundaries risks losing the complex record of field enclosure and degrading landscape character. Historic parkland have suffered serious decline. In 1918, about 6 per cent of the area was historic parkland making this area nationally important. By 1995 it was estimated that 37 per cent had been lost. They remain a key character and measures should be taken to secure their setting and presence. Loss of traditional village patterns and building materials from increased development pressure is a risk, particularly outside the boundaries of the AONB especially as new developments tend to lack traditional features such as greens. Continued expansion of larger villages and towns and cities like Bath, Banbury, Gloucester and Stroud detract from the rural feel of the NCA.	Seek opportunities to protect, manage and enhance historic features and their setting, particularly in the face of land management or land use change. Seek to continue and enhance interpretation of the many layers of historic evidence for educational and recreational purposes. Continue to ensure that the restoration of vernacular buildings is carried out using local styles and appropriate materials, and that land management practices and developments do not damage archaeological evidence or historic features, including buried archaeology. Enhance opportunities to use the network of paths to gain access to, reveal and interpret the area's rich history. Protecting the historic settlement pattern within rural villages and across the NCA as a whole through new developments. Maintenance of the large house estates along with their associated parkland will increase sense of history and their link to historical features in the landscape. Ensuring good soil management and low tillage can help protect buried archaeology.	**A sense of history** **Sense of place / inspiration** **Recreation** **Tranquillity** **Biodiversity** **Regulating soil quality**

Service	Assets/attributes: main contributors to service	State	Main beneficiary	Analysis	Opportunities	Principal services offered by opportunities
Tranquillity	Secluded and quiet valleys and scarp Small traditional villages linked by an intimate road network Open and expansive vistas from the scarp and high wold Woodland Parkland Largely uncluttered landscape and views	The area has suffered significant loss in tranquillity in the past fifty years, with a decline in 'undisturbed' areas from 84% in the 1960s to 54% in 2007[11]. Factors affecting tranquillity include the major settlements of Bath, Cirencester and Stroud, as well as most notably the major transport routes including the M4, M40, A417, A46 and A40 and mainline railways that cross the NCA. A sense of tranquillity is nevertheless associated with much of the area, especially the undeveloped valleys and scarp, the areas of woodland and parkland, and the rural lanes linking traditional villages that retain a timeless air	Regional	Despite the reduction in tranquillity from 84% in the 1960s to 54% in 2007, the area still retains a rural sense of space with uncluttered open vistas, important in providing an experience of tranquillity for those living and visiting the area. Expansion of settlements and the major road network should be monitored and opportunities taken to ensure remaining tranquillity enhanced, There remain many quiet, rural intimate and secluded valleys for undisturbed contemplation.	Seek opportunities to retain the sense of uncluttered open vistas on the scarp and high wold by protecting them from inappropriate development. Protect and enhance the features and uncluttered nature of undeveloped valleys, woodland, parkland and winding country lanes which add to sense of tranquillity. Where possible, existing obtrusive features (power lines, masts, disused structures etc) should be removed or more sensitively incorporated into the landscape.	**Tranquillity** **Sense of place / inspiration** **Sense of history** **Recreation**
Recreation	Public rights of way network Cotswold Way National Trail, the Thames Path National Trail and the Wychwood Way Open access land Parklands and gardens Numerous towns and villages Bath World Heritage Site National Cycle Network	Recreation and tourism are key features of the area, supported by 4,700 km of rights of way (at a density of 1.66 km per km^2), including 151 km of the Cotswold Way National Trail running the length of the NCA as well as the start of the Thames Path National Trail and a number of other long distance paths. Multi-user paths and particularly those suitable for horse riders are more limited and often fragmented. The NCA also enjoys a number of routes that form the National Cycle Network. Around 2,500 ha of open access land also lies within the NCA, associated with areas of common land and down, while the area's parklands, gardens, towns and villages, the architecture and history of Bath World Heritage Site and Roman Cirencester attract numerous visitors.	National	This area is well known for its range of recreational opportunities and attracts a great number of international and domestic visitors. With limited rail and bus transport, a number of villages suffer traffic congestion in summer months while many tourist attractions and the Cotswold Way National Trail require ongoing active management to maintain a high quality visitor experience. Multi-access routes are more limited although popular with initiatives such as horse friendly bed and breakfasts.	There are opportunities to create more multi-user paths and improve greenspace for both visitors and local people and the range of recreational opportunities they provide, particularly by making some paths "access for all" at key locations and encouraging higher rights on paths for cyclists and horse riders. There are opportunities to enhance an existing well-signed rights of way network, to help relieve pressures on main routes with accompanying interpretation, and create circular routes linked to towns and villages that can be used by local people and visitors that can help support the rural economy. There are opportunities to provide interpretation of the landscape and its many features, especially historic features such as hill forts, prehistoric burial sites, and Roman villas.	**Recreation**

[11] CPRE Intrusion Map (2007)

Service	Assets/attributes: main contributors to service	State	Main beneficiary	Analysis	Opportunities	Principal services offered by opportunities
Biodiversity	Internationally and nationally designated sites and habitats including: Lowland mixed deciduous woodland including Lowland beech and yew woodland Wet woodland Lowland calcareous grassland Flood plain grazing marsh Lowland meadow Reedbed Fen Rivers	This NCA supports a wealth of biodiversity with priority habitats covering 15,800 ha (6 per cent) of the NCA. Just under 5,000 ha of the NCA area is designated as SSSI (1.45 per cent of the NCA) and this area includes 3 SAC. In 2011, 57 per cent of SSSI were in favourable condition and 37 per cent in unfavourable recovering condition. Key habitats include: 6,000 ha of lowland beech and yew woodland, 3,000 ha each of wet woodland and lowland calcareous grassland as well as 1,700 ha of lowland mixed deciduous woodland and 1,300 ha of flood plain grazing marsh. There are also pockets of lowland meadows (600 ha), reedbeds (200 ha) and fens (200 ha). The area supports an abundance of important vascular plants, invertebrates such as Duke of Burgundy butterfly, and important overwintering roosts of greater and lesser horseshoe bats and Bechstein's bats, alongside farmland birds and arable plants.	National	Habitats such as lowland calcareous grassland and beech woods provide a coherent mosaic along the scarp, and onto the dip slope, with tree-lined rivers and valleys providing habitat corridors running west to east across the dip slope. Generally, designated sites and habitats are in favourable or favourable recovering condition. Scrub formation, a loss of species interest and species-rich grassland are as a result of a lack of appropriate grazing on biodiverse sites and increase in arable conversion on the scarp and dip slope. Lack of woodland management is also a risk to the condition of beech woods, and woodland birds in particular. Farmland bird numbers have declined in this area and this is thought to be due to a decline in mixed farms and therefore a reduction in a good matrix to support their nesting and food needs. Initiatives to reinstate a good matrix of given habitats have seen some success with species such as tree sparrow increasing in numbers. Woodland birds are in decline in this area and although the reasons for this remain unclear, a lack of diversity in structure of woodlands and their associated features may be a contributory factor. Across much of the area appropriate management and grazing levels are crucial to maintaining habitat condition, including soil biodiversity, including management of woodland or grazing of grassland. In some areas sourcing suitable grazing stock is difficult.	Concerted action should be taken to bring into good condition designated sites and other priority habitats, particularly through re-establishing appropriate grazing regimes alongside scrub and woodland management. Enhanced buffering, alongside extension and linking of the core of designated sites should be undertaken, in line with climate change adaptation principles and landscape-scale working principles outlined in the Natural Environment White Paper. Continued opportunities should be identified to improve the matrix of habitat for species of farmland birds, particularly on the high wold where arable cropping is most prevalent. While a habitat-led conservation approach suits many species, increased attention should be given to many rare species which occupy more specialist niches. Enhance interpretation of the importance of the areas biodiversity and its intimate relationship with geodiversity and land management.	**Biodiversity** **Sense of place / inspiration** **Tranquillity** **Pollination** **Pest regulation** **Regulating water flow** **Regulating water quality** **Regulating soil erosion** **Climate regulation** **Recreation**

Service	Assets/attributes: main contributors to service	State	Main beneficiary	Analysis	Opportunities	Principal services offered by opportunities
Geodiversity	Dramatic scarp edge Nationally designated sites Historic and current limestone quarrying Local stone often used in vernacular buildings History of geology Rich fossil beds of the Jurassic Period	There are currently 50 SSSI of or containing geological/ geomorphological interest and features. In addition, there are 186 local sites of geological interest. The wealth and variety of geology and geomorphology provides opportunities for study, reinforces local distinctiveness and, influences the distinctive landform and biodiversity of this area. Quarrying remains important locally with significant sites along the length of the Cotswolds taking advantage of the different limestone qualities. There is a long history of geological study within this area. William Smith, father of geology, developed his thinking of stratigraphy informed by sites here, and rich fossil finds, including the first scientifically recognised dinosaur fossil make this an important area for geodiversity.	National	Geodiversity sites and features occur across the area with concentrations and particular features of interest along the scarp edge and valley systems. Quarries and fluvial geomorphological sites also feature in the rich range of geodiversity present. Geology and geomorphology also influence the aesthetic and cultural qualities of the area. Local stone used throughout for buildings and stone walls, and influencing the biodiversity interest brings a sense of harmony, however sensitivity is required in placing and scale of quarry workings. The scale and drama of the scarp, the visible remains of prehistoric and bronze-age occupation, and local buildings, bridges and fossil finds all add to the rich geodiversity of the area, and its long history of study and contribution to science.	Support the use of local stone as a building material to help maintain local distinctiveness while balancing landscape impact and managing the resource. Identify and realise opportunities for enhanced access to and recognition and understanding of geodiversity within the area.	**Geodiversity** **Sense of place / inspiration** **Sense of history** **Biodiversity**

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