National Character Area profile:

116. Berkshire and Marlborough Downs

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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.

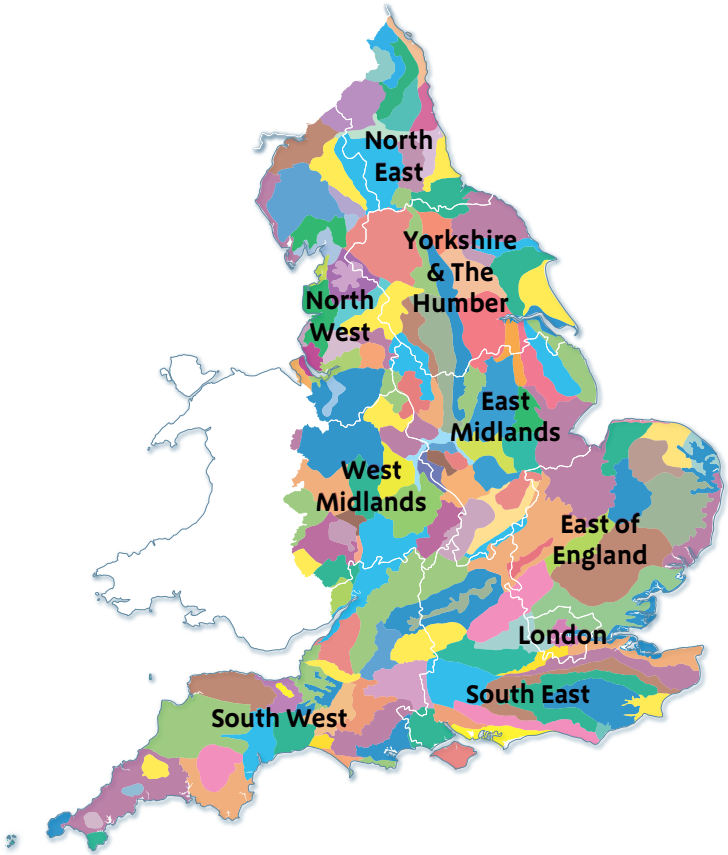
NCA profiles are guidance documents which can help communities to inform their decision-making about the places that they live in and care for. The information they contain will support the planning of conservation initiatives at a landscape scale, inform the delivery of Nature Improvement Areas and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

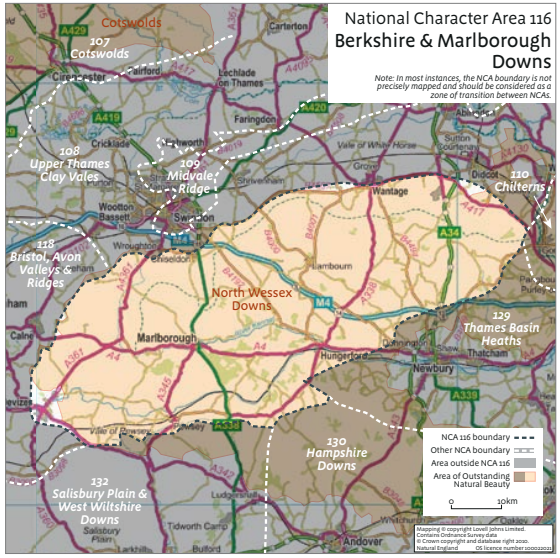
[3] European Landscape Convention, Council of Europe (2000; URL: http://conventions.coe.int/Treaty/en/Treaties/Html/176.htm)

Summary

Vast arable fields stretch across the sparsely settled, rolling Chalk hills of the Berkshire and Marlborough Downs National Character Area (NCA). There are extensive views from the escarpment in particular, punctuated by landmarks including chalk-cut horse figures, beech clumps and ancient monuments. Historic routeways, including the Ridgeway National Trail, provide public access across this landscape. Writers and artists have been inspired by this landscape, including Eric Ravilious and Richard Jefferies, while monuments around Avebury have attracted historians and antiquarians such as John Aubrey. Avebury stone circle is a popular visitor destination and part of a World Heritage Site and there are numerous other Scheduled Monuments and heritage features across this landscape. Heritage features are at risk from damage by cultivation and animal burrowing. The natural beauty and special scenic qualities of the area lead to the majority of the area (97 percent) being included in the North Wessex Downs Area of Outstanding Natural Beauty.

Farmland habitat supports brown hare, harvest mouse, rare arable plants and farmland birds including stone curlew. Along the escarpment and steep slopes, limited tracts of hanging woodlands and species-rich chalk grassland can be found. Open access downland offers the public the opportunity to see species such as the skylark and Adonis blue butterfly. At Hackpen Hill and Pewsey Downs Special Areas of Conservation (SAC) early gentian can be found. Downland at Fyfield displays sarsen stone 'trains' lying largely undisturbed since the Quaternary glaciations.

In the valleys, woodlands are found on steep slopes, and settlements cluster along the valley bottoms. Marlborough and Hungerford sit beside the River Kennet. The Kennet catchment feeds the Thames and, like other watercourses in the Downs, is a chalk river fed by groundwater in the chalk aquifer. The rivers and aquifer are affected by abstraction and pollution. Wetlands support Desmoulin's whorl snail in the Kennet and Lambourn Floodplain SAC and extensive wet woodland lies in the Kennet Valley Alderwoods SAC. Meadow and pasture in the valleys combine with arable farming and small woods to create a mixed agricultural landscape, defined by hedgerow boundaries.



Click map to enlarge; click again to reduce.

Woodlands grow on clay-with-flints deposited on the lower dip slope. The historic hunting forest of Savernake is by far the largest concentration of woodland with much of it ancient. Farmsteads are small scale in Savernake, unlike the huge landholdings on the Downs.

In the south-west, the Vale of Pewsey is floored by Upper Greensand and enclosed by the Chalk escarpments of the Downs and adjacent NCAs in the south, including Salisbury Plain and West Wiltshire Downs NCA. There are numerous watercourses of the Hampshire Avon, incorporating part of the River Avon SAC. The Kennet and Avon Canal also passes through. Small settlements are densely scattered and the Grade 1 soils are cropped, except near watercourses. The area also celebrates prestige associated with horse racing in the Lambourn Valley, and trout fishing.

Across the vast fields of the high Downs, routeways and gallops stretch into the distance.

Statements of Environmental Opportunity

- **SEO 1**: On a catchment basis, seek to conserve, enhance and restore the flora, fauna and heritage features of the Kennet and Avon Canal and the chalk streams, springs and associated wetlands, such as those in the Kennet catchment and in the Vale of Pewsey. Enhance public access to key features to reinforce sense of place and secure water quality and water availability as appropriate.

- **SEO 2**: Across the huge arable fields of the high Downs, conserve and enhance linear features, field edges and in-field features, such as fallow plots and farm reservoirs, and manage these as an interrelated network of features. Manage this network to benefit wildlife (including arable plants and farmland birds), to conserve soils, to store water, to protect heritage features, to improve public enjoyment, and to regulate pests and diseases. Maximise these benefits through targeted arable reversion of strips and areas to grassland, securing the additional benefit of expanding the species-rich chalk grassland network where possible.

- **SEO 3**: Across the open expanses of the Downs, identify and manage natural and man-made landmarks and associated viewpoints valued by local communities and visitors in order to maintain sense of place and history and also so that they act as focal areas for engaging people in the conservation and sustainable enjoyment of the wider area. As well as high-profile landmarks such as Avebury, consider exposed scarp landforms, downland pasture, beech clumps, ancient monuments, historic buildings and sarsen stones.

- **SEO 4**: With the historic area of Savernake hunting forest being a key focus, manage the Downs' wooded features to maintain sense of place, to conserve and enhance woodland archaeology and biodiversity, and to maximise sustainable timber and wood fuel production. Ensure that new plantings or restockings across the Downs reflect historic distribution patterns so that they strengthen sense of history and sense of place and also seek to support networks of small woods.

Description

Physical and functional links to other National Character Areas

The Berkshire and Marlborough Downs form the western limit of the London Basin. They are part of a much larger deposit of uplifted Chalk extending from East Anglia to Dorset and to the South Downs. To the north-east, the chalk hills continue into the Chilterns and, immediately to the south, lie Salisbury Plain and the Hampshire Downs. These chalk landscapes function as a massive principal aquifer and provide an ecological network supporting interconnected populations of species such as stone curlew.

To the north and west, the escarpments offer far-reaching views over the low-lying Avon Vales National Character Area (NCA) and Upper Thames Clay Vales NCA and beyond to the high ground of the Midvale Ridge, Chilterns and Cotswolds NCAs. Views from Milk Hill reach as far as the Black Mountains in Wales. From the vales, the escarpments provide a backdrop and, in the case of the Vale of the White Horse, a Downs' landmark has given the area its name.

Rivers draining the dip slope of the Downs flow east into the Thames in the London Basin, via the Thames Valley and Thames Basin Heaths NCAs. Watercourses at the base of the escarpments flow out into the surrounding vales to the north, south and west (into the Thames, Hampshire Avon and Bristol Avon catchments respectively). Groundwater flows out of the NCA largely in an easterly direction into the London Basin but water is also exported to nearby Swindon in the Midvale Ridge NCA. The Kennet and Avon Canal channels water through this NCA between the Avon and Thames rivers and also provides a through-route for transport, wildlife and recreation.

The Kennet and Avon Canal linking Bath to London is a corridor for wildlife, water and recreation.

The Downs are connected by historic routeways to adjacent vales and to NCAs along the historic Ridgeway that extends from Norfolk to Dorset, including the adjacent Chilterns NCA. The M4, A4 and railway are more recent corridors passing through to link London with Bristol.

Historic associations persist between Avebury and Stonehenge in Salisbury Plain and West Wiltshire Downs NCA and they are managed together as a World Heritage Site.

Distinct areas

- Vale of Pewsey

Key characteristics

- Uplifted mass of Chalk dipping south-east into the London Basin and edged by an extensive, complex escarpment. Rolling hills of the dip slope defined by the River Kennet valley and its tributaries, many of which are dry 'combes'.
- Sarsen stones are prominent in prehistoric monuments, in historical buildings and in the countryside.
- Chalk rivers, wet woodland, reedbed and wet grassland in the major chalk valleys, supported by groundwater. River Lambourn displays exemplary chalk river ecology.
- Woodland and hedgerows concentrated on clay-with-flint soils of the lower dip slope where Savernake Forest is the nucleus of ancient woodland. Isolated beech clumps and shelterbelts stand out on the hills.
- Huge arable fields managed in very large holdings stretch across the chalk soils of the uplands, bounded by post-and-wire fencing and grass baulks. In the valleys and around Savernake, agriculture is more mixed and boundaries are irregular and hedged, often with oak trees. Savernake farmsteads are small scale.
- Gallops and stables of large horse-racing establishments, with a nucleus in the Lambourn Valley.
- Small areas of species-rich chalk grassland scattered on the scarps and steep slopes of dry valleys display colourful and rare plants such as early gentian.
- Mosaic of farmland habitats supports established populations of farmland birds, arable plants, harvest mouse and brown hare.
- High density of monuments, many being prominent landmarks across the arable uplands including stone circles, hill forts, barrows, chalk-cut horse figures and historic routeways. Avebury World Heritage Site is internationally significant.
- Traditional building materials include thatch, red brick, flint and sarsens.
- Settlement is sparse on the high Downs, offering experiences of tranquillity, dark skies and far-reaching views. Villages cluster in valley bottoms and near springs, often associated with historical mills, watercress beds and watermeadows, and farmsteads at low densities.
- Recreation focused on limited areas of open access land, well-known heritage features including Avebury and historic routeways, including the Ridgeway National Trail and Kennet and Avon Canal. Private fishing interests dominate access to chalk streams.
- The Vale of Pewsey is a low-lying corridor of Upper Greensand enclosed by chalk escarpments. Villages are densely scattered across high-grade agricultural land supporting mixed agriculture.

Berkshire and Marlborough Downs today

The Berkshire and Marlborough Downs comprise a mass of uplifted Chalk which reaches as high as 295 m AOD (above ordnance datum) and falls gently south-east into the London Basin. The chalk plateau is incised by numerous steep-sided valleys which, due to water percolating into the aquifer, may be dry valleys or 'combes' or contain watercourses and springs that are naturally intermittent.

Almost the entire NCA falls within the North Wessex Downs Area of Outstanding Natural Beauty (AONB) in recognition of the scenic qualities and national significance of features across this landscape.

The chalk hills are prominent, adjacent to low-lying vales to the north. Along the northern boundary in the west between Calne and Swindon, springline settlements such as Clyffe Pypard are backed by a steep escarpment with hanging woodlands and designed landscapes. Above this scarp is the almost flat Avebury Plain comprised of Lower Chalk and farmed for cereals. Intermittent headwaters of the River Kennet arise on the plain and flow past the plain's few small settlements and monuments near Avebury. Avebury and a number of interrelated monuments are designated as a World Heritage Site (in conjunction with stonehenge). These monuments draw on connecting routeways and their setting and distinctive appearance against the skyline form a huge and seemingly sacred landscape that attracts high numbers of visitors.

From Avebury, the River Kennet flows between hills which rise above the plain as a second, higher escarpment. The Horton Downs escarpment overlooks Calne in the west and the Vale of Pewsey in the south-west, with the Wansdyke (a historic boundary bank) being one of many monuments on the escarpment above Pewsey. To the east, the escarpment and the rolling hills behind stretch north-east to meet the Chilterns at the Goring Gap, and comprise the Marlborough, Lambourn, Brightwalton and Blewbury Downs respectively. In contrast, the lower escarpment and plain grades into low hills before reaching Goring.

The higher escarpment is almost bare of woodland, exposing a slope convoluted by combes including the 'Manger'. Steep slopes support the majority of the chalk grassland (around 1,500 ha) which can be vibrant with diverse flowering plants and butterflies. Rarities include the wart-biter cricket and, at Pewsey Downs and Hackpen Hill Special Area of Conservation (SAC), early gentian. Traditional downland makes up the majority of the open access land in the NCA and also conserves ancient monuments and isolated blocks of cemented sandstone known as sarsen stones, of which Fyfield Down National Nature Reserve (NNR) protects prime examples.

Across the sparsely settled uplands, huge arable fields offer vast skies and high levels of tranquillity. Post-and-wire fencing and grass strips bound fields, with views interrupted only occasionally by small woodlands and historic routeways bordered by scrub. The poet Edward Thomas wrote "there is something oceanic in their magnitude, their solitude... flowing on and on".[4] Man-made landmarks include chalk-cut horse figures, planted beech clumps and historic monuments. Gallops, racecourses and stables are particularly concentrated around the Lambourn Valley. Dew ponds, droveway verges and fallow plots create a mosaic of farmland habitat. Brown hare, harvest mouse, farmland birds including stone curlew, and arable plants such as Venus' looking-glass[5] thrive particularly where there has been a history of consistent cultivation.

[4] *Richard Jefferies: His Life and Work*, E Thomas (1909)

[5] *A Strategy for Arable Biodiversity in the North Wessex Downs AONB*, S Smart et al (2008, updated 2010)

A wealth of monuments, cropmarks and historic routeways are visible evidence of a long history of human activity, with some damaged by modern cultivation[6]. There are 442 Scheduled Monuments across the NCA including Neolithic long mounds, bronze-age round barrows and enclosures, hill forts, Saxon earthworks and chalk-cut horse figures. Historic routeways bordered by historic hedgerows remain in use today, with byways and bridleways providing for walkers, cyclists, horse riders and, in some places, motorised vehicles. This includes the Ridgeway National Trail which traverses the top of the higher escarpment, linking key prehistoric monuments such as the White Horse and associated iron-age fort at Uffington.

Vale of Pewsey is a low-lying corridor of Upper Greensand with numerous watercourses and densely scattered villages.

Historic, often sunken routes wind from the uplands down into the dip slope valleys to reach farmsteads and settlements clustering along valley bottoms. Historic farmsteads typically have a courtyard plan, with outfarms built away from the main steading being a rare feature[7]. Traditional buildings are often constructed with timber and brick, while flint and hard bands of chalk are also common. Sarsen stone is found in the west and cob walls are distinctive. Roofing materials include thatch, tiles and Welsh slate.

Marlborough and Hungerford are the principal towns of the Downs sited on the London–Bath road and beside the River Kennet. The River Kennet is a chalk river and, with its few tributaries including the Lambourn, it drains the dip slope to feed the Thames. The Pang in the east drains directly to the Thames. Chalk rivers are characteristically clear and water-crowfoots are common. Pea mussel, white-clawed crayfish, wild brown trout and brook lamprey thrive in stretches of good habitat. The River Lambourn SAC is one of the least modified chalk rivers in the country[8] while other rivers have been restored or enhanced. Fishing interests influence management of watercourses and fish populations. Some watercourses exhibit artificially low flows as well as sediment pollution.

The flood plains support significant areas of grassland and wetlands of natural and historic interest, including watermeadows. Reedbeds, ditches and wet meadows in the Kennet and Lambourn Floodplain SAC support Desmoulin's whorl snail while a complex of wet woodlands lie in the Kennet Valley Alderwoods SAC. However, the majority of the valleys are managed productively, with arable crops making the most of the fertile soils.

Woodland grows on steep valley sides and on clay-with-flint deposits on lower dip slope ridges. Woodlands contain features of archaeological interest,

[6] *Heritage At Risk Register South West, English Heritage (2012); Stonehenge and Avebury World Heritage Site Condition Survey,* Wessex Archaeology (2010)

[7] *Berkshire and Marlborough Downs Historic Profile,* English Heritage

[8] SAC description

including the Bedwyn Dyke in Savernake. Savernake Forest is largely unsettled and represents the largest concentration of woodland in the NCA, with much of this being ancient. There are wood pasture, heathland and veteran trees supporting lichens and birds such as hawfinch.

To the south-west of Savernake is the Vale of Pewsey, a low-lying corridor of Upper Greensand enclosed by the escarpments of the Downs and, to the south, Salisbury Plain. A mainline railway passes through as well as the Kennet and Avon Canal which is a corridor for recreation, wildlife and historic features. Tree-lined, groundwater-fed watercourses flow south to the Hampshire Avon, bordered by meadows, pastures and wetlands. The headwaters of the River Avon SAC conserve Desmoulin's whorl snail, brook lamprey and fish spawning grounds. Grade 1 agricultural land sustains arable crops and remnant orchards.

The landscape through time

Between 145 and 95 million years ago, the Upper Greensand bedrock flooring the Vale of Pewsey was laid down. Chalk was subsequently deposited between 95 and 70 million years ago under warm seas.

During the Palaeogene (60 to 40 million years ago), the London Basin syncline was formed by massive earth movements, tilting the Chalk into the Basin. In the south-west, the Chalk was uplifted to form an anticline but erosion of the Chalk has since reduced the elevation to create the low-lying Pewsey Vale. Silts, sands and clays were also deposited at the bottom of the dip slope. Sarsen stones were later formed through the cementing of some of these deposits.

During the Quaternary glaciations (the last 2.6 million years), tundra conditions made the Chalk impermeable, allowing water to flow across the dip slope, scouring valleys and the escarpment. Watercourses shaped terraces of gravels and sands, as exemplified by the Kennet terraces, and weathering of the Chalk produced the widespread clay-with-flint deposits. The rare sarsen stone 'trains' at Fyfield Down, now an NNR, illustrate how frost heave shifted these stones across the ground. Unique lower plant communities have since evolved on these stones.

Evidence of the earliest humans is associated with Palaeolithic artefacts found in the clay-with-flints around Hungerford and in Kennet terrace deposits.[9] By the late Mesolithic, woodland was being cleared off high ground to attract grazing animals. With the development of agriculture and changes to soils in the Neolithic (4th and 5th millennia BC), the characteristic chalk downland vegetation first appeared.[10] Neolithic peoples constructed Avebury stone circle using sarsen stones and, along with other monuments, it remains as a legacy of the mortuary ritual and ceremonial life of some of the earliest farmers in Britain.

Many of the most important prehistoric monuments date from the Late Neolithic to the Early Bronze Age and are linked by the Ridgeway, which is considered to represent one of the oldest routeways in Britain. Several monuments centred on Avebury are recognised as internationally significant by World Heritage Site designation, including the largest man-made mound in Europe known as Silbury Hill. The concentration of unique causewayed enclosures around the Vale of Pewsey and numerous long mounds around Avebury suggest the development of different regional traditions.

By the Bronze Age, field systems were established on the Marlborough and Lambourn Downs and woodland was managed for firewood and timber. The late Bronze Age saw more substantial building and settlements, including the first example of 'hill fort' construction at Rams Hill.

[9] *The Lower Palaeolithic Occupation of Britain*, J Wymer (1999)
[10] *The North Wessex Downs landscape: a landscape assessment of the Area of Outstanding Natural Beauty*, Countryside Agency (2002)

Hill forts continued to be developed in the Iron Age, including the so-called Uffington Castle, while the first chalk-cut horse figure at Uffington is associated with this period. Iron-age farming evolved to combine sheep grazing and cultivated fields across the area, the boundaries of which remain visible today, mostly as cropmarks. Livestock farming gave rise to droving and trade routes and monuments for containing livestock – 'banjo' enclosures.[11] Large nucleated settlements had developed, often at strategic points such as river crossings.

Following the Roman conquest in 43 AD, the Roman settlement of Cuentio was established on the River Kennet. Villa estates adapted existing farmsteads and field systems with their linear boundaries on the Lambourn Downs and elsewhere. New roads were built, including the Roman road from Swindon to Aldbourne.

During the Anglo-Saxon period, the area lay on the boundary between the kingdoms of Wessex and Mercia. Iron-age hill forts were re-defended and the Wansdyke and Bedwyn Dyke defined territorial boundaries. Many valley settlements – including Avebury – had been established by the 11th century. Large estates were established, apportioning meadow, arable lower slopes and pasture on the high ground to villas and manors. 'Strip' parishes reflect these ancient boundaries and retain routeways linking vale to down. The royal hunting grounds of Savernake and Barroc were established, probably as continuous woodland.

The Normans introduced new features including Marlborough's motte and bailey and 'pillow mounds' for farming rabbits. As with nearby chalk landscapes, the Downs were a prime area for corn and sheep farming in the medieval period. Market centres included Burbage, Pewsey and Marlborough.

Throughout the medieval period, population growth and decline drove cycles of cultivation and reversion to pasture. Strip lynchets on the steep slopes of Morgan Hill are evidence of an intense land-hunger in the 13th century. Successions of earthworks at Fyfield Down NNR and elsewhere indicate the flux between arable and pasture which prevailed throughout history.

Disease and famine in the 14th century brought desertion of villages as well as arable reversion. Sheep numbers rose, stimulated by a growing wool and cloth industry, to the extent that East Ilsley became home to the biggest sheep fair in the country and Marlborough became an important textile centre. Fulling mills were built along the chalk rivers.

In the late 15th and 16th centuries, the amalgamation of holdings and informal enclosure led to the establishment of some of the largest farms in the country. This contrasts with Savernake where small-scale holdings persisted. Further increases in farm size occurred in the late 18th century in addition to formal Parliamentary enclosures.

Areas of down pasture were converted to arable and rectangular, regular boundaries came to dominate. Significant areas of woodland were also clear felled to supply the Navy and industry during the 18th and 19th centuries. By 1810, the Kennet and Avon Canal provided a fully navigable waterway between Bath and London, and this was later followed by the Great Western Railway in 1841. Improved transport links to London stimulated watercress-growing[12] and dairying.[13] Local industries now included brewing and sarsen stone-cutting and the area had become known for trout fishing and horse racing.

[11] For further information, refer to Introductions to *Heritage Assets: Banjo Enclosures,* English Heritage (2011), (accessed September 2013; URL: **www.english-heritage.org.uk/publications/iha-banjo-enclosures/banjoenclosures.pdf**)

[12] Action for the River Kennet website (accessed September 2013; URL: **www.riverkennet.org**)

[13] *Historic Farmsteads – Preliminary Character Statement – South East Region*, English Heritage (2006)

In the early 20th century, the significance of the area's prehistoric archaeology was promoted through Alexander Keiller's research, building on work in earlier centuries by antiquarians John Aubrey and William Stukeley. More recently, the Second World War meant the introduction of pillboxes along the Kennet and Avon Canal[14] and a legacy of airfields.[15] The World Wars also stimulated a revival and intensification of arable production involving the amalgamation of fields, cultivation of slopes and decline of traditional downland pasture. By the 1950s, amalgamation had created exceptionally large farmsteads by national standards. Dew ponds, small woodlands and flood plain meadows fell out of use while scrub cover increased and the Kennet Valley alder woods developed.[16] Drying of the Kennet headwaters was first recorded in the 1930s. Dutch elm disease had a particularly significant impact on hedgerows in the Vale of Pewsey where elms had been prominent.

More recently, the area has been a focus for conservation and restoration. In 1972, the area was designated as part of the North Wessex Downs AONB and there has since been targeted conservation management of downland pasture, farmland bird habitat, chalk streams and key historic monuments. Low flow alleviation schemes were initiated in the 1970s to benefit the chalk streams and continue to this day alongside pollution prevention measures such as phosphate-removing plants along the Kennet[17]. In 1986, Avebury was listed as a World Heritage Site together with Stonehenge and associated monuments. The Kennet and Avon Canal was reopened in the 1990s following restoration.

[14,15] Ibid.

[16] Kennet Valley Alderwoods SAC description

[17] Action for the River Kennet website (accessed September 2013; URL: www.riverkennet.org)

Ecosystem services

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

Provisioning services (food, fibre and water supply)

- **Food provision:** Grade 1 and 2 agricultural land across the northern plateau, in valley bottoms and in the Vale of Pewsey offers optimal conditions for growing. Light, chalk soils can be easily cultivated and, consequently, arable farming dominates across the high Downs. Arable crops and remnant fruit orchards are present in the Vale of Pewsey across well-watered, fertile Grade 1 land. The remainder of the NCA is Grade 3 and can be put to grass or cropping as circumstances dictate. Dairying is largely confined to areas in the Vale of Pewsey and in the valleys of the Berkshire Downs. The local brewing industry was founded on nearby supplies of good quality barley and clean water.

- **Water availability:** Underlain by the Chalk and Upper Greensand, the entire NCA comprises a major aquifer. The majority of the aquifer is unconfined so the potential for recharge is high. Swallow holes and freely draining soils further support infiltration. Water is largely abstracted directly from the aquifer, rather than from surface waters, for public water supplies and, to a lesser extent, for agriculture and fish farming. Water is also exported out of the NCA from Axford on the River Kennet to the major urban and growth area of Swindon.

In addition to human consumption, water availability is important for the functioning of water-dependent features that are significant in this NCA: four SAC, chalk streams, the Kennet and Avon Canal and distinctive chalk stream heritage features including flood meadows and mills. The Vale of Pewsey is noted for its numerous watercourses which contrast with the dry valleys and low flows of chalk streams in the Downs.

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

- **Regulating soil erosion:** Soil conservation is achieved where there is permanent grassland and by vegetated strips in arable landscapes such as woodlands, hedgerows and grassland buffers. The intrinsic vulnerability to erosion is greatest across the arable downlands where large fields lie on slopes and where thin soils are cultivated.

  Prevention of soil erosion is critical to good water quality in the major aquifer and to the conservation of valued water-dependent features including four SAC, chalk streams and fish populations, including those managed for angling interests, as well continuing agricultural productivity.

- **Regulating water quality:** Chalk has the capacity to filter pollutants, but rapid infiltration through swallow holes, for example, makes widespread and long-lasting pollution possible. Exchange of water between watercourses and the Kennet and Avon Canal also introduces a pollution pathway. In this NCA, the thin soils overlying the aquifer have a high leaching potential but some pollutants can be removed from surface run-off by grassland buffers in farmland and by reedbeds and by other features adjacent to waterbodies.

  Groundwater quality is critical in this NCA since the bedrock functions as a major aquifer from which water is drawn for human consumption. Unpolluted water is also important in the conservation of chalk stream biodiversity and of healthy fish stocks. Characteristic chalk stream plants such as the water crow-foots and fish such as wild brown trout require water devoid of chemical pollutants and sediments.

- **Regulating water flow:** Groundwater flows within the chalk aquifer are predominantly in the direction of the London Basin to the south and east but, along the northern escarpment, groundwater flows northwards towards the vales. Surface water flows fall into four catchments and watercourses on the Chalk and Upper Greensand are also fed by groundwater. The River Lambourn has a near-natural flow regime but other chalk watercourses have exhibited low flows and dry headwaters attributable to abstraction.

  Flow is important for water-dependent features characteristic of this NCA. Adequate flow is required to scour the riverbeds to provide suitable spawning habitat for fish such as brook lamprey and bullhead which are subject to SAC designation in the rivers Avon and Lambourn. Flow regimes supporting the breeding of game fish such as brown trout are of significance to fishing interests. Chalk stream heritage assets, including flood meadows and mills, are reliant on water flows being maintained at reasonable levels.

  Flooding by groundwater and surface water has been localised in the past. Settlements such as Compton have been affected.

Cultural services (inspiration, education and wellbeing)

- **Sense of place/inspiration:** The majority of the area is designated as an AONB, recognising the special scenic and natural qualities of the landscape. Landform is prominent and large scale and includes well-known features such as the 'Manger' and characteristic chalk scenery. Nationally prominent artists such as Eric Ravilious, Paul Nash and David Inshaw and writers such as Thomas Hardy and Richard Jefferies have been inspired by this landscape.

  Famous landmarks and visitor destinations include Avebury stone circle, Uffington chalk-cut horse figure, Silbury Hill, the Kennet and Avon Canal and the Ridgeway National Trail, all attracting large numbers of visitors. Distinguished historians, archaeologists and antiquarians are associated with Avebury and surrounding monuments, including John Aubrey, William Stukeley and Sir Richard Colt Hoare. Chalk streams in the Downs have also long attracted settlement and are associated with historical buildings and monuments.

  The Lambourn Valley is a centre for the horse-racing industry, second only to Newmarket.

  The Vale of Pewsey and Vale of Ham form a discrete, low-lying corridor between the Downs and the escarpments of the NCAs to the south. In contrast to the Downs, there are densely scattered villages, numerous watercourses and ditches, and remnant orchards.

- **Sense of history**: This is a visibly ancient landscape which has for centuries attracted antiquarian interest, with more than 400 Scheduled Monuments and the Avebury World Heritage Site dating from the Neolithic period and extending over 25 km^2. The World Heritage Site is a focus of research for this period. Historical features represent the various eras of civilisation, including more recent pillboxes and other anti-invasion defences from the Second World War.

  The sarsen stone 'trains' and periglacial landforms extend the time-depth of this landscape further as relic features unmodified since the glaciations of the Quaternary.

  Many monuments and modified landforms are prominent on the skyline and several emblematic sites are accessible to the public along the Ridgeway or on open access land. Avebury and other monuments are well documented in academic literature. The fieldscapes and farmsteads of the area also provide a sense of the continuity of farming, where the importance of arable cropping and cattle is represented in large barns and cattle yards.

- **Biodiversity**: Six SAC and two NNRs are located in this NCA, including long stretches of chalk stream. Just over 2,000 ha are designated Sites of Special Scientific Interest (SSSI) and there are 442 Local Wildlife Sites. Savernake Forest is a large SSSI at approximately 900 ha. The River Lambourn SSSI is a rare example of a relatively unmodified chalk stream[18]. There are complexes of habitat which represent valuable core areas or connected sites in the ecological network, in particular clusters of chalk grasslands on the escarpments. Special flora and fauna include stone curlew, rare lichens, bryophytes and arable plants, and early gentian. Biodiversity associated with chalk grassland is accessible as open access land while linear routes provide limited public access to arable and woodland biodiversity.

- **Geodiversity**: There are seven SSSI with geodiversity interest and seven Local Geological Sites. Chalk landform is a defining feature of this NCA, involving dramatic and extensive escarpments, high hills and steep valleys. Well-known features associated with the Chalk include cut figures on the escarpments, the combe known as the 'Manger' and the plain upon which Avebury stone circle is sited. Flint, hard chalks and sarsens have been traditionally used to create distinctive buildings. Prehistoric stone circles and barrows are often constructed from uncut sarsen stones. The sarsen stone 'trains' on Fyfield Down and Piggledene are protected by SSSI designation for their rarity as relics of Quaternary landscape but sarsens are also found at field edges or scattered in grasslands. The Chalk and Upper Greensand bedrocks are also important for their aquifer function.

Avebury stone circle and other monuments have attracted visitors for centuries, from antiquarians to artists to pagans.

[18] SAC description.

Statements of Environmental Opportunity

SEO 1: On a catchment basis, seek to conserve, enhance and restore the flora, fauna and heritage features of the Kennet and Avon Canal and the chalk streams, springs and associated wetlands, such as those in the Kennet catchment and in the Vale of Pewsey. Enhance public access to key features to reinforce sense of place and secure water quality and water availability as appropriate.

For example, by:

- Planning for landscape restoration, creation and enhancement activities with reference to the special qualities of the North Wessex Downs Area of Outstanding Natural Beauty (AONB).
- Working in partnership to meet Water Framework Directive objectives for good ecological status (surface water) or good status (groundwater) across the National Character Area (NCA). Working at a catchment scale, continue to investigate and implement measures that improve river morphology and river ecology, including measures to tackle low flows.
- Planning for landscape management and enhancement activities affecting the Avebury World Heritage Site so that they contribute to the protection and enhancement of the attributes of its outstanding universal value.
- Building on existing stakeholder groups and strategies involved in water resource management and conservation including, for example, catchment management plans, North Wessex Downs AONB management plan, water company resource plans and county green infrastructure strategies.
- Drawing on best practice developed by Action for the River Kennet and others to deliver practical conservation and engage communities.
- Continuing to identify and build information around the heritage of flood plain landscapes and their condition.
- Securing conservation management and restoration of heritage features, such as bridges, mills, watercress beds and floating meadows. Prioritise those recognised by designation and valued by local communities and visitors.
- Working with the Environment Agency to establish the issues and opportunities around restoring and creating water management structures and channels to benefit natural and cultural heritage features and to regulate water flow, including floodwaters.
- Restoring, where appropriate, natural channels to allow natural river processes to take place and to create areas of floodwater storage in the flood plain to build resilience against climate change impacts.
- Continuing to develop expertise around the conservation and restoration of the natural and cultural heritage of the distinctive floating meadows – drawing support from agri-environment schemes and volunteer effort, where possible.

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SEO 1: On a catchment basis, seek to conserve, enhance and restore the flora, fauna and heritage features of the Kennet and Avon Canal and the chalk streams, springs and associated wetlands, such as those in the Kennet catchment and in the Vale of Pewsey. Enhance public access to key features to reinforce sense of place and secure water quality and water availability as appropriate.

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- Enhancing, where possible, public access opportunities, education and interpretation for heritage features (such as flood meadows, locks and mills) in the flood plains, particularly those near to settlements and popular visitor destinations. Seek to co-ordinate engagement with the public across entire catchments and to shared audiences. Draw on existing examples, such as the Lambourn Valley Way, to interpret the history of water use in the area and engage the public in conservation. Ensure that access and interpretation structures are minimal, designed in a way which is appropriate to the setting, and do not obscure key views.

- Working with managers and owners of chalk streams and wetlands to identify long-term sustainable management that conserves unique and valued chalk stream ecology and wetland ecology. Develop and draw on best practice in the conservation of the River Lambourn Special Area of Conservation (SAC), River Avon SAC, Kennet and Lambourn Floodplain SAC and the Kennet Valley Alderwoods SAC.

- Continuing liaison with fishing interest groups to secure management that brings wider benefits as well as supporting fishing activity and the area's fishing heritage. Explore the potential to realise recreation benefits for the wider public, including public access along chalk streams.

- Conserving and building populations of species typical of chalk streams and special to this area. Maintain and increase those stretches supporting naturally recruiting wild populations of fish, including wild brown trout.

- Conserving and expanding, where appropriate, the areas of semi-natural habitat in the flood plains with the aim of improving the ecological network and increasing the extent of habitats of principal importance, such as wet woodland, flood plain meadow and fen. Wetlands such as reedbeds can also be managed to store water (such as during times of flood), filter pollutants, facilitate filtration to the aquifer and store carbon.

- Conserving soil quality in the flood plain, with particular care of peat-based soils and undisturbed wetland soils which also retain high palaeo-environmental potential. Avoiding compaction will also benefit management of run-off and filtration to the aquifer.

- Supporting farmers and other land managers across the catchment in preventing pollution, conserving soils, using water efficiently and protecting resources by managing and creating flood plain habitats. Draw on best practice, including techniques relating to catchment sensitive farming, precision farming and low-input farming. Target soil erosion prevention measures on steep, cultivated slopes in particular.

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SEO 1: On a catchment basis, seek to conserve, enhance and restore the flora, fauna and heritage features of the Kennet and Avon Canal and the chalk streams, springs and associated wetlands, such as those in the Kennet catchment and in the Vale of Pewsey. Enhance public access to key features to reinforce sense of place and secure water quality and water availability as appropriate.

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- Seeking to maintain the natural flow regime of the River Lambourn and secure appropriate water levels in other watercourses, springs and wetlands. Manage flow between the River Kennet and the Kennet and Avon Canal. Where appropriate, make use of the West Berkshire Groundwater Protection Scheme to manage groundwater flooding and to maintain flows in watercourses.

- Providing information to consumers of water from the NCA's watercourses and aquifer, including residents of Swindon outside the area, to help them to recognise, conserve, enjoy and benefit from the Downs' chalk streams, springs and other wetlands. Encourage efficient use of water in urban and rural settings through measures such as water metering. Maintain and strengthen the identity of chalk streams as positive focal points for settlements and communities.

- Working in partnership with water companies operating across the water supply network area, to secure sustainable abstraction and consumption. Promote developments that are water-efficient, for example those incorporating sustainable drainage systems. Recognising and addressing the links of supply and environmental impact between the Downs and other NCAs, including Thames Basin Heaths and Midvale Ridge. Plan for climate change impacts and future consumer demands, for example by supporting landowners in building winter storage reservoirs.

- Bringing together the various recreational user groups relating to the Downs' chalk streams and wetlands so that they can contribute to the future of local watercourses as recreational assets and secure sustainable recreational use. Enable user groups to support conservation activities and avoid damaging recreational behaviour.

- Managing wetlands and chalk streams to increase the resilience of habitats, species and heritage features to climate change, for example by managing trees and scrub to create shade along chalk streams and monitoring water levels around heritage features that are vulnerable to drought or waterlogging.

SEO 2: Across the huge arable fields of the high Downs, conserve and enhance linear features, field edges and in-field features, such as fallow plots and farm reservoirs, and manage these as an interrelated network of features. Manage this network to benefit wildlife (including arable plants and farmland birds), to conserve soils, to store water, to protect heritage features, to improve public enjoyment, and to regulate pests and diseases. Maximise these benefits through targeted arable reversion of strips and areas to grassland, securing the additional benefit of expanding the species-rich chalk grassland network where possible.

For example, by:

- Planning for landscape restoration, creation and enhancement activities with reference to the special qualities of the North Wessex Downs AONB.
- Building on existing stakeholder groups and strategies involved in managing routeways and networks including, for example, AONB management plans, Marlborough Downs Nature Improvement Area, rights of way improvement plans and green infrastructure strategies.
- Mapping linear features and improving understanding of the range of historic and natural interests and ecosystem services associated with linear features across the high Downs in order to inform management. Historic linear features are a starting point for this research and include the Wansdyke, historic routeways including the Ridgeway, and ancient parish boundaries.
- Drawing on best practice when managing all features (including routeways, boundary banks, boundary trees, verges, beetle banks, hedgerows, vegetated field margins, gallops, fallow plots, cultivated margins and Scheduled Monuments). Manage features both as a connected network and as individual components. New features can be created or existing features adapted through buffering, for example, to enhance function but these changes must be appropriate to or enhance landscape character.
- Creating new linear features, field edge features or in-field features that reflect historic landscape character and/or current landscape character. This is particularly relevant to new boundary features and new permanent features such as hedgerows and areas of arable reversion which have potential for high and long-term landscape impact.
- Building on the best practice developed by the South West Farmland Bird Initiative, developing complexes of features such as follow plots, field margins and corners and beetle banks, in the arable landscape which benefit wildlife species, particularly those which are distinctive of this area and/or require habitat mosaics and corridors for movement, including stone curlew and brown hare. Target conservation effort where there are known 'hot spots', such as those recognised for arable plants and farmland birds. Design complexes of features at the field edge and in the field which together provide a mosaic of habitat for wildlife species but also regulate soil erosion, water quality, and pests and diseases.
- Conserving and increasing areas of habitats of principal importance including arable field margins and lowland calcareous grassland while also securing delivery of ecosystem services.

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SEO 2: Across the huge arable fields of the high Downs, conserve and enhance linear features, field edges and in-field features, such as fallow plots and farm reservoirs, and manage these as an interrelated network of features. Manage this network to benefit wildlife (including arable plants and farmland birds), to conserve soils, to store water, to protect heritage features, to improve public enjoyment, and to regulate pests and diseases. Maximise these benefits through targeted arable reversion of strips and areas to grassland, securing the additional benefit of expanding the species-rich chalk grassland network where possible.

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- Building on the best practice developed by the Catchment Sensitive Farming Programme, for managing routeways and other linear features, such as field margins, to manage run-off and to filter pollutants. Target linear features on slopes, particularly above watercourses or other surface water features, and near zones of rapid filtration to the aquifer.

- Avoiding or minimising disturbance and erosion of soils associated with all features in a cultivated and non-cultivated context, but particularly those features which do not have a history of disturbance. This will conserve soils in areas where, in the wider context, soil structure and quality have been modified by cultivation and may be poor or declining due to unsustainable cultivation.

- Managing, creating and extending vegetated field margins to deliver multiple benefits as part of a network of features and as stand-alone features. Benefits include managing run-off; filtering pollutants; providing habitat for wildlife; providing a link in a network of wildlife corridors; harbouring natural predators of crop pests; buffering heritage features from cultivation damage; buffering designated nature conservation sites from agricultural spray drift; and extending the area of low-input or species-rich grassland.

- Continuing to develop best practice guidance for the management of gallops so that they incorporate features that support biodiversity, filter pollutants in run-off and contribute positively to sense of place. Gallops could contribute positively to the chalk grassland or semi-natural grassland network. Managing cultivated margins and areas to benefit arable plants and to regulate pests and diseases.

- Drawing on best practice developed at Avebury World Heritage Site, protecting Scheduled Monuments and other heritage features associated with linear features and arable farmland. Draw on guidance from English Heritage to adopt the farming practice which carries the least risk to heritage assets and sites of heritage interest (such as cropmarks), carrying out arable reversion where possible. Target conservation effort at those Scheduled Monuments which are at risk and/or contribute significantly to sense of place and history. Seek opportunities to create species-rich grassland where this will support the chalk grassland ecological network.

- Recognising the high potential in this landscape for buried and undiscovered remains and managing the land with this in mind, particularly in relation to cultivated areas and surface improvements and erosion on routeways. Surfaces need to be managed to minimise disturbance, erosion or loss of the surface and boundary features need to be maintained.

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- Securing benefits for public recreation and public access as appropriate across the high Downs. Ensure that linear access routes and access areas meet the needs of user groups, with the Ridgeway managed to demonstrate best practice. In consultation with user groups and landowners, target improvements to routeways and the creation of new temporary or permanent access routes where they are most needed.

- Identifying viewpoints from public access routes of key features in private farmland and providing interpretation where appropriate. Provide educational access to farmland with key features where appropriate.

- Introducing and conserving features that improve pest and disease regulation in areas of monoculture cropping. This includes features that generally increase heterogeneity and break up blocks of crops but also those that potentially harbour natural predators of pests such as beetle banks and field margins.

- Targeting arable reversion of areas and strips where there is the greatest negative impact from cultivation and/or best opportunity. This will include Scheduled Monuments which are at risk due to cultivation; key gaps in the chalk grassland ecological network; key areas for the restoration of the historic downland pasture landscape; cultivated land prone to high soil erosion; areas of high filtration to the aquifer with a history of pollution; and features to be made more accessible to the public. Seek to create grassland which provides habitat for wildlife species and target creation of species-rich chalk grassland where it supports the chalk grassland ecological interest.

- Aligning and managing linear features and areas of arable reversion so that they support the chalk grassland ecological network, addressing fragmentation and isolation of extant grassland areas in particular. Seek to link species-rich linear features such as routeway verges and field margins to existing species-rich grassland areas and create new species-rich grassland features. Where possible, reinstate and reinforce the relationship between droveways and grazed downland pasture for historic and livestock movement reasons.

SEO 3: Across the open expanses of the Downs, identify and manage natural and man-made landmarks and associated viewpoints valued by local communities and visitors in order to maintain sense of place and history and also so that they act as focal areas for engaging people in the conservation and sustainable enjoyment of the wider area. As well as high-profile landmarks such as Avebury, consider exposed scarp landforms, downland pasture, beech clumps, ancient monuments, historic buildings and sarsen stones.

For example, by:

- Planning for landscape restoration, creation and enhancement activities with reference to the special qualities of the North Wessex Downs AONB.
- Planning for landscape management and enhancement activities that contribute to the protection and enhancement of the attributes of outstanding universal value of the Avebury World Heritage Site.
- Building on existing stakeholder groups and strategies involved in managing landmarks including, for example, green infrastructure strategies and the Avebury World Heritage Site Management Plan[19].
- Working with local communities, visitors and other stakeholders to understand what landmarks (designated and non-designated) are valued by them and where potential user group conflicts might lie. Integrate this understanding with knowledge of formally designated features.
- Building understanding and guidance around the management of landmarks of interest particularly where there is potential for conflicting demands or management recommendations. Good examples might include a busy multi-user access route such as a byway and also a landmark beech clump planted on a barrow monument.
- Demonstrating best practice integrated management and a landscape-scale approach at landmarks, particularly those accessible to the public. Ensure that all landmarks are under appropriate conservation management and delivering ecosystem services. Manage landmarks to maintain sense of place and history but also, where possible, to provide habitat for biodiversity, to provide recreation opportunities, to conserve soils and to filter pollutants.
- Building information about valued landmarks, particularly where information and public understanding is lacking, for example periglacial landforms. Develop interpretation and education materials and activities to engage landowners and the public in increasing their understanding and enjoyment of these landmarks.
- Raising awareness of valued landmarks and views of these landmarks, particularly among stakeholders who influence their future use and management, including landowners and managers, relevant planning authorities, developers and the North Wessex Downs AONB.
- Tailoring management to conserve the distinctiveness of landmarks. This may require innovative management practices and bespoke projects.

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[19] http://www.wiltshire.gov.uk/artsheritageandlibraries/museumhistoryheritage/worldheritagesite/aveburyworldheritagesitemanagementplan.htm.

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- Supporting local stakeholder networks and building capacity as appropriate and particularly for landmarks only valued at a local level. For all landmarks, draw on local involvement to support conservation, including volunteer practical work parties and fundraising events.
- Securing positive management of Scheduled Monuments that are landmarks, endeavouring to ensure that none are listed on the Heritage at Risk Register. Work with landowners and managers to establish a management regime of Scheduled Monuments that is sustainable over the long term.
- Working on a landscape scale with neighbouring landowners to tackle burrowing animals causing damage to landmarks.
- Managing historic monuments under grass to deliver benefits for biodiversity and to conserve soils. In cultivated contexts, encourage minimum tillage and explore potential for arable reversion in order to conserve historic features above and below ground as well as conserve soils.
- Maximising the contribution that landmarks make to the mosaic of habitat across the farmed landscape, supporting farmland birds and species such as brown hare.
- Managing landmarks to conserve and increase areas of priority habitats as well as deliver other ecosystem services. This includes the conservation, enhancement and expansion of species-rich chalk grassland which can also be managed to provide habitat for wildlife species; to provide recreation and education opportunities; to conserve soils; to regulate water quality; and to conserve heritage features including Scheduled Monuments.
- Conserving historic buildings, including farmsteads, that are valued as landmarks in order to maintain sense of place and history. Continue to build understanding around traditional building styles and the sourcing and use of traditional, local building materials. Draw on information and best practice developed by English Heritage and the North Wessex Downs AONB.
- Confirming the best practice for managing landmark trees on earthworks, conserving veteran trees and succession planting.
- Conserving sarsen stones as rare natural landmarks in the countryside, particularly where there is a long history of limited or no disturbance.

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- Considering how to recognise and preserve the setting of landmarks. Restore and strengthen historic links, including historic routeways. Provide ecological links such as field margins linking a landmark into a wider network that provides hunting ground for mammals and birds of prey. In cultivated settings, manage soil and water movement by positioning buffer strips strategically in relation to landmarks. Draw on best practice developed at Avebury World Heritage Site and in the North Wessex Downs AONB in relation to setting.
- Managing scrub and woodland cover to avoid obscuring landmarks and impeding public access. Chalk-cut white horses, earthworks and landforms are vulnerable.
- Avoiding creating or conserving features that negatively impact on the setting or backdrop of a landmark. Changes within intervening space and upon skylines are significant, for example.
- Building understanding around the threats and risk relating to valued landmarks, including impacts relating to climate change, change of land management and development. Identify landmarks in poor or declining condition and work with the relevant stakeholders to identify suitable remedies.
- Identifying and increasing understanding of the vulnerability of landmarks to visitor pressure, particularly in light of potential increases in visitor numbers and climate change impacts. Draw on best practice developed at Avebury World Heritage Site in relation to the conservation of heritage features. Reduce pressure upon well-visited sites by drawing visitors to new places, distant viewpoints and routes into the wider landscape.
- Managing visitors and visitor impacts, particularly where there are concerns about deteriorating tranquillity and where the condition of landmarks is declining, for example the erosion of monuments and their settings at Avebury.

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- Building an understanding about landmarks as part of a story about the wider landscape and as a collective group that tells a shared story about this landscape over time.

- Engaging people in enjoying and understanding landmarks and their place in the wider landscape and in the wider 'story', through interpretation and education at landmarks which are co-ordinated with other related landmarks, viewpoints and along public access routes. Focus work initially at destinations that are already popular with visitors and near to settlements. Draw on existing landscape-scale interpretation such as the Avebury World Heritage Site, White Horse Trail and Ridgeway National Trail.

- Identifying the public access needs and opportunities relating to all valued landmarks. At key sites such as country parks and National Nature Reserves, enhance provision of visitor facilities, public access, education and interpretation as appropriate and where this supports sustainable recreation. Recognise the limitations and constraints in an unsettled, rural landscape but support appropriate enterprises which benefit visitors at a strategic scale, such as designated visitor parking areas and farms providing accommodation and refreshments. Consider how these locations should be promoted to the public.

The escarpment provides a backdrop to the adjacent vales. The 'Vale of the White Horse' gets its name from the chalk-cut figure at Uffington.

SEO 4: With the historic area of Savernake hunting forest being a key focus, manage the Downs' wooded features to maintain sense of place, to conserve and enhance woodland archaeology and biodiversity, and to maximise sustainable timber and wood fuel production. Ensure that new plantings or restockings across the Downs reflect historic distribution patterns so that they strengthen sense of history and sense of place and also seek to support networks of small woods.

For example, by:

- Planning for landscape restoration, creation and enhancement activities with reference to the special qualities of the North Wessex Downs AONB.
- Within and near the Avebury World Heritage Site, planning for woodland management and planting activities that contribute to the protection and enhancement of the attributes of its outstanding universal value.
- Drawing on information and best practice concerning this area's woodlands and appropriate woodland management compiled by the North Wessex Downs AONB and Avebury World Heritage Site.
- Building information and understanding around wooded features across the landscape in partnership with stakeholders, including woodland owners and managers. Develop management guidance to conserve the distinctive characteristics of wooded features in this area, from small woodlands to large woodland blocks and including beech clumps, ancient hedgerows and veteran trees. Work with woodland managers to develop approaches that accommodate the needs of biodiversity, the historic environment, recreation (including shooting), timber and biomass.
- Engaging the full range of stakeholders – including woodland owners, managers, contractors and consumers – in bringing managed and neglected woods under sustainable long-term management.
- Co-ordinating woodland management at a large scale to tackle landscape-scale issues such as deer management, disease management and woodland ecological networks.
- Working with shooting interests to identify opportunities for benefits additional to game, particularly in relation to coverts which may currently have limited wildlife interest.
- Working to improve timber quality in terms of age structure and pest control (deer and squirrel).
- Ensuring appropriate conservation management of designated sites, priority woodland habitats and ancient woodland. Secure a resilient ecological network to increase the resilience of these wooded features.
- Managing woodlands to support populations of wildlife species including dormice, bats and woodland birds.
- Conserving veteran trees in woodlands and hedgerows for their natural and cultural interest. Where appropriate, harvest for timber and undertake succession planting.
- Encouraging local markets for wood fuel, including community schemes. Supporting wood fuel harvesting and use at the farm scale.
- Co-ordinating management and marketing across networks of small woodlands in order to benefit from economies of scale.

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- Conserving semi-natural and ancient woodlands across a range of soils and aspects, improving age structure and maintaining the area of the hunting forest of Savernake as a concentration of ancient woodland, wood pasture and veteran trees.
- Managing woodlands as part of a mosaic of habitats in the farmed landscape that are supporting farmland birds and mammals.
- Developing a resilient woodland ecological network in conjunction with hedgerows and other habitats and recognising Savernake as a core area in this network. Investigate the viability of small woodlands in various locations to support healthy ecological function and explore options. Identify how small woodlands function in a mosaic with other habitats and help to support non-woodland specialist species. Secure connections into surrounding NCAs, for example in relation to the hanger woodlands on the northern scarp (Chilterns and Upper Thames Clay Vales NCAs).
- Restoring plantations on ancient woodland sites to broadleaved woodland. Plant species should reflect local conditions and character, and have resilience to climate change.
- Increasing resilience to pests and diseases, particularly those expected with climate change. Conserve the genetic diversity of wooded features.
- Conserving woodlands as valued landmarks, including key beech clumps and Savernake.
- Developing measures to protect wooded features and especially landmarks from climate change impacts such as drought and heat stress. Focus upon those features that are most vulnerable such as beech clumps, exposed trees and related species including lichens.
- Managing wooded features to build resilience of the wider landscape to climate change. Provide shade along stretches of chalk streams, for example.
- Building information and understanding about the NCA's woodland archaeology in order to inform conservation management.
- Maximising public access and recreation opportunities in woodlands, particularly near to settlements.
- Avoiding planting where it will negatively impact upon valued views and is inconsistent with landscape and historic character at the local level, such as at Avebury World Heritage Site. Water-thirsty tree crops, such as poplar, are also inappropriate in this area.

Supporting document 1: Key facts and data

Total area: 110,986 ha

1. Landscape and nature conservation designations

The NCA is almost entirely (97 per cent) within the North Wessex Downs Area of Outstanding Natural Beauty.

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

- www.northwessexdowns.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)	Hackpen Hill SAC; Kennet and Lambourn Floodplain SAC; Kennet Valley Alderwoods SAC; Pewsey Downs SAC; River Avon SAC; River Lambourn SAC	306	<1
National	National Nature Reserve (NNR)	Fyfield Down NNR; Pewsey Downs NNR	379	<1
	Site of Special Scientific Interest (SSSI)	A total of 38 sites wholly or partly within the NCA	2,297	2

Source: Natural England (2011)

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

Land covered by international and European nature conservation designations totals 306 ha (<1 per cent), whilst national designations cover 2 per cent. Some parts of the two NNRs are not within an SSSI designated area.

There are 442 Local Sites in the Berkshire and Marlborough Downs covering 6,003 ha which covers 5 per cent of the NCA.

Source: Natural England (2011)

- Details of individual Sites of Special Scientific Interest can be searched at: http://www.sssi.naturalengland.org.uk/Special/sssi/search.cfm
- Details of Local Nature Reserves (LNR) can be searched 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 in category condition
Unfavourable declining	61	3
Favourable	594	26
Unfavourable no change	118	5
Unfavourable recovering	1,524	66

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

Ranges from 55 m to a maximum 297 m at Walbury Hill, which is the highest chalk hill in southern England. The mean is 159 m.

Source: Natural England (2010)

2.2 Landform and process

Chalk strata have been tilted upwards to create prominent scarp slopes facing north-west with a dipslope descending gently south-east into the London Basin. The Chalk escarpment exists as a high plateau with a lower 'ledge' forming a raised plain beneath which protrudes northwards into the surrounding clay vales. In the south, uplift and erosion of the overlying Chalk has created the lower lying Pewsey Vale which is enclosed by chalk scarps of the Marlborough Downs to the north and Salisbury Plain to the south. Behind the long sinuous steep scarps, there is the typical rolling downland dissected by valleys.

Periglacial landforms and features formed during the Quaternary are distinctive of the area. The dipslope is dissected by a network of valleys, some of which are without watercourses. These dry valleys or 'coombes' were formed by watercourses which could flow across the chalk because it was made impermeable by permafrost. Deposits of frost shattered bedrock have also created terrace features on some valley slopes and accumulated on valley floors as 'head' deposits. There are also striking examples of 'sarsen trains', such as at Fyfield Down. These standing stones are evidence of solifluction processes which moved the stones from their original source areas.

At the foot of the scarps on the northern boundary and in the Vale of Pewsey, spring line watercourses emerge and cut a convoluted edge to the scarp face.

Source: Berkshire and Marlborough Downs Countryside Character Area; Berkshire & Marlborough Downs Natural Area Profile, County geology profile; North Wessex Downs AONB Management Plan 2009-2014

2.3 Bedrock geology

The oldest bedrocks are Gault Clay and Upper Greensand from the Lower Cretaceous. These bedrocks are only exposed where overlying chalk has been removed; along the northern escarpment and in the Vales of Pewsey and Ham along the southern boundary. Elsewhere, Upper Cretaceous Chalk dominates the area and is part of a larger mass that extends from this area to East Anglia. Chalk is unique, being deposited under specific conditions in tropical seas. Harder Middle and Upper Chalks form the plateau, with a lower 'ledge' of eroded Lower Chalk protruding from beneath along the northern boundary. Tertiary deposits of London Clay and Bagshot Beds are restricted to the bottom of the dipslope and represent the western limits of London Basin deposits. More prominent, however, are the scattered blocks of silica-cemented sand or pebble conglomerates called 'sarsen stones' found on valley slopes and bottoms. Sarsen stones can be a considerable distance from their original source area, having been moved by solifluction processes during the Quaternary Period.

Source: Berkshire and Marlborough Downs Natural Area Profile; County geology profiles, Natural England website; North Wessex Downs AONB Management Plan 2009-14

2.4 Superficial deposits

Many of the chalk plateau and ridges of the chalk down are capped with Quaternary deposits of clay with flint. These deposits are the result of weathering of the chalk bedrock. River terrace deposits and alluvium are associated with rivers.

Source: Berkshire and Marlborough Downs Natural Area Profile

2.5 Designated geological sites

Tier	Designation	Number
National	Geological Site of Special Scientific Interest (SSSI)	3
National	Mixed Interest SSSI	3
Local	Local Geological Sites	7

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

Thin, well drained and nutrient poor soils on the Chalk which are under grass or, where improved, under arable. Deep, well watered loamy soils on the Greensand in the Vale of Pewsey, combined with river alluvium, supports arable and dairy. Till deposits in some of the dry valleys provide rich soils, often under arable. Heavier, damp clay with flint soils support much of the woodland cover.

Source: North Wessex Downs AONB Management Plan 2009-14

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

Agricultural Land Classification	Area (ha)	Percentage of NCA
Grade 1	4,414	4
Grade 2	35,065	31
Grade 3	63,028	57
Grade 4	4,047	4
Grade 5	1,296	1
Non-agricultural	2,192	2
Urban	914	1

Source: Natural England (2010)

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

3. Key waterbodies and catchments

3.1 Major rivers/canals

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

Name	Length in NCA (km)
Kennet	48
Kennet & Avon Canal	47
Avon	9
Pang	3
Bourne	<1

Source: Natural England (2010)

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

The chalk rivers of the Kennet, Lambourn and Pang drain the downs and flow eastwards down the dipslope towards the Thames. Some watercourses are 'bournes' which flow only when water tables are high. Off the downs, numerous minor streams drain the Pewsey Vale to supply headwaters of the Salisbury Avon which flows south to Salisbury Plain, whilst the foot of the downs on the western boundary falls into the Bristol Avon catchment. The Kennet and Avon Canal passes through the Vale of Pewsey, connecting the Thames to the Avon at Bath.

3.2 Water quality

The total area of Nitrate Vulnerable Zone is 110,985 ha, 100 per cent of the NCA.

Source: Natural England (2010)

3.3 Water Framework Directive

Maps are available from the Environment Agency showing current and projected future status of water bodies 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 9,758 ha of woodland (9 per cent of the total area), of which 4,087 ha is ancient woodland. The Great Western Community Forest, one of twelve Community Forests established to demonstrate the contribution of environmental improvement to economic and social regeneration, covers 9,451 ha of this NCA, which is 9 per cent.

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

4.2 Distribution and size of woodland and trees in the landscape

Small woods are scattered across the area, except at the western end where woodland is almost absent. Savernake, near Marlborough, represents the largest block of woodland by far and sits in a cluster of woodlands including West Wood that are associated with the royal hunting forest of Savernake. Half the woodland resource is ancient, with Savernake being by far the largest block of ancient semi natural woodland. Savernake also dominates in terms of wood pasture and parkland.

Since early Neolithic clearance of the natural tree cover in the Marlborough and Lambourne Downs, these areas have remained sparsely wooded with the notable exception of the 18th century beech clumps and small fox covert plantings. Broadleaved woodland is found on steep scarp slopes, in inaccessible coombes and on heavy clay-with-flint soils; a good example are the woods on the scarp near Streatley. More recent forestry operations have been directed towards replanting with conifer or beech for timber production and remaining coppice woodlands have largely been neglected.

Woodlands on thin chalk soils are characterised by ash, field maple and oak standards over a hazel understorey with a rich ground flora of dog's mercury, wood anemone and ramsons. On the heavier clay-with-flints oak and ash predominate over a hazel understorey with a ground flora more typical of acid soils including bluebell, bracken and bramble. Beech hangers are restricted to the northern escarpment and to Savernake where it is planted in avenues. Savernake is otherwise composed of oak and conifer.

Arable fields on the dipslope are characterised by boundary trees and shelterbelts are common on high ground. Orchards are distinctive of the Vale of Pewsey.

Source: Natural England 2010; North Wessex Downs AONB Management Plan 2009-14; Berkshire & Marlborough Downs Natural Area Profile; Berkshire & Marlborough Downs Countryside Character Area

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	6,941	6
Coniferous	1,199	1
Mixed	670	<1
Other	948	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	2,447	2
Planted ancient woodland sites PAWS)	1,640	1

Source: Natural England (2004)

5. Boundary features and patterns

5.1 Boundary features

On the open chalk downlands, there are few boundaries and these are largely defined by post-and-wire fencing or grass baulks. In contrast, hawthorn hedges that frequently contain oak hedgerow trees are found on lower slopes and manorial or parish boundaries are often well defined by hedgerows. In the royal hunting forest area of Savernake, lanes have high grassy banks. In the Vale of Pewsey, trees border the watercourses. The Ridgeway is enclosed by hedges and banks along some stretches.

Source: North Wessex Downs AONB Management Plan 2009-14; Berkshire and Marlborough Downs Countryside Character Area description; Countryside Quality Counts (2003)

5.2 Field patterns

Close to settlements, fields tend to be small representing meadowland or, occasionally former arable strips. On the valley sides and higher ground large fields predominate. Mostly, these fields have a degree of irregularity suggesting enclosure by agreement, mainly from between the 16th and early 18th centuries, rather than parliamentary enclosure. This irregularity is partly derived from the sinuous droves, tracks and roads running from the valleys up to higher ground which often form the framework for manorial and parish land divisions.

Source: Berkshire and Marlborough Downs 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 NCA has a mixed farming character with the main farm type being cereals. Farm types can be broken down as follows: 229 cereals (41 per cent); 124 other types (22 per cent); 105 grazing livestock lowland (19 per cent) (mainly sheep or pigs) ; 35 mixed (6.5 per cent); 25 dairy (4.5 per cent); 13 generally cropping (2.5 per cent); 11 specialist poultry (2 per cent); 8 specialist pigs (1.5 per cent); and 8 horticulture (1.5 per cent) During the period 2000-2009, grazing livestock lowland increased by 23 holdings and other types by 27 holdings. Mixed farms fell by 32 holdings, dairy by 10 and cereals by 9 over the same period.

Source: Agricultural Census, Defra (2010)

6.2 Farm size

Farms over 100 ha in size are the most numerous by numbers of holdings with 239 holdings covering an area of 80,442 ha followed by farms between 5 and 20 ha at 115 holdings, covering 1,274 ha. Between 2000-2009, farms over 100 ha decreased by 34 holdings. Numbers of holdings increased across all other size bands. The greatest increase was seen in those between 5-20 ha.

Source: Agricultural Census, Defra (2010)

6.3 Farm ownership

Owned land makes up 63 per cent of total farm area, while the remainder is tenanted. There has been a decrease in owned land by 1,598 ha or 3 per cent as well as land held in tenancy by 9 per cent. 2009: Total farm area = 89,554 ha; owned land = 56,626 ha.2000: Total farm area = 94,972 ha; owned land = 58,224 ha.

Source: Agricultural Census, Defra (2010)

6.4 Land use

By hectarage, the greatest land cover is cereals at 38,617 ha or 43 per cent of the total farmed area followed by grass and uncropped land at 28,174 ha or 31 per cent of the total farmed area. There was an increase by hectarage for many crop types during 2000-2009, the largest being for oilseeds (by 3,090 ha) and other arable crops (by 2,129 ha). Cereals saw a reduction of 8,887 ha and uncropped pasture dropped by 1,915 ha.

Source: Agricultural Census, Defra (2010)

6.5 Livestock numbers

The commonest form of livestock in the area with is sheep with 56,000 animals, followed by pigs with 45,000 and cattle with 24,000. There was a decline in the number of all livestock between 2000 and 2009. The largest percentage fall was in sheep by 31 per cent or 25,000 then cattle by 25 per cent or 8,000 and pigs by 15 per cent or 7,700.

Source: Agricultural Census, Defra (2010)

6.6 Farm labour

Most farms are managed by owner farmers (763). 114 are run by salaried managers. Between 2000 and 2009 there has been an increase in both owner farmers and salaried managers (by 12 and 14 respectively). The number of full time workers has fallen however by 194 as has the number of casual/gang workers by 3. The number of part time workers has risen by 53.

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

Habitat is scattered across the area. Woodland dominates, with chalk grassland covering 1 per cent of the area and notable lengths of chalk stream/river. Woodland habitat is present as small fragments associated largely with the dipslope in the south. The largest area by far is Savernake at over 90ha which includes wood pasture. Chalk grassland is commonly present as small isolated fragments in the north. They are often linear due to their association with narrow valleys and historic routeways including the Ridgeway, and are also present as archaeological site pasture. The largest areas of chalk grassland are in the west, including Pewsey Downs, Roundway Down and grasslands near White Horse Hill, and there is a concentration of chalk grassland areas which are strung along the northern chalk scarp from Devizes north to Beckhampton. A few isolated habitats are associated with the Kennet, Lambourn and other watercourses. Chalk scrub, hedgerows, wetlands associated with chalk rivers and dew ponds add to habitat variety. Mosaics of arable, down and scrub land can support species distinctive of the area such as Brown Hare and Lapwing.

Chalk grassland is one of the most biologically rich and diverse habitats in the UK and supports species including the Early Gentian and Adonis Blue butterfly. Farmland birds such as stone curlew also make use of downland.

Associated with the open downs are sarsen stones which provide one of the few incidences of natural exposures of acidic hard rock in lowland Britain and growing on them are diverse relict lichen and bryophyte flora of great importance. Some communities, such as those at Fyfield Down, are nationally important because they have taken centuries to develop and include sarsen stone specialists. Most notable are the species usually confined to the northwest or coastal locations.

Spring fed fast flowing chalk streams and rivers support an extremely diverse range of plant and animal communities. Pea mussel, freshwater white-clawed crayfish and river water-dropwort can be found. In the upper reaches, 'bournes' support flora adapted to wide variations in flow such as pond water crowfoot and fool's watercress. Associated flood meadows, grazed pastures, fen, marsh, carr and woodland provide diversity. Scarce wet meadow, characterised by crested dog's tail, ragged robin and marsh marigold, is found along the Kennet and Lambourn and can support breeding warblers and rare invertebrates.

Broadleaved woodland is found on the steep scarp slopes, in coombes and on the hills capped by clay with flint. There are many woodland stand types across the varied geology and includes hornbeam coppice. Calcareous woodlands support rare plants including Herb Paris and Green Hellebore whilst less calcareous are carpeted with bluebells in the spring. (Also see Woodland section).

Savernake Forest contains large remnants of wood pasture which supports outstanding lichen flora, fungi, rare invertebrates and breeding bird assemblages. Many species rely for their survival on the ancient and magnificent specimens of oak and beech, many of which are over 200 years old.

In addition the NCA contains important arable habitats. These support nationally important assemblages of arable birds as well as nationally and regionally important species associated with tilled land including Stone Curlew, Corn Buttercup, Shepherd's Needle and Brown Hare.

Source: Berkshire & Marlborough Downs Natural Area Profile; Natural England 2010; North Wessex Downs AONB Management Plan 2008-14; North Wessex Downs landscape

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:

http://www.naturalengland.org.uk/ourwork/conservation/biodiversity/protectandmanage/englandsbiodiversitystrategy2011.aspx

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

Priority habitat	Area (ha)	Percentage of NCA
Broadleaved mixed and yew woodland (Broad habitat)	4,683	4
Lowland calcareous grassland	1,334	1
Coastal floodplain and grazing marsh	302	<1
Lowland meadows	108	<1
Lowland heathland	14	<1
Fens	13	<1
Purple moor grass and rush pasture	2	<1
Reedbeds	1	<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

Generally, this is a sparsely settled landscape, with historic market towns such as Marlborough and Hungerford being the principal settlements. Outside the NCA but nearby, Reading and Swindon are major urban centres and the M4 passes through the NCA.

Water supply has attracted settlements to cluster in the valley bottoms and at springs along the foot of the lower north facing scarp. Around Savernake royal hunting forest area, settlement is dispersed as hamlets and farmsteads. Compact nucleated villages define the Vale of Pewsey, as well as communication routes (road, rail and canal). On the exposed high ground and on the Lower Chalk 'ledge' on the northern boundary, there is little settlement although archaeology indicates there has historically been more settlement here.

Horse racing establishments are a feature, with race horse gallops, training stables and stud farms developed from the 19th century. Floating meadows, watercress beds, water mills and pools are evidence of the historical uses of the rivers. The Kennet and Avon Canal has several features along its length that are of major significance in terms of industrial history – including the flight of locks at Devizes. On the 'ledge' on the northern boundary, airfields and redundant military sites are found.

Source: Berkshire and Marlborough Downs Countryside Character Area description; Countryside Quality Counts (2003); Historic Profile; North Wessex Downs Landscape

8.2 Main settlements

The main settlements within the NCA are: Devizes; Marlborough and Hungerford. The total estimated population for this NCA (derived from ONS 2001 census data) is: 78,070.

Source: Berkshire and Marlborough Downs Countryside Character Area description; Countryside Quality Counts (2003), Natural England (2012)

8.3 Local vernacular and building materials

Timber-framing was the tradition until the later 17th century when brick became dominant. The only true local building stones are the hard bands of Melbourn Rock, Chalk rock and sarsen stones. Chalk was rarely used externally but was often used as the inner skin to brick walling. A substantial sarsen stone industry developed in the 19th century, with roughly broken blocks being used in buildings and gate posts, for example at West Overton, Lockeridge, Fyfield and West Kennet. Flint and hard bands in the Upper Greensand were often used in association with other materials (for example. banding, chequerboard), while straw thatch, clay tiles and Welsh slate are used for roofing. Cob, a mixture of clay or chalk, water and straw, and weather-boarding is also seen.

Source: Berkshire and Marlborough Downs Countryside Character Area description; Countryside Quality Counts (2003); North Wessex Downs AONB Management Plan 2009-14; Draft Historic Profile

9. Key historic sites and features

9.1 Origin of historic features

The Berkshire and Marlborough Downs have been settled since Neolithic or early prehistoric times as the numerous barrows, and other prehistoric earthwork features that are scattered around the chalk downs, testify. Of recognised international significance is the Neolithic stone circle at Avebury, the ceremonial mound known as Silbury Hill plus the adjacent West Kennet long barrow on the Marlborough Downs, which are collectively designated as a World Heritage Site.

Further significant archaeological features are found on the north scarp of the Berkshire Downs around White Horse Hill. These include the bronze-age hillfort of Uffington Castle, the Neolithic chambered long barrow of Wayland's Smithy built from massive sarsens and the striking figure of the White Horse itself, dating from the first century, cut into the chalk scarp face. Round barrows such as Seven Sisters by Beacon Hill and enclosures such as at Walbury Hill are also

found. These features can be prominent when positioned on hilltops and ridges and when large, for example, West Kennet long barrow is 113 m long and Silbury Hill is the largest man-made mound in Europe.

There are numerous historical routeways. Linking much of the archaeology is the Ridgeway, considered one of Britain's oldest 'green' roads. The Ridgeway follows the highest part of the chalk scarp linking Avebury with Ivinghoe in the Hertfordshire part of the Chilterns. The area is also crossed by Roman roads including a road (now a ride) that runs through Savernake Forest. Medieval droveways that are today's green lanes originated at a time when the area was renowned for its wool industry, and Marlborough, for example, developed as a textile centre. More recently, the early 19th century saw turnpike roads and, in 1810, the Kennet and Avon Canal and then the Great Western Railway in 1841.

In the post-Roman period it is thought that the south-west part of the area was a frontier between tribal areas – the construction of Wansdyke formed the boundary stretching westwards towards Bath. Another major boundary is the Bedwyn Dyke in Savernake. During the 1940s, the Kennet and Avon canal became a defence line, as evidenced by its pillboxes and anti tank obstacles.

Source: Berkshire and Marlborough Downs Countryside Quality Counts Draft Historic Profile, Countryside Character Area description; North Wessex Downs landscape

9.2 Designated historic assets

This NCA contains the following numbers of designated heritage assets:

- 1 World Heritage Site.
- 6 Registered Parks and Gardens covering 2,335 ha.
- 1 Registered Battlefield covering 953 ha.
- 442 Scheduled Monuments.
- 3,190 Listed Buildings.

Source: Natural England (2010)

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

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

10. Recreation and access

10.1 Public access

- 4 per cent of the NCA 4,477 ha is classified as being publically accessible.
- There are 1,971 km of Public Rights of Way at a density of 1.8km per 1km2.
- There is 1 National Trail (The Ridgeway) within the NCA. This covers 76 km within 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)	300	<1
Common Land	219	<1
Country Parks	53	<1
CROW Access Land (Section 4 and 16)	1,882	2
CROW Section 15	160	<1
Village Greens	11	<1
Doorstep Greens	0	0
Forestry Commission Walkers Welcome Grants	58	<1
Local Nature Reserves (LNRs)	52	<1
Millennium Greens	1	<1
Accessible National Nature Reserves (NNRs)	395	<1
Agri-environment Scheme Access	280	<1
Woods for People	2,298	2

Sources: Natural England (2011)

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

11. Experiential qualities

11.1 Tranquillity

Based on the CPRE map of Tranquillity (2006) it seems that although some parts of the NCA are quite disturbed, for example, around the larger towns such as Hungerford and along the M4, other sections are quite tranquil. The greatest tranquillity can be found to the west of Marlborough away from major roads, this area is relatively undisturbed.

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

Tranquillity	Score
Highest value within NCA	111
Lowest value within NCA	-55
Mean value within NCA	4

Sources: CPRE (2006)

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

11.2 Intrusion

The 2007 Intrusion Map (CPRE) shows the extent to which rural landscapes are 'intruded on' from urban development, noise (primarily traffic noise), and other sources of visual and auditory intrusion. This shows a similar picture to the tranquillity data with the most disturbed areas found around major settlements and road networks such as the M1, A1 and A6. A breakdown of intrusion values for this NCA is detailed in the table below.

Intrusion category	1960s (%)	1990s (%)	2007 (%)	Percentage change (1960s-2007)
Disturbed	10	30	44	34
Undisturbed	90	70	55	-35
Urban	0	0	1	1

Sources: CPRE (2007)

Notable trends from the 1960s to 2007 are the dramatic increase in disturbance and urbanisation of the NCA noted for the first time in 2007.

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

Water quality, flow and availability impacts upon groundwater in the aquifer and upon chalk rivers and wetlands.

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

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

Supporting document 2: Landscape change

Recent changes and trends

Trees and woodlands

- Between 1999 and 2003, an area equivalent to 4 per cent of the 1999 total stock (267 ha) was approved for new planting under Woodland Grant Scheme agreements. New planting was locally concentrated and included areas on the typically open Downs, for example north of Marlborough.

- The area of woodland covered by a Woodland Grant Scheme management agreement increased from 10 to 15 per cent between 1999 and 2003. Of the woodland which is ancient, the proportion covered by a Woodland Grant Scheme increased from 9 to 17 per cent.

Boundary features

- Between 1999 and 2003, agri-environment scheme agreement options for linear features included 84 km of fencing, 26 km of hedgerow management, 94 km of hedgerow planting and restoration and protection restored to 15 km of boundary. In 2003 the most extensive option for linear features was 38 km of sheep fencing.

- Total length of boundary options in agri-environment scheme agreements between 1999 and 2003 was just under 300 km; equivalent to about 3 per cent of the total boundary length in the NCA. In 2011 the total length of boundaries under agri-environment scheme options was 942 km. The majority of options related to hedgerows while 18 km applied to ditches and 28 km to woodland boundaries.

- Between 1999 and 2003, neglect of hedgerows and hedgerow trees had been particularly noted in the Vale of Pewsey and across the open downs, while over-trimmed hedgerows were an issue in some areas. By 2011 the length of hedgerow under agri-environment agreement options had increased greatly since 2003 to 895 km.

Agriculture

- Agri-environment scheme uptake for annual area features has been consistently above national average.

- Although the rate of grassland loss has reduced the proportion of permanent grassland cover has not recovered to 1990 levels. Mixed farming continues to decline.

- Between 2000 and 2009, the area of cereals declined significantly by nearly 9,000 ha. Oilseeds increased by 3,000 ha and other arable crops by 2,000 ha approximately.

- Between 2000 and 2009, there was a decline in all livestock. Sheep numbers fell by 31 per cent (24,981 animals) and cattle by 25 per cent (8,289 animals).

Settlement and development

- Development pressure on average is low but there are local concentrations around the fringes of Devizes and Marlborough and dispersed development in the Kennet valley and Vale of Pewsey. Expanding urban centres lieing adjacent to the NCA include Swindon, Didcot and Reading.

- Farm buildings have been subject to change due to requirements for new large scale farm buildings and traditional farm buildings becoming redundant with potential for conversion. Barn conversions are limited compared with other NCAs.

Semi-natural habitat

- Agri-environment scheme uptake for annual area features has been consistently above national average. The most extensive annual agreements in 2003 secured management of 1,729 ha of calcareous grassland and regeneration of 1,148 ha of grassland/semi-natural vegetation.

- In 2003 agri-environment scheme agreements included options for the management of 1,729 ha of calcareous grassland, regeneration of 1,148 ha of grassland and semi-natural vegetation, management of 770 ha of lowland pastures on neutral/acid soils and 455 ha of arable reversion.

- Since 2008 the South West Farmland Bird Initiative has targeted conservation efforts towards supporting ten farmland birds in the Wiltshire part of the NCA (approximately the eastern half of the NCA) and across the entire NCA since 2010. A project officer has provided advice to farms over nearly 30 per cent of the area of the North Wessex Downs AONB in order to secure agri-environment scheme options benefitting arable biodiversity with a focus upon ten bird species including six range-restricted species; grey partridge, lapwing, turtle dove, yellow wagtail, tree sparrow and corn bunting.

- A small long-established population of stone curlew is located on the Berkshire–Oxfordshire border in this NCA. Agri-environment scheme options have been secured on farms in this NCA to support stone curlew. LIFE+ funding was awarded in 2012 to support continued targeted work in this NCA.

- Beginning in 2012, the Marlborough Downs is taking part in a national initiative to establish resilient ecological networks in twelve areas across the country.

- In 2011 66 per cent of the area of SSSI in the NCA (1,524 ha) was recovering from an unfavourable condition. This compared with 3 per cent (61 ha) which was unfavourable and declining in condition.

- Introduction of comprehensive restorative management across the majority of Savernake Forest SSSI has improved the long term conservation prospects of the habitats and species. A Forest Design Plan published in 2007 applies to much of the SSSI. By 2010 95 per cent of the SSSI (from a total area of 905 ha) was assessed as recovering from unfavourable condition.

- Scrub management and restorative/conservation grazing has also been introduced and maintained in the last ten years across several key chalk grassland SSSI, including Roundway Down and Covet, Calstone and Cherhill Downs and Whitehorse Hill.

Historic features

- According to the Heritage at Risk Register, 2010, the proportion of Scheduled Monuments classed as at 'high risk' of deterioration, loss or damage in this NCA was above the national and regional averages. A significant proportion of monuments were also classed as 'medium risk'. The condition of many 'at risk' monuments showed a 'deteriorating' trend. Common factors contributing to decline included extensive animal burrowing, arable cultivation and 'clipping', vandalism and vehicle damage.

- Since 2003 agri-environment scheme agreements have converted more than 140 ha of arable land to grass, protecting more than 50 monuments including key sites such as West Kennet Long Barrow[20]. These agreements have also secured some public access improvements.

[20] *Avebury World Heritage Site* (leaflet within WHS residents' pack), Natural England (2008)

- About 86 per cent of listed historic farm buildings remain unconverted. About 92 per cent are intact structurally.

- About 54 per cent of the remaining parkland in the area is covered by a Historic Parkland Grant, and about 18 per cent is included within an agri-environmental scheme. According to the Heritage at Risk Register, 2010, only one Registered Park was at risk – Tottenham House (Grade II*).

- Within the Avebury World Heritage Site the number of monuments affected by badger damage has risen from 2 in 1999 to 23 in 2010.[21]

Coast and rivers

- Dedicated projects working within and outside agri-environment scheme agreements have delivered advice and practical works to improve the ecology and hydrological function of the rivers Kennet, Lambourn, Pang and Hampshire Avon.[22]

- Low flows and retreating headwaters are a feature of the chalk rivers and streams in this NCA. There have been changes to abstraction practices to address artificial low flows as, for example, in 2008 when a major abstraction licence for Axford on the River Kennet was amended to reduce permitted volumes.[23]

- Between 1999 and 2003, the Upper Kennet Rehabilitation Project realised several enhancements to degraded sections of the Kennet between Marlborough and Ramsbury.[24]

[21] *Avebury World Heritage Site Condition Survey,* Wessex Archaeology (2010)
[22] *River Basin Management Plan – Thames River Basin District,* Environment Agency (2009); *Strategic Framework for the Restoration of the River Avon System (Non-technical Summary – Final Report),* Environment Agency (2009)
[23] *Kennet and Pang CAMS 3rd Annual Update,* Environment Agency (2008)
[24] *Map and Guide to the River Kennet: Silbury Hill to Hungerford,* Action for the River Kennet (2004)

Minerals

- There has been no significant mineral extraction in this NCA in the recent past.

Drivers of change

Climate change

- Aquifer recharge will be affected by changes in climate. Periods of decreased rainfall and drought will offer less rainfall and increased evaporation rates. Rainfall events concentrated in major downpours will lead to greater run-off, reducing recharge potential. Pollution incidents may also increase as a result of failed drains and rapid run-off during storms.

- Water-dependent chalk streams and springs and wetland habitats are vulnerable to low groundwater levels and their resilience is already reduced by historical low flows along many streams. Polluted run-off will have a greater impact on rivers suffering low flows because their dilution capacity is reduced[25]. Unpredictable and frequent periods of drought and flood will give rise to erratic flows in rivers and difficulties in managing flows. There may be short-term or longer-lasting downstream migration of stream heads and winterbourne sections. River water quality may also deteriorate as a result of high temperatures.

- Erratic flows could destabilise riverbanks and, combined with greater sediment pollution, increase turbidity to the detriment of biodiversity and fishing interests.

- Historic features associated with watercourses and wetlands, including canal structures and watermeadows, are vulnerable to damage during prolonged dry periods or flooding.

[25] *Impacts of Climate Change on Nitrogen in a Lowland Chalk Stream: An Appraisal of Adaptation Strategies, PG Whitehead et al (undated) (obtained from Action for the River Kennet website)*

- Climate change will affect the behaviour and ranges of species, especially those near or at the limit of their range. Small populations of immobile niche species ('relict' populations) may be lost.

- Climate change favouring a longer growing season will increase the rate of scrub and woodland encroachment on open downland habitats, viewpoints and historical features such as burial mounds and boundaries.

- Trees in exposed positions, such as in hedgerows and planted clumps, may be vulnerable to sun scorch, crown and root die back and windthrow. Associated lichen, fungi and invertebrate interest may also be affected. Loss or damage to landmark trees and beech clumps might be particularly significant. Failure of trees on earthworks has potential to cause damage to monuments and to buried archaeology and this is particularly relevant to beech clumps planted on barrows.

- The fragmented and small size of some habitats in the Berkshire and Marlborough Downs, including chalk grassland, flood plain meadow and small ancient woodland, reduces their resilience to threats under climate change. 'Core areas' of habitat will become increasingly important to conservation over the long term, while 'movement corridors' will assist more mobile species in finding more favourable conditions.

- Mild winters may lead to greater visitor numbers in the winter. Surfaces of access routes and infrastructure will be at risk during flooding and periods of drought, with impacts affecting many visitors at well-visited locations such as Avebury and the Ridgeway. The most extensive damage will be likely where motorised vehicles are involved.

- There may be an increase in the popularity of waterside recreation in the hottest months.

- Changing rainfall patterns will lead to changing patterns of water demand. Continuing or increasing demand for high loss uses, such as farmland irrigation, will make water conservation difficult and potentially conflict with other users such as anglers and water sports groups.

- Changes in rainfall patterns and temperature may increase soil erosion risk and create new areas of soil erosion risk. Water logging, erosion and loss of stability will threaten the conservation of historic earthworks, such as Silbury Hill[26]. Pollution of watercourses will be exacerbated by increased soil erosion and rapid run-off.

- Conditions of high stress relating, for example, to soil erosion and drought, will favour annuals, deep-rooting plants and ruderals. Plant community composition in semi-natural habitats will change.

- High temperatures and summer drought are expected to reduce the species diversity of chalk grassland. Younger calcareous grasslands composed of fast-growing or short-lived species are likely to be more vulnerable than older calcareous grasslands. South-facing habitats will suffer greatest exposure to increased solar radiation.

- The species composition of woodlands associated with the clay-with-flint soils of the southern chalk dip slope, notably Savernake Forest, may change in response to changing temperatures and the increased prevalence of 'sudden oak death' and other diseases. Beech trees which are characteristic of the clumps on the open downs are a species vulnerable to drought stress because they are shallow rooted.

- Changing water regimes will be particularly significant for wetland habitats, with a loss of restricted communities such as neutral grassland and fen.

[26] *The North Wessex Downs landscape: a landscape assessment of the Area of Outstanding Natural Beauty*, Countryside Agency (2002)

- A longer growing season with increasing temperatures may encourage the expansion of arable production, causing loss of pasture where it is easily cultivated and reduced interest in keeping parts of arable land out of production for example, field margins, buffer strips, fallow plots and winter stubble. There may be an increase in field sizes on the flood plain. Higher temperatures may encourage the introduction of novel crops for example sunflowers, navy beans, soya and lupins into the cereal-dominated landscape (potentially masking the subtle folds of the chalk topography), as well as different crop timings and increased prevalence of pests and diseases. Changes to farming practices and to the farmed landscape will have knock-on effects upon wildlife and habitats.

- Grazing regimes will need to adapt to changes in vegetation growth and the suitability of breeds may alter as a result of changing weather conditions.

Other key drivers

- While the NCA is largely rural, major developments are possible in this NCA and could include wind turbines, development of further M4 junctions, brownfield developments (for example, redundant airfields) and greenfield housing and employment sites. Large numbers of new homes are planned for Devizes, Marlborough and Pewsey. Swindon, Wantage, Didcot and Newbury are particular focus areas for growth adjacent to the NCA boundary. Potential negative impacts relating to development affect the 'rural scene' or 'natural beauty' of the area as recognised by the North Wessex Downs AONB designation; experiences of high tranquillity, dark skies and far-reaching views, and sustainable resource use.

- Farming practices may demand large grain stores in areas that are otherwise undeveloped, with the potential for significant impact upon views.

- The North Wessex Downs AONB designation will continue to influence planning decisions affecting this NCA and its setting.

- Didcot power station closed in 2013 and, with the large cooling towers intended for demolition, a major landmark at the foot of the Downs escarpment will be removed.

- Sustainable water resource management within the context of further development in areas such as Swindon will continue to shape the management of the aquifer and watercourses. Alternative sources of water, such as a reservoir for public water supply at Farmoor outside the NCA, will continue to be explored.

- Demand for alternative fuels will encourage landowners and managers to consider options for energy crops and for managing woodlands for wood fuel.

- Development needs of the horse-racing industry may see further losses of grass gallops to artificial surfaces, conversion of open chalk downland to new fenced fields and paddocks, and changes to access roads which negatively impact the historic, rural character of minor roads.

- Conservation of Scheduled Monuments and other heritage features within a productive agricultural landscape will remain a challenge. Monuments are often neglected as non-productive areas in the farmed landscape, giving rise to scrubbing up and focus for burrowing animals. Clipping by arable machinery will continue to degrade assets.

- Agricultural and forestry economics as well as agri-environment and forestry grant schemes will continue to shape the character of the rural landscape. Scrub and woodland encroachment into open areas including downland may continue as viability of sheep and cattle farming remains limited, particularly in relation to small areas of grassland.
- There may be conflict between user groups, particularly in relation to off-road vehicle users on byways. Visitors will require information and, where appropriate, signage to assist them.
- Inappropriate or unsustainable visitor pressure will need to be managed and avoided at Avebury World Heritage Site and at other popular destinations and routes which are vulnerable to damage.
- Demand for water at a local and regional level will impact upon the groundwater resource and its management. Water resource management will be a critical consideration in relation to development both within and outside the NCA, particularly regarding the growth area of Swindon. Groundwater impacts upon chalk streams will arise.
- Pests and diseases will influence woodland and cropping choices, giving rise to new woodland species compositions and new crops.
- Invasive plants and animals will threaten native populations, with restricted populations being most vulnerable, for example, white-clawed crayfish.
- Farming will increasingly incorporate measures that are resource efficient and prevent pollution. This will introduce new features, potentially at a catchment scale, including buffer strips and water storage reservoirs.

Supporting document 3: Analysis supporting Statements of Environmental Opportunity

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

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

A long continuity of farming has created a landscape providing for farmland wildlife such as grey partridge, Venus'-looking-glass and brown hare.

Statement of Environmental Opportunity	Ecosystem service																		
	Food provision	Timber provision	Water availability	Genetic diversity	Biomass energy	Climate regulation	Regulating water quality	Regulating water flow	Regulating soil quality	Regulating soil erosion	Pollination	Pest regulation	Regulating coastal erosion	Sense of place/inspiration	Sense of history	Tranquility	Recreation	Biodiversity	Geodiversity
SEO 1: On a catchment basis, seek to conserve, enhance and restore the flora, fauna and heritage features of the Kennet and Avon Canal and the chalk streams, springs and associated wetlands, such as those in the Kennet catchment and in the Vale of Pewsey. Enhance public access to key features to reinforce sense of place and secure water quality and water availability as appropriate.	↔ **	↔ **	↑ *	↔ **	↔ **	↗ **	↑ **	↑ **	↗ **	↗ **	↔ **	↔ **	N/A	↑ **	↑ **	↔ **	↗ *	↑ **	↗ **
SEO 2: Across the huge arable fields of the high Downs, conserve and enhance linear features, field edges and in-field features, such as fallow plots and farm reservoirs, and manage these as an interrelated network of features. Manage this network to benefit wildlife (including arable plants and farmland birds), to conserve soils, to store water, to protect heritage features, to improve public enjoyment, and to regulate pests and diseases. Maximise these benefits through targeted arable reversion of strips and areas to grassland,securing the additional benefit of expanding the species-rich chalk grassland network where possible.	↔	↔ **	↔	↔ *	↔ **	↔	↑ *	↑ **	↗ *	↑ **	↗ **	↑ **	N/A	↗ **	↑ **	↔ *	↗ **	↑ **	↔ **

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

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

Statement of Environmental Opportunity	Food provision	Timber provision	Water availability	Genetic diversity	Biomass energy	Climate regulation	Regulating water quality	Regulating water flow	Regulating soil quality	Regulating soil erosion	Pollination	Pest regulation	Regulating coastal erosion	Sense of place/inspiration	Sense of history	Tranquility	Recreation	Biodiversity	Geodiversity
	Ecosystem service																		
SEO 3: Across the open expanses of the Downs, identify and manage natural and man-made landmarks and associated viewpoints valued by local communities and visitors in order to maintain sense of place and history and also so that they act as focal areas for engaging people in the conservation and sustainable enjoyment of the wider area. As well as high-profile landmarks such as Avebury, consider exposed scarp landforms, downland pasture, beech clumps, ancient monuments, historic buildings and sarsen stones.	↔ **	↔ **	↔ *	↔ **	↔ **	↔	↗ *	↗ *	↗ *	↗ *	↗ *	↗ *	N/A	↑ ***	↑ ***	↗ **	↑ **	↗ *	↑ *
SEO 4: With the historic area of Savernake hunting forest being a key focus, manage the Downs' wooded features to maintain sense of place, to conserve and enhance woodland archaeology and biodiversity, and to maximise sustainable timber and wood fuel production. Ensure that new plantings or restockings across the Downs reflect historic distribution patterns so that they strengthen sense of history and sense of place and also seek to support networks of small woods.	↔ *	↑ **	↔ *	↔ *	↗ **	↗ **	↗ *	↗ *	↗ *	↗ *	↔	↗ *	N/A	↗ **	↗ **	↔ *	↗ *	↑ *	↔ *

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

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

Landscape attributes

Landscape attribute	Justification for selection
A chalk mass defined by complex escarpments, rolling downland and dry valleys. Well-known features include White Horse Hill and Avebury plain.	■ With little woodland and settlement across the high Downs and escarpment, there is a dramatic, sinuous scarp slope and broad expanses of rolling downland on the high ground. The views to and from the escarpment and across the high Downs are defining features of the area. ■ The lengths of escarpments are extensive and complex with several chalk-cut horse figures providing distinctive landmarks. From the Goring Gap in the east, the escarpment defines the northern boundary of the NCA and, at Swindon in the west, curves back on itself to border the vales to the south. There is a double escarpment along the northern boundary, incorporating Avebury plain upon which the stone circle and numerous other monuments are sited. ■ White Horse Hill SSSI is a famous example of a karst dry valley. ■ Erosion of the chalk bedrock has created valleys, terracettes, clay-with-flint deposits and head deposits in the valleys.
The open, largely uninhabited high downs offer vast skies, panoramic views and a sense of remoteness and tranquillity. Isolated features stand out on skylines, including chalk-cut horse figures, barrows and hill forts.	■ A lack of water has largely dissuaded settlement in modern times other than isolated farmsteads across the downs. The lack of habitation, the vast numbers of prehistoric monuments and the expansive views generate a sense of remoteness and antiquity. ■ Before the Second World War, the high Downs were unenclosed and uninhabited, sheep-grazed pastures. Conversion to arable retained this open landscape. Field boundaries are minimal and defined by post-and-wire fencing or grass baulks. ■ Farmsteads are large by national standards due to a long history of amalgamation of fields and landholdings. ■ The escarpments overlook adjacent vales, offering panoramic views. Milk Hill is the second highest chalk hill in the country and provides views as far as the Black Mountains in Wales. ■ Experiences of tranquillity are high except along major transport corridors including the M4. ■ Many standing stone monuments, chalk-cut horse figures, historical earthworks and beech clumps were deliberately positioned by their creators to be visually prominent in the landscape. The escarpment displays numerous such features.

Landscape attribute	Justification for selection
Woodland is found across agriculturally marginal land mainly on the lower dip slope. On the high Downs, woodland is restricted to beech clumps, shooting coverts and shelter belts.	■ Semi-natural woodland on clay-with-flints comprises oak and ash, often with a hazel understory, bracken and bluebells. Wet woodlands in the flood plains include the Kennet Valley Alderwoods SAC complex where herb paris and green hellebore are found. On the chalk, the semi-natural woodlands are dominated by oak and ash, with a hazel understory and ground flora including dogs mercury, wood anemone and ramsoms. ■ Hanging woodlands grow on the steep slopes of the valleys and scarp. ■ Conifer plantations are found on the poor agricultural soils. Across the arable fields of the high Downs, trees have been planted as shelter belts and, in the 18th century, as landmarks in the form of beech clumps. ■ Half the woodland resource is ancient, with the remnants of Savernake royal hunting forest being the significant concentration. ■ Just over 900 ha of Savernake is designated SSSI for its outstanding lichen flora, fungi, rare invertebrates and breeding bird community. Over 160 species of lichen and some 500 species of fungi have been recorded. Savernake includes wood pasture areas and there are many veteran trees supporting deadwood fauna including many notable invertebrates.
Smaller-scale, irregular fields defined by woods, hedgerows, meandering watercourses and winding lanes are typical in the valleys and on the lower dip slope. This contrasts with the vast rectilinear fields spread across the high Downs and the regularity of horse studs and training grounds.	■ Evolution of field pattern differed between the high Downs, valleys and lower dip slope due to the difference in agricultural potential of soils and land. ■ Fields on the valley sides are large and irregular, suggesting enclosure pre-dating the Parliamentary enclosures. Historic tracks and roads linking valley bottoms to the high ground have determined sinuous field boundaries in the valleys. Hedges are largely hawthorn with frequent oak trees and along historical parish boundaries. ■ Farmsteads around Savernake are small scale. ■ The high downs were unenclosed and uninhabited sheep-grazed pastures before the Second World War. Conversion to arable retained this open landscape. Field boundaries are minimal and usually consist of post-and-wire fencing or grass baulks. ■ Horse-racing industry developed over the past 150 years, dividing land into regular components such as gallops and paddocks.

Landscape attribute	Justification for selection
A mixed agricultural landscape with a predominance of arable farming in the high Downs and in the fertile Vale of Pewsey, supporting important arable biodiversity.	■ Grade 1 land is found across the Vale of Pewsey, with Grade 2 land concentrated on the northern plain. River alluvium and combe deposits make many valley floors good for cultivation. Elsewhere, land is largely Grade 3. ■ The Vale of Pewsey benefits from fertile, easily cultivated soils and water issuing from the Upper Greensand. Grade 1 land supports relict orchards and arable crops, with meadows and pastures along the watercourses. ■ The lower, wooded dip slope is characterised by mixed farming. ■ There are established populations of farmland birds, arable plants and mammals including brown hare. Arable biodiversity is richest where there is a long continuity of cultivation and sustainable land management. A long history of arable farming can be traced back to at least the 17th century when the local brewing industry was thriving in Ramsbury, Marlborough and Devizes. ■ Thin chalk soils support rare arable plants where there is a continuity of traditional cultivation practices. ■ Within the arable landscape of the high Downs, features such as droveway verges, grassed Scheduled Monuments, fallow plots, beetle banks, relic dew ponds and small woodlands provide heterogeneity in the landscape. This mosaic of farmland habitat supports brown hare, harvest mouse and farmland birds. ■ A farmland bird project in combination with agri-environment scheme agreements has, for several years, supported farmers in providing habitat for birds including skylark. ■ There is a small population of breeding stone curlew in the Lambourn Downs.
Fragments of unimproved chalk grassland comprising a variety of swards and supporting a wealth of plants and animals.	■ Chalk downland is limited in extent and restricted to the steep scarp slopes of the Pewsey, Marlborough and Lambourn Downs. The variety of aspect, gradient and management history has created a variety of swards. Pewsey Downs SAC and Hackpen Hill SAC, for example, support a mosaic of community types and the richest may contain up to 50 species per square metre. ■ Important plant populations of early gentian, Chiltern gentian, chalkhill eyebright, pasque flower, wild candytuft and dwarf mouse-ear can be found. Invertebrates found here include Adonis blue, silver-studded blue, chalkhill blue, Duke of Burgundy fritillary and wart-biter cricket. The grasslands are important for stone curlew and quail populations, alongside more common farmland birds such as skylark and tree sparrow. ■ The largest area of chalk grassland is Pewsey Downs at around 300 ha and smaller grasslands are to be found in clusters such as around Calstone and Cherhill Downs SSSI.

Landscape attribute	Justification for selection
Watercourses, springs, rivers, including internationally important chalk streams, wet woodland and watermeadows with many rare and scarce plants.	■ Across the permeable Chalk, watercourses and springs only occur where and when groundwater levels are sufficiently high enough to reach the surface. Groundwater-fed features are found only in some valleys and at the foot of the escarpment. Changes in groundwater levels over time mean that some features are intermittent, in particular the winterbournes which flow during wetter periods only. ■ The Kennet and Lambourn host a range and mosaic of habitat types such as chalk stream, fen, reedbed and wet grassland. The rivers Lambourn and Avon are designated SAC to reflect the European importance of their chalk stream plant communities and also populations of bullhead and brook lamprey. The River Kennet is designated SSSI for its chalk river plant and animal communities and there are areas of a wet grassland community (MG8) that is very restricted nationally. ■ The Kennet and its tributaries drain the dip slope, with the Kennet flowing eastwards to the Thames in the London Basin. Water arising at the foot of the escarpments flows out into the surrounding vales to supply the Hampshire Avon, the Bristol Avon and the Vale of White Horse catchments. ■ Historic settlements are associated with rivers, including Marlborough and Hungerford, and there are vestiges of human uses of the rivers including watermeadows and watercress beds. ■ Special species include river water-dropwort, summer snowflake, Desmoulin's whorl snail, bullhead, brook lamprey, wild brown trout, water vole and white-clawed crayfish.

Landscape attribute	Justification for selection
Immense archaeological and cultural resource including the Ridgeway, the Uffington White Horse and Avebury stone circle and associated sites, early field patterns, enclosures and hill forts as well as more recent remains of past human activity.	■ Visibly ancient landscape with 442 Scheduled Monuments and additional monuments identified in the local Historic Environment Record. This wealth of monuments survives despite damage and loss that is known to have occurred over centuries. There are barrows, stone circles, earthworks, Roman roads, ancient tracks, chalk-cut horse figures and ancient field systems. ■ Above ground features are often made prominent and dramatic by their location on skylines. ■ Monuments are dramatic due to their scale, remarkable engineering and survival. The stone circles at Avebury and Hatfield Farm in the Vale of Pewsey are huge. The West Kennet long barrow is 113 m long. Silbury Hill is the largest man-made mound in Europe. The Ridgeway runs the full length of the scarp. ■ Prehistoric monuments and sites in the Avebury complex are internationally recognised through World Heritage Site status as being of 'outstanding universal value' to humanity. The site is just over 25 square kilometres with 188 Scheduled Monuments and also several listed buildings. ■ There are relatively rare Early Neolithic causewayed monuments, with their absence in other areas indicating the emergence of different regional traditions. ■ The Ridgeway is reputedly Britain's oldest green road and, having escaped cultivation or other forms of significant disturbance, it is an 'archaeoreserve' preserving centuries of archaeology. It is said to have been in use since prehistoric times. The Ridgeway National Trail provides critical access to the historic environment – it passes some of the most notable and important sites in the NCA. ■ This region was the setting for power struggles between the emerging kingdoms of Wessex and Mercia. Substantial defences were developed, including the massive earthworks of the Wansdyke. ■ Modifications by succeeding generations have created complex monuments, as illustrated at Avebury. ■ High potential for undiscovered and non-designated heritage features in this landscape, including buried archaeology as indicated by cropmarks.
Compact villages and hamlets nestle in the valley bottoms and vales, with Hungerford, Marlborough and Devizes being principal settlements. Settlement on the hills is limited to isolated farms and racehorse establishments.	■ A lack of water across the high Downs has largely dissuaded settlement through to modern times, other than isolated farmsteads. In contrast, watercourses and springs in the lower lying areas attracted settlement which persists today. Small settlements are often regularly spaced along the valley bottoms and there are spring-line settlements along the base of the escarpments. Settlements are densely scattered across the Vale of Pewsey which has numerous watercourses. ■ Marlborough, Hungerford, Devizes and Pewsey are the main settlements. All are agricultural market towns. ■ Swindon is one of the major urban centres just outside the NCA and it is visible from the northern escarpment. ■ Gallops and stables define the Lambourn Downs which is a national centre for racehorse training, with further equine influence found elsewhere.

Landscape attribute	Justification for selection
Distinctive sarsen stones of national importance for their geology, ecology and history of human use.	■ Fyfield Down SSSI and Piggledene SSSI are striking and rare examples of 'sarsen trains', surviving relatively intact since the glaciations of the Quaternary. ■ Sarsen stones provide one of the few incidences of natural exposures of hard acidic rock in lowland Britain. They are notable in supporting species more usually confined to a north western distribution or maritime species. Other lichens are unique to sarsen stones and represent relict lichen and bryophyte flora of great importance. ■ During the cementing process, sarsen stones have fixed evidence of plants growing at the time in the form of holes or 'fossil roots'. ■ Sarsen stones have been used in construction since Neolithic times. The well known Avebury stone circle and West Kennet long barrow incorporate sarsen stones. They are also a distinctive feature of historic buildings in the west of this area. ■ Grooves on the Polissoir stone on Fyfield Down resulted from the sharpening of axe heads over millennia[27].
Traditional building materials include thatch, red brick, flint, chalk and weather-board. Sarsen stones occur as lintels and gate posts and in foundations.	■ Although there is a general lack of true building stone, much of the local geology has been used for construction, for example hard bands of the Melbourn Rock, the Chalk Rock and sarsen stones. Foundations are built of flint, brick or occasionally hard bands within the Upper Greensand. The Chalk has also been used to create cob. ■ Red brick imported into the area, particularly in the 19th century, and often associated with the expansion of the traditional market centres. ■ Weatherboarding occurs in areas where woodland is more prevalent, for example in and around Savernake Forest.
Through-routes are a feature, including the key historical routes of the Ridgeway and the Kennet and Avon Canal. Rights of way are a focus for recreation in an area where accessible greenspace is limited.	■ The Ridgeway is reputedly the oldest green road in Britain. It links Overton Hill in this NCA to Ivinghoe Beacon in the neighbouring Chilterns NCA. ■ The Kennet and Avon Canal provided a fully navigable waterway between Bath and London after its completion in 1810. It is physically and hydrologically linked to the River Kennet. It is a recreation corridor today. ■ The export of wool and livestock established a network of medieval droveways which survive today as valued recreational assets. There are numerous byways. ■ Communication routes developed during the 19th century with the construction of turnpike roads, two canals and the Great Western Railway. ■ The M4 and A34 are the largest modern roads. Beyond the major routes, relatively narrow roads characterise the countryside.

[27] Protecting the Natural Environment in the World Heritage Sites', T Frayling, in *Avebury World Heritage Site – Values and Voices,* S Simmons (ed.) (2008)

Landscape opportunities

- Conserve the open aspect of the downlands where it is valued and particularly where there are views of key landforms and historic features.
- Protect sarsen stones from removal or displacement in the countryside, especially intact 'trains' and scatters in pasture; manage them as lower plant habitats and maintain them as building stones in prehistoric and historic constructions.
- Conserve geodiversity and geomorphological features and facilitate research and education. Raise awareness particularly in relation to key views, designated sites and well-visited sites.
- Plan for new features that are necessary to ensure sustainable water management, including establishing winter reservoirs and increasing flood plain capacity by expanding existing and creating new wetland areas.
- Maintain and restore the natural and cultural heritage of chalk streams and their wider flood plains through sustainable abstraction, habitat restoration, pollution prevention and conservation of historic features from mills to watercress beds to bridges. Harness catchment scale approaches, recognising the interrelationships between watercourses, wetland habitats and groundwater resources. Facilitate public access to chalk streams where possible, particularly within and near to settlements.
- Manage the physical and hydrological links between the Kennet and Avon Canal, the River Kennet and associated water-dependent features in order to maximise opportunities for public access, recreation and habitat conservation.
- Conserve and restore historic hedgerows, semi-natural woodlands, ancient woodland sites and distinctive planted beech clumps as appropriate. Plan for new woodlands and hedgerows, particularly where they will enhance and restore existing landscape features such as the historic woods of Savernake or along chalk streams.
- Manage existing shelter belts, woodlands and hedgerows as parts of a connected woodland network. Work on a landscape scale to tackle deer damage, manage public access and sustainably meet local demand for wood fuel and game.
- Plan to influence proposals for future plantations and buildings to ensure they are not incongruous and conspicuous in the landscape.
- Expand areas of species-rich grassland to conserve and enhance the pastoral character of the landscape and where it will also help to protect and conserve scheduled monuments. Where large blocks of arable reversion are not possible, create grassland strips to buffer grasslands and watercourses with existing interest to increase the structure and character of the landscape and to improve habitat connectivity.

Landscape opportunities

- Adapt horse gallops to incorporate more diverse grassland swards with increased biodiversity.
- Conserve the chalk grassland interest by supporting sheep farmers and building local flocks. Encourage rare breeds most appropriate to the area such as Wiltshire Horn. In targeted locations, restore historic downland pasture scenes.
- Conserve numerous historic features that are valued at a local level but not appropriate for designation as Scheduled Monuments through engaging local communities and landowners in conservation activities including promoting 'local lists'.
- Enhance access to the historic environment and increase the resilience of features to visitor pressure through physical improvements, visitor management, interpretation and engagement with the tourism and leisure sectors. Target conservation and liaise with user groups to identify and protect features already suffering degradation, including and particularly those associated with the Avebury World Heritage Site and byways.
- Conserve the tranquillity found across much of the area by working to ensure that only appropriate development and recreational use occurs across the unsettled downs. Identify and plan for visual and noise reduction measures that are specific to their location; for example, the use of noise reducing road surface improvements rather than tree buffers across open downland. Develop safe cycling and walking routes linking settlements, public transport hubs and features of interest.
- Secure sustainable development which also reflects traditional local building styles and materials. Conserve and enhance the traditional built environment through skills training, settlement characterisation, design statements and planning conditions.
- Manage light pollution through influencing new development and through awareness-raising among home owners and others.

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 the 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	Soils Aquifer Grassland	The northern plateau and Vale of Pewsey are areas of high grade agricultural land. Almost half the farmed area of the NCA is cropped, with arable dominating in the high Downs in the north. The Vale of Pewsey, in the south-west, supports mixed agriculture. Grass and uncropped land is found across approximately 30 per cent of the farmed area. Livestock produced includes sheep, cattle and pigs. Dairy is undertaken by almost 5 per cent of farms. Specialist poultry and pigs combined account for nearly 5 per cent of farmed area.	Regional	The proportion of high agricultural grade land (Grade 1 and 2) is considerable. The Vale of Pewsey comprises largely Grade 1 agricultural land which is put to a variety of uses, including remnants of fruit orchards. Grade 2 is found across approximately 30 per cent of the NCA, with extensive areas on the plateau in the north. Farmers use groundwater, making use of abstraction points in farmland. Large arable fields are a dominant feature of the downlands and high quality barley has historically been grown in this NCA. Local breweries include Wadworths. With a long history of cultivation across the thin chalk soils, soil quality may be declining and problems of soil erosion may be significant. Impacts upon yields will only be avoided by high inputs of fertiliser and water, with consequent impacts upon water resources. **Continued on next page...**	Conserve soils in order to sustain yields in the long term. Adopt farming systems such as 'precision' farming which are resource efficient and minimise negative impacts on water quality, soil quality and biodiversity. Build markets for local foods produced by farming systems which conserve the landscape and rare breeds. In particular, secure sheep farming where it conserves chalk grassland and heritage assets, and protects the aquifer and soils.	**Food provision** **Sense of place / inspiration** **Biodiversity** **Regulating soil erosion** **Regulating soil quality** **Regulating water quality** **Water availability** **Geodiversity**

Service	Assets/ attributes: main contributors to service	State	Main beneficiary	Analysis	Opportunities	Principal services offered by opportunities
Food provision cont				**... continued from previous page** Grade 3 land makes up almost 60 per cent of the NCA. The use of such land is often greatly influenced by market forces and, compared to Grade 1 and 2, grazing livestock and dairy are more likely to be found on such land. Between 2000 and 2009, grazing livestock holdings increased in number by 23 holdings but mixed farms fell by 32 holdings and dairy by 10 holdings. There are significant areas of Grade 2 and Grade 3 land not utilised for food provision but instead managed for horses as gallops, grazing and hay/silage. Sheep or cattle may, however, be involved in mixed grazing systems.		

Service	Assets/ attributes: main contributors to service	State	Main beneficiary	Analysis	Opportunities	Principal services offered by opportunities
Timber provision	Woodland	Woodland cover extends to nearly 9 per cent of the NCA (approximately 9,700 ha) and is largely broadleaved. Savernake and West Wood are examples of woods managed for timber.	Local	A North Wessex Downs AONB study[28] suggests that many woods are not managed and the timber crop quality is not high. Timber production is restricted by low woodland cover and the small average size of woodlands (woods less than 2 ha are considered to be numerous). Other factors include unsuitable crop type and low quality timber. Squirrel and deer damage is significant and affects timber quality. There are, however, larger woodland areas such as Savernake Forest which present some opportunity to obtain timber. The majority of standing conifer, approximately 1,200 ha, will be felled in the next 20 years as much is reaching maturity and is in the form of plantation on ancient woodland sites. New plantation for timber provision is limited by the large areas of high grade agricultural soils, dry and thin chalk soils and the presence of nature conservation designations and heritage assets.	Existing large woods should be managed to improve future timber provision. Small woodlands present limited opportunity for timber provision and may instead be managed to provide other ecosystem services such as wood fuel, biodiversity and sense of place. Future plans for felled conifer plantations should take into account other ecosystem services. For example, it may be appropriate to re-stock with broadleaves. Manage for sustainable supplies of high quality hard timber from mature woodlands such as Savernake. Opportunities to increase timber production should not be to the detriment of valued open landscapes, heritage assets and nature conservation interests, or on areas of productive and versatile agricultural soils.	**Timber provision** **Biodiversity** **Sense of place / inspiration**

[28] *North Wessex Downs AONB Woodland Strategy* (2005), Land and Landscape Management Ltd

Service	Assets/ attributes: main contributors to service	State	Main beneficiary	Analysis	Opportunities	Principal services offered by opportunities
Water availability	Aquifer Chalk Swallow holes Soils Watercourses	The NCA is comprised of Chalk and Upper Greensand which functions as a major aquifer. The majority of the aquifer is unconfined. Re-charge of the aquifer is facilitated by freely draining and often shallow soils found across nearly three-quarters of the NCA. Swallow holes across the area also enable rapid filtration of water into the aquifer. In the Kennet and Pang catchment, which covers the majority of the NCA but also land outside to the east, the greatest volumes are taken for public water supply and also agriculture. Abstraction points are largely drawing from groundwater rather than surface water and points are associated with settlement but also agricultural land. **Continued on next page...**	Regional	Groundwater levels depend upon recharge of the aquifer, percolation and volume of water abstracted. Aquifer recharge in the majority of the catchment is significantly aided by numerous swallow holes which allow rapid percolation of large amounts of water[29]. The majority of soils in the NCA are valuable for aquifer re-charge because they are freely draining. However, the maintenance of good structural conditions in these soils is important to aid water infiltration. In 2008, abstraction for public water supply at Axford was reduced to address flow impacts upon the River Kennet SSSI[30]. Similarly, Blewbury pumping station was closed to address	Across the unconfined aquifer and particularly around swallow holes, the land and soils should be managed to assist infiltration and avoid contamination. Encourage water storage reservoirs. Work across the catchment to encourage water efficiency on farms, alongside other resource protection measures. Current water demands and supply required for new development should be managed and planned to secure sustainable water consumption which protects water-dependent biodiversity and respects fisheries interests. In partnership with the Environment Agency and water companies, encourage take-up of water resource management measures in relation to public water supply and agricultural uses, for example, winter storage reservoirs, water metering and best practice irrigation.	**Water availability** **Regulating water flow** **Regulating water quality** **Recreation** **Biodiversity** **Food provision** **Geodiversity**

[29] *Groundwater Quality Review – Kennet Valley Chalk (2005),* Environmental Simulations International Ltd (on behalf of Environment Agency)

[30] *Kennet and Pang Catchment Abstraction Management Strategy (2004),* Environment Agency; *Hampshire Avon Catchment Abstraction Management Strategy (2006),* Environment Agency; *Kennet and Pang Catchment Abstraction Management Strategy (2004),* Environment Agency

Service	Assets/ attributes: main contributors to service	State	Main beneficiary	Analysis	Opportunities	Principal services offered by opportunities
Water availability cont		**... continued from previous page** Most abstractions are used and discharged locally. However, 70 per cent of the volume abstracted from Axford leaves the Kennet catchment to supply Swindon and natural groundwater flow around Streatley in the east exports water out of the NCA directly into the Thames. Groundwater and surface water resources are over-abstracted or over-licensed. This is despite recharge of the aquifer being higher than abstraction in the Kennet valley. Some abstractors have storage facilities. Water storage is also provided by flood plain habitats including flood meadows. The Kennet and Avon Canal draws water from the River Dun and River Kennet, affecting volumes in the rivers[31]. **Continued on next page...**		concerns about Mill Brook[32] and Compton pumping station closed to improve flows in the Pang. The West Berkshire Groundwater Protection Scheme is a system of boreholes designed to supplement river flows and alleviate groundwater flooding when in operation. Fish farms account for many licensed abstractions, but being non-consumptive, water is returned downstream. Other users include stables and general agriculture. There are extensive areas of water-dependent habitat including the River Kennet and Lambourn Floodplain SAC, River Lambourn SAC, River Avon SAC and Kennet Valley Alderwoods SAC. Chalk streams are groundwater-fed and their flows are therefore vulnerable to abstraction. Upper reaches of chalk streams, including the perennial head of the Kennet, have been lost[33].	Maximise water storage opportunities through restoring and managing flood meadows, particularly where there are benefits to biodiversity and the protection and restoration of heritage assets. Work at a catchment scale to address and integrate the flow requirements of the chalk streams and the Kennet and Avon Canal.	

[31] *North Wessex Downs AONB State of the Environment Report (2012),* North Wessex Downs AONB
[32] *The Vale of White Horse Catchment Abstraction Management Strategy (2006),* Environment Agency
[33] *Passing of a River*, G Maurice (undated)

Service	Assets/ attributes: main contributors to service	State	Main beneficiary	Analysis	Opportunities	Principal services offered by opportunities
Water availability cont		**... continued from previous page** Chalk streams have historically suffered low flows exacerbated by abstraction, for example the rivers Bourne[34], Kennet. The River Kennet is the largest tributary of the Thames and in summer months contributes up to half its flow.		Winter flooding of the undeveloped flood plains in this area is a regular occurrence and historically led to the creation of managed flood meadows or 'floating meadows', a strongly characteristic feature of chalk rivers, providing a large area to store water. There are significant fisheries interests associated with the chalk rivers and canal which require flows to support healthy fish populations. Flow conditions cater for the salmonid spawning grounds in some of the chalk stream headwaters. The River Bourne is one of the most important lamprey habitats in the Avon catchment.		

[34] *Hampshire Avon Catchment Abstraction Management Strategy (2006),* Environment Agency

Service	Assets/ attributes: main contributors to service	State	Main beneficiary	Analysis	Opportunities	Principal services offered by opportunities
Genetic diversity	Orchards Wiltshire Horn sheep breed	Fruit is grown in the few remaining orchards of the Vale of Pewsey. Historically, Wiltshire Horn was a breed of sheep associated with the Downs but there are no local breeds currently established.	Local	Orchards in the Vale of Pewsey have a long history and so may contain valuable varieties. Wiltshire Horn was once the dominant breed across the downs at a time when the wool industry was thriving. Such a breed is suitable for the conservation grazing of species rich chalk downland and may prove resilient in dry conditions expected from climate change.	Restore traditional orchards in the Vale of Pewsey to preserve genetic stock and use to replant or create new orchards, potentially through community initiatives. Encourage Wiltshire Horn flocks, particularly where this would strengthen sense of place and conserve species rich chalk grassland.	**Genetic diversity** **Sense of place / inspiration**
Biomass energy	Woodland Short rotation coppice	There is approximately 9 per cent woodland cover, with further cover provided by small farm woods and shelterbelts. Much of the woodland resource is unmanaged. Current miscanthus and short rotation coppice cover is not known.	Local	With many woods unmanaged, wood fuel is not being harvested and future viability is declining. In many woods, the timber quality is poor and so wood fuel may be a suitable alternative product. While biomass crops would not appropriate on the open rolling chalk downland, it may be possible to accommodate short rotation coppice in the valleys and in the more wooded areas to the south and east. **Continued on next page...**	Where timber quality is poor in existing woodlands, harvest the wood for biomass and regenerate the woodland so that its productivity and biodiversity is enhanced. Encourage local wood fuel markets and community-based schemes where this brings woods into sustainable management. At the farm-scale, develop biomass use on the farm and, where possible, harvest farm woods. Where woodland cover is a feature, such as the Vale of Pewsey, plant new woods to deliver biomass and other ecosystem services such as biodiversity and sense of place.	**Biomass energy** **Timber provision** **Sense of place / inspiration** **Biodiversity**

Service	Assets/ attributes: main contributors to service	State	Main beneficiary	Analysis	Opportunities	Principal services offered by opportunities
Biomass energy cont				**... continued on next page** The potential yield for miscanthus is considered as predominately medium across the area, although larger areas of high potential exist locally on the lower slopes and in the Vale of Pewsey . Water demands of biomass crops need to be sustainable, particularly where watercourses are already suffering from low flows.	Opportunities to increase biomass production should not be to the detriment of valued open landscapes, heritage assets and nature conservation interests, or on areas of productive and versatile agricultural soils. Unsustainable demands upon water resources should also not be introduced.	

[35] *DEFRA yield maps*

Service	Assets/ attributes: main contributors to service	State	Main beneficiary	Analysis	Opportunities	Principal services offered by opportunities
Climate regulation	Wetland habitats Wetland soils Permanent grassland Woodland	There are very small areas of soils with potentially 20 to 50 per cent carbon content towards the east of the NCA, mainly associated with flood plain areas. Soil carbon content is predominantly low at 5 per cent or less. Carbon storage capacity is maximised across those areas subject to minimum soil disturbance, principally historical downland pasture, ancient woodland and historical flood plain habitats. Carbon sequestration and storage in trees is restricted due to only localised woodland cover (approximately 9 per cent of the NCA, with additional cover provided by numerous small farm woods and shelterbelts).	Local	Soil carbon stores are limited due to the predominance of mineral soils which store limited carbon. Arable farming of such soils will further reduce their carbon content and arable farming dominates across the high Downs. Relict patches of historical pasture represent the best carbon stores across such soils. The small areas of undisturbed wetland soils in the flood plains have good carbon storage potential, particularly those with peat components. However, lowering of water tables, drought and low river flows leading to reduced flooding may result in desiccation, oxidisation and subsequent loss of carbon content. Due to low levels of woodland cover and lack of management, the contribution that woodlands can make to carbon sequestration is limited. However, woodland along chalk streams will cast shade and so help mitigate high water temperatures.	Manage soils to maximise carbon storage capacity through incorporating organic matter, arable reversion to permanent grassland and reduced cultivation frequency. Conserve undisturbed soils and particularly peat soils, including those under permanent pasture, wetland habitats and ancient woodland. Restore and create new wetland areas to benefit biodiversity, sense of place, water availability and also carbon sequestration. Manage woodlands along chalk streams to provide sheltered corridors.	**Climate regulation** **Regulating soil erosion** **Regulating water quality** **Regulating water flow** **Biodiversity**

Service	Assets/attributes: main contributors to service	State	Main beneficiary	Analysis	Opportunities	Principal services offered by opportunities
Regulating water quality	Chalk aquifer Swallow holes Soils Hedgerows, woodlands and grassland buffers Reedbeds and wet woodland	The chalk aquifer removes pollutants from water percolating through the rock. This removal is most effective during slow percolation and least effective via swallow holes. Groundwater in this NCA has suffered from high nitrate concentrations. The rivers in the Kennet and Pang catchment are chemically of high quality. The Rivers Kennet and Lambourn (both SSSI and within an SAC) are subject to pollution from soil erosion. The Bourne suffers from high nitrate levels[36]. Patches of low input land uses, including semi-natural habitats, expose groundwater and surface waters to minimal or no chemical pollution. These habitats are scattered across the NCA. **Continued on next page...**	National	Organic and inorganic pollutants are found throughout the aquifer, usually at low concentrations[37]. However, there are consistently high nitrate concentrations and trends in several boreholes in the most vulnerable areas show that concentrations are rising. The entire NCA is within a Nitrate Vulnerable Zone due to the presence of a major aquifer. Across the unconfined aquifer, soils are predominantly thin and have high leaching potential, making the aquifer vulnerable to pollution. Numerous swallow holes further increase the vulnerability of the aquifer and make widespread and long-lasting pollution possible. The presence of nitrate is attributable to diffuse pollution such as agricultural fertilizer use and in some cases to urban pollution including sewerage. Sewage has been known to affect the upper reaches of the Pang, for example, where the channel is often dry and/or in low flow. There is a major sewage treatment works at Marlborough. Discharges also originate from fish farms, mineral workings and agriculture. In a rural catchment, a great number of discharges are from private dwellings where there is no mains foul sewer.	Adopt farming systems which minimise pollution risk such as precision farming and low input farming. Farmers and others work at a whole farm and at a catchment scale to maximise and strategically locate land cover which slows and filters run-off and reduces soil erosion, for example, arable reversion, hedgerow restoration and reinstatement, and introducing grassland strips and reedbeds where appropriate. Work with water companies to indentify innovative and sustainable solutions to waste water treatment from domestic sources in rural areas.	**Regulating water quality** **Food provision** **Regulating soil erosion** **Regulating soil quality** **Regulating water flow** **Biodiversity** **Geodiversity**

[36] DEFRA Priority Catchments - http://archive.defra.gov.uk/foodfarm/landmanage/water/csf/documents/catchment-priorities.pdf

[37] Groundwater Quality Review – Kennet Valley Chalk (2005), Environmental Simulations International Ltd (on behalf of Environment Agency)

Service	Assets/attributes: main contributors to service	State	Main beneficiary	Analysis	Opportunities	Principal services offered by opportunities
Regulating water quality cont		**... continued from previous page** Reedbeds are present in some areas, such as the Kennet valley. They may function to filter sediments in run-off. Other features in the farmed landscape can intercept pollutants in run-off, including hedgerows, field margins, and waterside buffers.		Sources of sediment pollution in the River Kennet have been linked to land use practices but also to tracks and roads and numerous tributary streams. Water quality issues in the River Kennet have also been linked to the Kennet and Avon Canal[38]. The rivers Kennet and Lambourn (both SSSI and within an SAC) have been identified as priority catchments by Defra. Pollution has been linked to arable fields of maize and late-planted cereals within the catchments as well as unrestricted livestock access to river banks[39] and areas of free range pig farming on valley sides. The Bourne is also a priority catchment. Farmers have been implementing measures to reduce pollution, sometimes with grant support under Catchment Sensitive Farming schemes. Measures include grassland buffers and fencing along watercourses, sediment traps, routeway and farm infrastructure improvements.		

[38] River Basin Management Plan - Thames River Basin District (2009), Environment Agency

[39] DEFRA Priority Catchments - http://archive.defra.gov.uk/foodfarm/landmanage/water/csf/documents/catchment-priorities.pdf

Service	Assets/attributes: main contributors to service	State	Main beneficiary	Analysis	Opportunities	Principal services offered by opportunities
Regulating water flow	Groundwater Springs Watercourses Riparian woodland Wooded and vegetated slopes Permanent pasture Calcareous and/ or well structured soils Water storage features Canal	Low flows affect the groundwater-fed chalk streams and other water-dependent habitats, including European designated sites and flood meadows. Variable water levels and flows are a natural feature of groundwater-dependent watercourses and springs but low flows in the upper reaches of the Kennet, Pang and Bourne have been a concern. The River Lambourn has a near-natural flow regime[40]. Springs issue at the foot of escarpments. Along the northern escarpment, the most numerous springs emit from Upper Greensand west of Letcombe Basset while the largest arise in the Lower Chalk east of Letcombe Basset[41]. In the south, springs arise from the Upper Greensand. The River Kennet is the largest tributary of the Thames and in summer months contributes up to half its flow. **Continued on next page...**	National	There are water-dependent SAC focused around the rivers Kennet, Lambourn and Avon as well as several water-dependent SSSI. The Kennet and its tributaries are chalk rivers with base flows dependent upon groundwater. Low flows, loss of springs and migration downstream of perennial heads have historically been observed and are associated with negative impacts on biodiversity. In the flood plain, wet meadows, fens and marshes are affected by reduced water availability, low river flows, reduced seasonal flooding and loss of the ability to manipulate water levels in flood meadows. Reduced water availability and hence flows are likely to be exacerbated by climate change and by increased water demand associated with population growth. Groundwater flooding has been known, for example in Compton. The West Berkshire Groundwater Protection Scheme has the potential to mitigate against groundwater flooding. Localised surface water flooding is most likely in the floodplains where soils and vegetation are not being managed to facilitate infiltration and slow run-off, and where flow is impeded by development. The principal settlements of Hungerford and Marlborough are on the Kennet.	Continue to monitor and manage for appropriate water regimes of key water-dependent features including chalk stream SAC. At a catchment scale, manage features in the landscape to store water, assist infiltration to the aquifer and manage flows during rainfall and flood events. In particular, seek to conserve and restore ancient landscape features such as watermeadow systems which offer additional benefits relating to biodiversity and sense of place and history. Work at a catchment scale to address and integrate the flow requirements of the chalk streams and the Kennet and Avon Canal. When appropriate, manage groundwater flooding using the West Berkshire Groundwater Protection Scheme. Seek benefits for biodiversity and water supply.	**Regulating water flow** **Water availability** **Biodiversity** **Recreation** **Sense of place / inspiration** **Sense of history**

[40] *North Wessex Downs AONB State of the Environment Report* (2012), North Wessex Downs AONB

[41] Groundwater Quality Review – Kennet Valley Chalk (2005), Environmental Simulations International Ltd (on behalf of Environment Agency)

Service	Assets/attributes: main contributors to service	State	Main beneficiary	Analysis	Opportunities	Principal services offered by opportunities
Regulating water flow cont		**...continued from previous page** Scattered areas of rough grassland strips, hedgerows and woodlands act to slow run-off and assist infiltration to the aquifer. Features in the flood plain including ditches and meadows help store water during flood events. Overland flow after rainfall events will be relatively low across well structured calcareous soils. This contrasts with clay-based soils in the floodplains which facilitate run-off, particularly when compacted. There is limited localised risk of flooding from the River Kennet. As demonstrated in 2001 in Compton, groundwater flooding is possible in this NCA. Groundwater flows vary across the NCA. A groundwater divide lies along the top of the escarpment overlooking the Vale of White Horse. Groundwater in the Bourne catchment flows towards the Test outside the NCA. **Continued on next page...**				

Service	Assets/attributes: main contributors to service	State	Main beneficiary	Analysis	Opportunities	Principal services offered by opportunities
Regulating water flow cont		**...continued from previous page** Groundwater flows vary across the NCA. A groundwater divide lies along the top of the escarpment overlooking the Vale of White Horse. Groundwater in the Bourne catchment flows towards the Test outside the NCA. The Kennet and Avon Canal brings water in from the Bristol Avon catchment but also draws from the River Dun and River Kennet, modifying their flows. The canal leaks water to the south into the Hampshire Avon catchment.				

Service	Assets/ attributes: main contributors to service	State	Main beneficiary	Analysis	Opportunities	Principal services offered by opportunities
Regulating soil quality	Lime-rich soils Freely-draining soils Soils under permanent pasture and ancient woodland	There are 7 main soilscape types in this NCA. Shallow lime-rich soils over chalk dominate, covering approximately 40 per cent of the NCA. The other principal types each cover around 15 per cent and are; freely draining lime-rich loamy soils; slightly acid loamy and clayey soils with impeded drainage; and freely draining slightly acid loamy soils. Patches of undisturbed soils under permanent pasture and ancient woodland potentially conserve unmodified soil structures and fertility. Prime agricultural soils of Grade 1 are found across nearly 4,500 ha and largely in the Vale of Pewsey. Grade 2 soils cover the northern plateau and total 31 per cent, approximately 35,000 ha, of the NCA. A further 57 per cent of the NCA is Grade 3.	Regional	The attributes of calcareous soils make them suitable for growing crops but they are often shallow, prone to drought and vulnerable to erosion particularly on steep slopes. Such soils include shallow lime-rich soils over chalk (approximately 41 per cent of the NCA) and freely draining lime-rich loamy soils (17 per cent). Across the high Downs, some areas have a long history of cultivation and crop yields are driven by chemical inputs. The structure of all soils is vulnerable to damage which reduces quality. The slightly acid loamy and clayey soils with impeded drainage are easily poached by livestock and compacted by machinery when the soil is wet. The underlying aquifer makes overlying soil structure and soil contaminants significant in terms of water filtration.	Conserve and maximise the resource, aiming to avoid deterioration of soil quality, particularly those with high agricultural land classification grades and calcareous soils. To benefit soils, water quality and biodiversity, maximise areas under permanent low input species-rich grassland and ancient woodland and particularly areas not well suited to cultivation, for example soils with naturally low fertility and steeply sloping fields. Increasing organic matter can improve soil structure. Adopt farming practices which conserve soil structure and minimise damage to heritage assets and buried archaeology, such as minimising vehicle and livestock movements when wet and adopting minimum tillage regimes. Highlight aquifer recharge benefits delivered by soil conservation.	**Regulating soil quality** **Regulating soil erosion** **Water availability** **Regulating water quality** **Regulating water flow** **Food provision** **Biodiversity** **Geodiversity**

Service	Assets/ attributes: main contributors to service	State	Main beneficiary	Analysis	Opportunities	Principal services offered by opportunities
Regulating soil erosion	Soils Uncultivated soils under ancient woodland and permanent pasture Hedgerows and buffer strips	Undulating landform and steep slopes make soils vulnerable to erosion, particularly if cultivated or unvegetated. The vast majority of soils across the NCA (96 per cent) are at risk of erosion. The shallow lime-rich soils over chalk (41 per cent of the NCA area) are sometimes unstable and prone to loss through erosion. Coarse textured cultivated variants of the freely draining slightly acid loamy soils (16 per cent of the area) are susceptible to wind erosion. Many of the slightly acid loamy and clayey soils with impeded drainage (17 per cent of the area) and some of the freely draining slightly acid but base-rich soils (5 per cent) are prone to capping, leading to increased risk of erosion. Woodlands regulate soil erosion on slopes where they lie on some parts of the escarpment and on valley sides down the dip slope. Hedgerows can also impede loss of soil and the grass baulks on the open Downs will serve a similar function.	National	There are significant areas of sloping land and thin soils made vulnerable to erosion by cultivation. Areas of grassland on the scarp and on steep valley sides protect thin chalk soils from erosion. There is a high risk of soil erosion on the high Downs due to a combination of factors: thin soils; chalk soils; large areas under cultivation; exposure to the elements; lack of intervening boundaries and woodlands to impede soil loss; and sloping ground. In the Kennet and Lambourn valleys, sediment sources have been traced to; arable fields growing maize and late-planted crops; river banks disturbed by livestock ; and areas of free range pig farming on valley sides. Unfavourable condition of the River Lambourn SSSI has been linked to sediment pollution.	Manage cultivated land to reduce risks of soil erosion, including contour ploughing, careful timing of cultivations and maintenance of vegetation cover. Incorporate features such as grassland strips into the arable landscape that; conserve soils; provide ecological connectivity; provide wildlife habitat; filter pollutants in run-off; and increase carbon sequestration. Avoid introducing new hedgerows across the high Downs to serve this purpose where there will be a negative impact upon the open landscape. Secure arable reversion to grassland on steep slopes and other high risk areas, especially where it will extend existing species rich grassland and conserve heritage assets such as scheduled monuments. Work at a catchment scale to tackle sediment pollution of watercourses, particularly where sediment is a recognised problem.	**Regulating soil erosion** **Regulating soil quality** **Regulating water quality** **Food provision** **Biodiversity**

Service	Assets/ attributes: main contributors to service	State	Main beneficiary	Analysis	Opportunities	Principal services offered by opportunities
Pollination	Species-rich grassland Hedgerows Woodland edge Orchards	The NCA has approximately 1,400 ha of semi-natural flower-rich chalk grassland and heathland, which provides an important source of nectar for pollinating insects. Other flower-rich habitats such as hedgerows and woodlands are scattered across the NCA and also serve pollinators. Remnant orchards are found in the Vale of Pewsey.	Local	Crops such as oilseed rape and orchard trees require insect pollination. Pollination of wild plants is also important to the conservation of species-rich habitats including chalk grassland. Neighbouring Salisbury Plain and West Wiltshire Downs NCA has a healthy bumblebee population.	Maintain pollinator habitat and, where possible, create new pollinator habitat which strengthens the habitat network for pollinators and delivers other ecosystem services. Develop bumblebee habitat to support and extend the populations in neighbouring Salisbury Plain and West Wiltshire Downs NCA. Should there be interest in growing crops which require insect pollination, opportunities to create pollinator habitat such as chalk grassland should be pursued in tandem. Maintain and restore traditional orchards in the Vale of Pewsey.	**Pollination** **Food provision** **Biodiversity** **Sense of place / inspiration**

Service	Assets/ attributes: main contributors to service	State	Main beneficiary	Analysis	Opportunities	Principal services offered by opportunities
Pest regulation	Mixed broadleaved woodlands Beetle banks Field corners and margins	Squirrel and deer damage is impacting woodlands. Signal crayfish is present in the area. Large blocks of single crops are farmed across extensive areas of arable downland. Features such as beetle banks, field corners and grassland margins may support predators of pests in nearby crops.	Local	Good practice soil management which incorporates break crops and fallow periods may increase the numbers of predators present and help regulate pests. Pest regulation is poor across large-scale homogeneous arable landscapes such as those found across the high Downs. In contrast, woodlands of mixed tree species and areas of mixed agriculture are more resilient to pests and diseases. The variety of aspects and altitudes across the Downs offers micro-climates which may be less favourable to spread of pests. Deer management takes place across large areas in some places.	Establish pest and disease management strategies. Support co-ordinated deer management at a landscape-scale, encouraging these networks to work together to address other landscape-scale opportunities, for example timber provision, ecological networks. Maintain heterogeneity of land use, features and management practices in order to support various natural predators of pests and to guard against simple, rapid pathways that might assist spread of disease and pests Incorporate beetle banks, field corners and field margins into the arable landscape to encourage predators to aid the regulation of pests, conserve natural resources and provide biodiversity benefits.	**Pest regulation** **Timber provision** **Food provision** **Regulating soil erosion** **Biodiversity**

Service	Assets/ attributes: main contributors to service	State	Main beneficiary	Analysis	Opportunities	Principal services offered by opportunities
A sense of place/ inspiration	Panoramic views Beech clumps, hangers Escarpment Chalk streams Open downland Settled and more wooded valley bottoms and vales Sarsen stones Avebury stone circle and associated ancient sites Numerous scheduled monuments The Ridgeway Chalk-cut horse figures Large arable fields Horse gallops and stables Historic buildings	The natural beauty and special scenic qualities of the area are reflected in designation as an Area of Outstanding Natural Beauty. The designation of this landscape reflects a strong scenic and landscape character and attracts resources towards its conservation. Landform is prominent due to limited woodland cover and dramatic escarpments towering over low-lying vales. Features which punctuate the open landscape create landmarks or accents and include beech clumps, the Ridgeway, sarsen stones, horse gallops, earth monuments and chalk-cut horse figures. With 442 scheduled monuments, many forming part of the Avebury World Heritage Site, the historic environment is evident and has inspired legends and artistic works. Beyond the open downland, intimacy is provided in valley bottoms and where woodlands are scattered. Chalk streams and springs are associated with settlements. Some ancient routeways remain in use. **Continued on next page...**	National	The quantity of Scheduled Monuments is considerable and collectively these historic features catalogue centuries of human activity. Many of the historic monuments are the product of past attempts to create distinctive places and landmarks, including chalk-cut horse figures. The ancient Uffington White Horse has inspired subsequent carvings. Far-reaching views can be enjoyed by the public from the Ridgeway, for example, while the Downs make a prominent backdrop to views from the surrounding vales. Many significant sites are visually and/or physically accessible to the public, including Avebury which attracts numerous visitors a year and striking landforms on the escarpment that are designated open access land.	Work with the AONB to conserve and enhance the landscape and the special qualities of the AONB. Work with various stakeholders to identify features that contribute significantly to sense of place. Seek to conserve these features, particularly where it conserves the landscape and special qualities of the AONB. Identify key features in poor or deteriorating condition or vulnerable to climate change, and prioritise their conservation, for example Scheduled Monuments on the At Risk Register. Protect and enhance the Avebury World Heritage Site and its attributes of Outstanding Universal Value for their contribution to sense of place and inspiration as well as historic value. Conserve historic buildings and, through the	**Sense of place / inspiration** **Recreation** **Biodiversity** **Sense of history** **Geodiversity**

Service	Assets/ attributes: main contributors to service	State	Main beneficiary	Analysis	Opportunities	Principal services offered by opportunities
A sense of place/ inspiration cont		**... continued from previous page** Large fields, prehistoric monuments and limited modern development give the open landscape of the high Downs a remote and ancient character. The Downs have long been associated with racehorse training. T he white-railed gallops and large stables and studs are a feature of the area. The area is second to Newmarket in terms of horse racing industry activity, with Lambourn known as the 'valley of the racehorse'[42] . Chalk streams are a valued fishing resource and pass through settlements. The area is famous for trout fishing.		The visitor experience can be awe-inspiring and dramatic at places such as Avebury and in the Vale of Pewsey where the stone henges are huge and at Fyfield Down NNR where sarsen stones lie in positions determined in the Quaternary. Education and interpretation of some features is lacking in some areas. Numerous legends and uncertainties surrounding the origins and purpose of features such as Avebury and Silbury Hill have intrigued people throughout history. Distinguished historians, archaeologists and antiquarians have produced work relating to Avebury and surrounding monuments, including William Stukeley and Sir Richard Cold Hoare. Writers inspired by this landscape include Thomas Hardy, Richard Jeffries, Edward Thomas, Kenneth Graham and Charles Hamilton Sorley. Equine artists have been attracted to the area, such as Sue Wingate, as well as generations of historians and artists intrigued by Avebury including Paul Nash. **Continued on next page...**	planning system, secure new development which reflects traditional construction and settlement pattern. Draw on best practice developed in the AONB. Work with farmers and the horse racing industry to ensure they positively contribute to landscape character. Engage local communities in celebrating, learning about and conserving valued features and their associated ecosystem services. Secure improved access to key landscape features.	

[42] A study of key effects of the horseracing industry on the North Wessex Downs AONB (2007), Reading University and Smiths Gore

Service	Assets/ attributes: main contributors to service	State	Main beneficiary	Analysis	Opportunities	Principal services offered by opportunities
A sense of place/ inspiration cont				**... continued from previous page** The significance of chalk streams to sense of place is apparent from the community action inspired by the threat of their loss - 'Action for the River Kennet was established in 1990. The AONB designation promotes and conserves this area as a distinctive landscape, raising awareness amongst the public and managers of key features. Development in the past century has negatively impacted local distinctiveness in some places.		

Service	Assets/ attributes: main contributors to service	State	Main beneficiary	Analysis	Opportunities	Principal services offered by opportunities
Sense of history	Scheduled monuments Avebury stone circle and associated sites Ridgeway Ancient routeways Periglacial landforms and sarsen stone trains	Sense of history is strong in this NCA and includes distinctive prehistoric features. Avebury and associated sites have been recognised as a World Heritage Site. It presents an extensive and well-known historical landscape. There are numerous scheduled monuments (442), with a significant number at high or medium risk of damage or destruction. Rare causewayed enclosure monuments date back to the Early Neolithic. Features vary in terms of scale, presence and significance. There is evidence of man's activity from the early Neolithic through the ages to the Second World War. Historic downland pasture is reduced to fragments on the scarp. Opportunities to experience key historic landscapes and features are provided by the Ridgeway, open access land and National Trust land. The Ridgeway is an ancient, well known track. Historic buildings and traditional building materials feature in the built environment. **Continued on next page...**	National	This is a visibly ancient landscape, with numerous scheduled monuments and an extensive World Heritage Site (just over 25 km2). Some features are large, including Silbury Hill which is the largest man-made mound in Europe and the Wansdyke. With many scheduled monuments present in the now arable landscape of the former downlands, there are risks of damage associated with cultivation. There is limited public access to many assets and sites. Pagan observances and international interest in key monuments generates exceptional visitor pressures to a number of key sites including Avebury, West Kennet barrow, Silbury Hill, Wayland's Smithy, Uffington Castle and the Uffington White Horse. However, there are key features under grass and arable reversion has been undertaken in the World Heritage Site. The Ridgeway is a key historic access resource, linking some of the most notable sites in the NCA. The Ridgeway can come under pressure and suffer erosion and	Engage communities and owners of historic features in celebrating and conserving the historic environment, including developing skills and industry around historic environment conservation and traditional building materials and construction. Seek arable reversion where scheduled monuments are at risk, securing additional biodiversity, public access and soil conservation benefits if possible. Where cultivation is necessary, adopt farming practices such as minimum tillage which limit damage to historic features. Improve the setting of key historic features, where possible improving public access through the landscape and incorporating species-rich grassland.	**Sense of history** **Sense of place / inspiration** **Regulating soil quality** **Regulating soil erosion** **Recreation** **Biodiversity**

Service	Assets/ attributes: main contributors to service	State	Main beneficiary	Analysis	Opportunities	Principal services offered by opportunities
Sense of history cont		**... continued from previous page** Periglacial landforms and undisturbed sarsen stone trains are distinct and relic landscapes that make tangible the time of the Quaternary glaciations.		damage as a result of the many and varied users. The history of the landscape is further evident in the irregular field patterns of the valleys, and the traditional buildings and building materials of thatch, red brick and weatherboard characteristic of the older buildings in the valleys, sometimes with knapped flint and weathered chalk in their walls. Dating as far back as the Quaternary, the periglacial landforms and sarsen stones that are so distinctive of the area generate a deep time-depth.		

Service	Assets/ attributes: main contributors to service	State	Main beneficiary	Analysis	Opportunities	Principal services offered by opportunities
Tranquillity	Sparsely settled downland Scarp Ancient woodland	This NCA offers highly tranquil spaces associated with the open, sparsely-settled chalk downland and the ancient woodland of Savernake Forest. The M4 and A34 corridors pass through what would be otherwise tranquil areas. Disturbance caused by off-road vehicles has been identified along the Ridgeway and other routes.	Regional	Highly tranquil spaces contrast with the neighbouring major urban centres of Swindon and Reading and the M4. Tranquillity is further enhanced by the associations with many ancient sites and monuments although visitors to the most popular sites and features can intrude on tranquillity. Noise from motorised vehicles using byways can negatively impact upon the experiences of other user groups. The Ridgeway and areas of open access land provide public access to highly tranquil places. Low trafficked lanes provide valued routes for cyclists. The level of tranquillity within the NCA has dropped significantly, from 90 per cent of the area being classified as undisturbed in the 1960s to 55 per cent in 2007. Construction of major routes cutting through the NCA including the M4 and expansion of settlements such as Swindon have led to rural areas becoming 'urbanised' and subject to noise pollution, development, and light pollution.	Further erosion of tranquillity should be avoided by ensuring development in areas of high to medium tranquillity is appropriate. Seek to manage visitor numbers to the most popular sites to limit their impact on tranquillity. Encourage dispersal of visitors away from 'honeypot' sites by promoting alternative destinations which are resilient to visitor pressure. Promote appropriate recreational behaviour through visitor information and education. Work with off-road clubs to reduce potential negative impacts of their activities.	**Tranquillity** **Sense of place / inspiration** **Sense of history**

Service	Assets/ attributes: main contributors to service	State	Main beneficiary	Analysis	Opportunities	Principal services offered by opportunities
Recreation	Rights of way Open access land Ridgeway National Trail Kennet and Avon Canal National cycle routes and regional promoted routes Woodlands	Recreation opportunities are provided by just less than 2,000 km of rights of way as well as almost 2,000 ha of open access land (2 per cent of the NCA). The Ridgeway National Trail and Kennet and Avon Canal towpath pass through the NCA, with further promoted routes such as the Lambourn Valley Way. There are cycle and horse riding routes including the Three Downs Link. The rivers and canal are important coarse and game fisheries, with numerous angling clubs. Accessible woodlands cover a further 2,298 ha, with Savernake Forest being an important greenspace in private ownership. Greenspace made accessible by the National Trust, Natural England and others provides important additional recreation opportunities.	Local	Due to significant historic losses of downland pasture to arable, there are limited areas of open access land and also limited rights of way across the downs. Land ownership involving large estates and a small local population has further limited the development of public access routes. Compared to other AONB and National Parks in the south-east, the North Wessex Downs has the smallest percentage of accessible natural greenspace at just 4 per cent of its area. Promoted routes including the Ridgeway provide access to key landscape features, which encompass extensive views and links to key historic features. Permissive or informal access routes and areas will be significant in areas where public access is limited. The Ridgeway and canal towpath are high profile multi-user routes. The River Kennet has suffered negative effects of recreational boating. The large number of multi-user routes gives rise to the potential for conflict between different user groups. Motorised vehicles are particularly associated with erosion and noise that can impact negatively on the experience of other user groups. Public access along riverbanks is restricted by private fishing interests. If recreational use of the larger North Wessex Downs AONB is true of this NCA, the area is not well used, despite neighbouring large urban centres.	Seek improved links and additional open access land around key features and settlements where sustainable. Manage visitor pressure on fragile historic or natural features. Review visitor information, signage and facilities and ensure they meet the needs of users and are designed to be sustainable and contribute positively to landscape character. Promote appropriate recreational behaviour on the waterways to ensure conservation of chalk streams and fisheries interests.	**Recreation** **Sense of place / inspiration** **Sense of history** **Biodiversity** **Geodiversity**

Service	Assets/ attributes: main contributors to service	State	Main beneficiary	Analysis	Opportunities	Principal services offered by opportunities
Biodiversity	Chalk streams Chalk grassland Farmland birds Rare arable flora Ancient woodland Savernake Forest Lichen flora	There are six SAC in this NCA, including long stretches of chalk stream. More than 2,000 ha are designated SSSI, with Savernake Forest being the largest SSSI at approx 900 ha. Only 3 per cent (60ha approximately) of SSSI area is in unfavourable declining condition. In contrast, 66 per cent (1,500 ha approximately) of SSSI area in recovering from unfavourable condition. An additional 5 per cent of the NCA is recognised by local communities as 442 Local Wildlife Sites. Two National Nature Reserves, open access land and other accessible greenspaces provide opportunities to enjoy the area's biodiversity. Native fish populations of lamprey and wild trout are valued. This NCA supports established populations of farmland birds including skylark and tree sparrow as well as a small population of stone curlew. **Continued on next page...**	National	Among the SSSI are a range of habitats, with several sites being a matrix of different habitats. Important biodiversity is protected by SSSI designation including one of the best examples of a lichen community in north-west Europe at Fyfield Down. This NCA also supports thriving farmland bird populations in some parts, including a small population of stone curlew, as well as rare arable plants. A long history of cultivation has allowed the establishment of populations of farmland birds and mammals and also seed banks of rare arable plants. The open farmed landscape and the mosaic of habitats caters for farmland birds and species such as brown hare. Key threats to chalk grassland include encroaching scrub and inappropriate grazing/cutting (usually not enough grazing pressure). Farmland birds can suffer from lack of nesting habitat and food. Pollution, low flows and modified channels negatively impact upon the ecology of chalk streams.	Build a resilient ecological network to support biodiversity across the NCA, incorporating public access wherever possible. Conserve large areas of semi-natural habitat as core areas, such as Fyfield Down NNR and the River Lambourn SAC. Conserve and create links to address fragmentation and isolation, making use of long-established byways in particular and securing benefits for recreation and sense of tranquillity. Restore the channel of the River Kennet to support a naturally recruiting trout population. Conserve the range of farmland species, including rare arable plants, farmland birds and mammals such as brown hare. Maintain the mosaic of habitats to provide food and nesting sites in and around the field as well as in hedgerows, woodlands and other semi natural habitats on the farm. Protect soil and water resources through this management. Conserve species populations which are special to this NCA including lower plant interest and stone curlew.	**Biodiversity** **Recreation** **Sense of place / inspiration** **Tranquillity** **Regulating water quality** **Regulating soil quality**

Service	Assets/ attributes: main contributors to service	State	Main beneficiary	Analysis	Opportunities	Principal services offered by opportunities
Biodiversity cont		**... continued from previous page** Rare lower plants are associated with the trees at Savernake and the sarsen stones at Fylfield Down and are subject to SSSI designation.		Conservation efforts have benefitted a large area of SSSI habitat, largely as a result of targeted management under agri environment schemes. Other biodiversity features outside SSSI will have been targeted for conservation since the AONB has been a focus for agri environment schemes and projects such as the Farmland Bird Initiative and habitat restoration along the Kennet. Chalk streams have attracted particular local community interest, as illustrated by 'Action for the River Kennet'. A farmland bird project has also been long established in this area, working towards conservation of species such as stone curlew.	Work with local community groups to secure biodiversity benefits and other ecosystem services which are valued by them.	

Service	Assets/ attributes: main contributors to service	State	Main beneficiary	Analysis	Opportunities	Principal services offered by opportunities
Geodiversity	Sarsen stones Chalk pits Karst landforms Chalk hard grounds Chalk soils Chalk rivers and floodplains Flint River terraces	There are seven SSSI with geodiversity interest and seven Local Geological Sites. Across the Downs, there are dramatic karst landforms which are well known landmarks including the distinctive combe known as 'The Manger' and the Avebury plain. River systems are fed by groundwater and comprise several SAC. The Kennet exhibits gravel terraces on the lower dip slope. Chalk-cut figures celebrate the Chalk. There are only a few extant chalk pits including SSSI pits which reveal evidence of climatic change in the geological past. Chalk, as well as Greensand, also functions as a major aquifer. Sarsen stones are considered 'one of the most identifiable and well known aspects' of this area's geodiversity[43]. The few examples of sarsen stone 'trains' are protected as SSSI for being rare relicts of the Quaternary landscape, but more common are smaller groups or individual sarsens found in fields and moved to field edges. Sarsens also contribute to a distinctive built heritage which includes prehistoric stone circles. Other hard bedrocks including Melbourn Rock, Chalk Rock and flint are traditional building materials.	National	Landform is prominent across the open downland where concealing woodland cover is absent and there are few distracting features. The significance of the escarpment has long attracted interest, as demonstrated by the numerous chalk-cut horse figures and historic monuments along the escarpments. The properties of Chalk and an understanding of features such as swallow holes and percolation rates is important in terms of how it dictates function of the major aquifer. Chalk streams, which are valued by local communities and by nature conservation designations, are dependent upon groundwater, with their flora and fauna benefitting from water that is clear, alkaline and of a stable temperature. The geology of the area influences land use. Farmers have made use of the easily cultivated chalk soils, while the clay-with-flint soils are utilised as woodland. **Continued on next page...**	Continue to improve interpretation and public access that supports geoconservation and maintains important cultural heritage interests linked to geodiversity. Identify and secure further chalk exposures and boreholes for research and education, particularly in relation to aquifer function. Work with existing and new groups, including landowners of green spaces, to build capacity to carry out geoconservation activities and education alongside or separate from other activities. Secure benefits to geodiversity through landscape scale projects which integrate multiple landscape objectives.	**Geodiversity** **Sense of place / inspiration** **Sense of history** **Regulating soil quality** **Regulating soil erosion** **Water availability** **Regulating water quality** **Recreation** **Sense of history**

[43] Local Geodiversity Action Plan for the North Wessex Downs AONB (2007), Oxfordshire Geology Trust

Service	Assets/ attributes: main contributors to service	State	Main beneficiary	Analysis	Opportunities	Principal services offered by opportunities
Geodiversity cont				**... continued on next page** Local legends are linked to particular landforms and to sarsen stones. The Manger, for example, has several common names and stories linked to it. Over time, the majority of sarsen stones have been moved by people to enable more efficient farming and for use in building. The presence of sarsens in high densities in some locations has promoted pasture management, with Fyfield and Piggledene SSSI being examples of undisturbed sarsen 'trains' upon semi-natural grazed grassland. There are local community groups carrying out geoconservation and public engagement activities.	Engage communities and property owners in celebrating and continuing use of local building materials, including developing skills and industry around traditional building materials. The relationship between geodiversity in this area and the underlying aquifer, water quality and availability, and soils presents an opportunity to engage a wide audience in better understanding natural processes that limit available resources.	

Photo credits

Front cover: Chalk-cut horse figures and other monuments on the escarpment can be seen for miles around, providing a strong sense of place. © Natural England

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