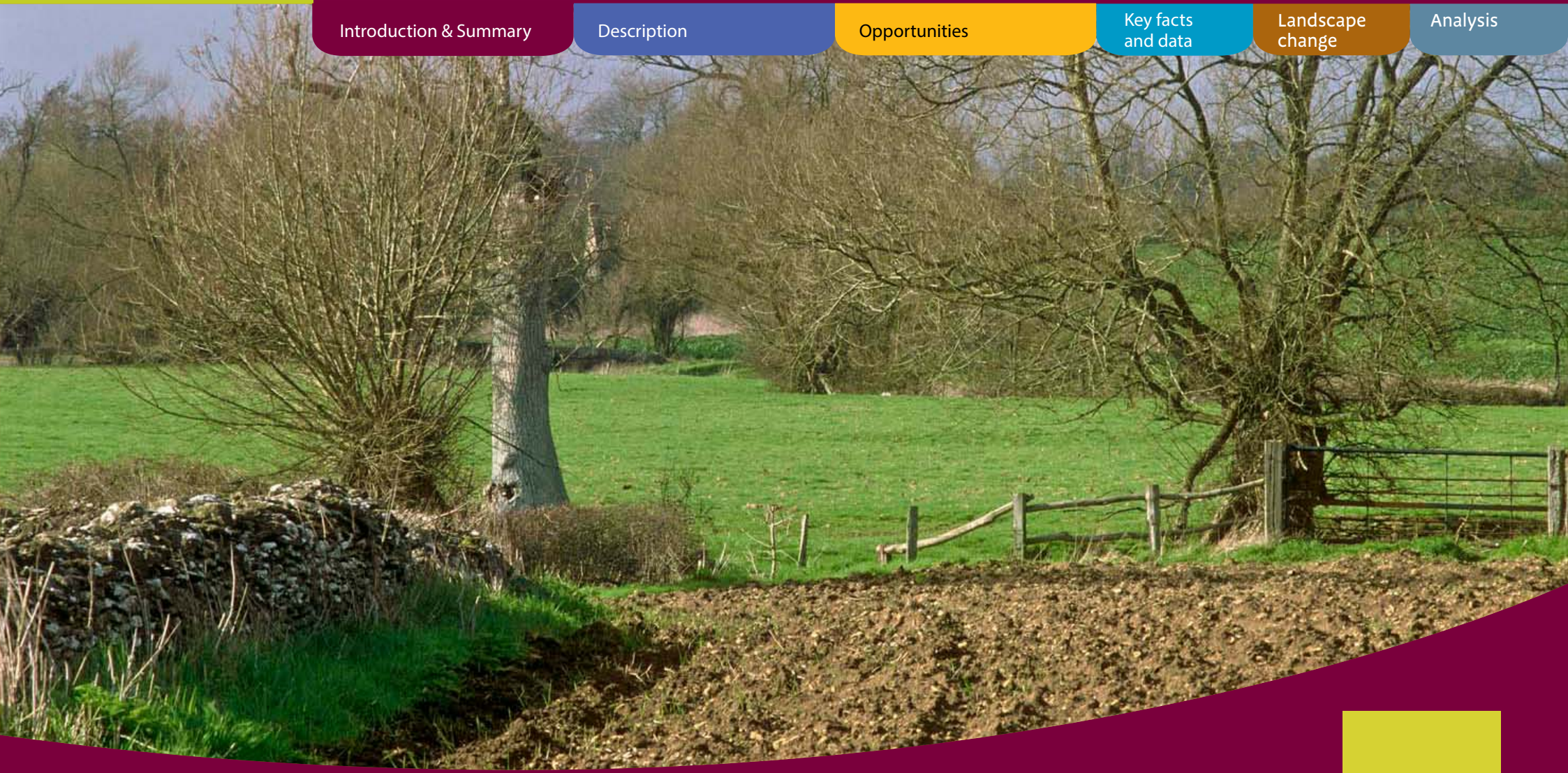
National Character Area profile:

117. Avon Vales



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Introduction

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

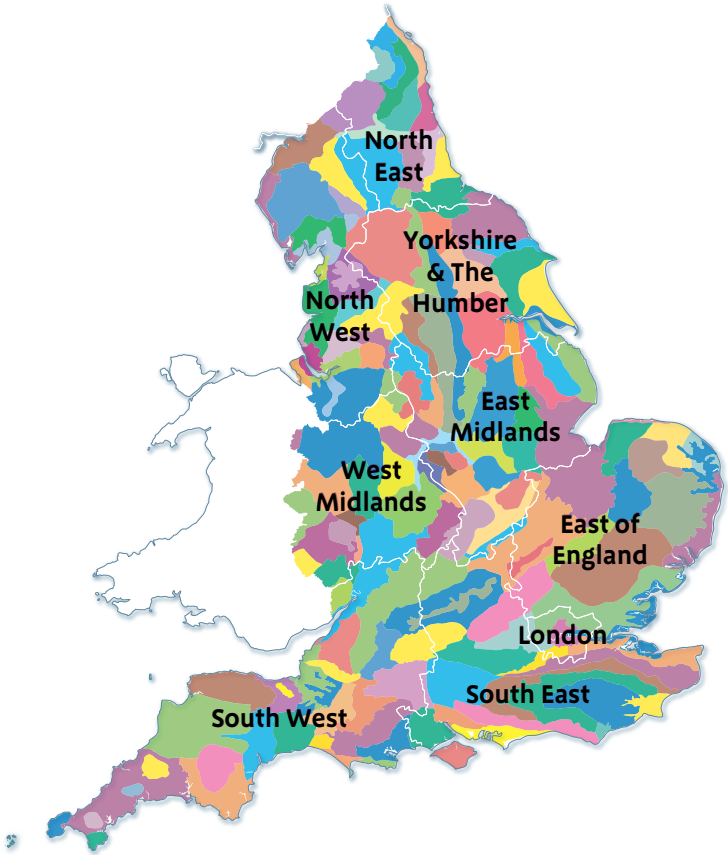
NCA profiles are guidance documents which can help communities to inform their decision-making about the places that they live in and care for. The information they contain will support the planning of conservation initiatives at a landscape scale, inform the delivery of Nature Improvement Areas and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

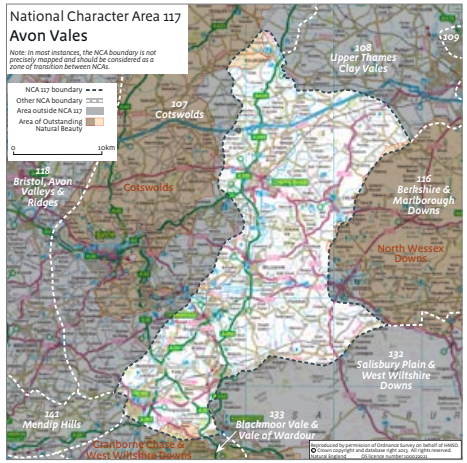
Summary

This is an undulating, low-lying landscape of mixed, predominantly pastoral agriculture and small limestone-built towns, cut by the (Bristol) River Avon and its tributaries, and surrounded to the west, south and east by higher land. Woodlands lie on the steeper slopes and by watercourses, and in a few other areas within a structured farmland of medium to large fields and now straggly hedgerows. It is more than 80 per cent agricultural (both arable and pasture, with some localised nurseries and market gardening) and less than 10 per cent urban, but from the late 20th century onwards it has been subject to much development. There is evidence of Saxon occupation in the many '–ham' place names, and there are prehistoric hill forts, with extensive areas of ridge and furrow that indicate medieval arable cultivation. This area still reveals its past role in broadcloth production and trade in its fine late medieval churches and merchants' houses in market towns and in its many stream-side mills. Smaller settlements and farmsteads are clustered along streams and lesser rivers, linked by narrow winding lanes. Ancient patterns of flood meadows and drainage ditches dominate these valley floors, with their wet grasslands and woodlands. Flooding affects many communities in this National Character Area (NCA), and the opportunities to restore wetland habitats within river corridors to alleviate problems with water flow and to aid climate change mitigation will be important ecosystem services here, to add to food provision and cultural services.

Large historic parks and mansions, such as Bowood and Lacock, which often still feature major woodlands, enrich the landscape and historical context and provide much local recreational resource, to the benefit of the local economy. The same can be said of the towns such as Malmesbury and Frome, with their historic and attractive town centres.

Less than 5 per cent of the land here is designated for any purpose. This 5 per cent is mostly accounted for by the Cotswolds Area of Outstanding Natural Beauty (AONB) in the north-west and the 17 Sites of Special Scientific Interest, a slight majority of which are of geological interest. The NCA is crossed by a wide communications corridor running broadly from east to west; most of the major settlements are clustered along this corridor. This was initially reliant on water routes, namely the (Bristol) River Avon and the Kennet and Avon Canal, as well as the Great West Road, now the A4. Now the M4 motorway and Isambard Kingdom Brunel's Great Western Railway, link London and the West Country and have spread wide the travel-to-work net.

This area can be easily overlooked, surrounded as it is by the high-quality designated landscapes of Cotswolds AONB and North Wessex Downs AONB, but it has a restful and undramatic charm of its own.



Click map to enlarge; click again to reduce.

Coir rolls with purple loosestrife in pond at Biss Meadows Country Park.

Statements of Environmental Opportunity

- **SEO 1:** Protect, manage and enhance the semi-natural habitats, including the pastoral waterside landscape of permanent pasture and wet grassland, calcareous and neutral grasslands, and (as site appropriate) ponds, and investigate and pursue opportunities to create such habitats, to increase resilience to climate change, reduce soil erosion and provide benefits to the water environment and biodiversity in general.

- **SEO 2:** Protect, manage and enhance the area's woodlands and parklands for their rich ecological, historical and archaeological resource, to foster a sense of place and to provide benefits to wildlife, and work to establish appropriate access, thus enhancing cultural, health and recreational benefits for local residents.

- **SEO 3:** Plan for the creation of new landscapes associated with the expansion of towns such as Chippenham, Melksham and Trowbridge, while incorporating the existing landscape features into green infrastructure planning. This will serve the interests of local landscape character, access and recreation, biomass provision, biodiversity and water flow regulation.

- **SEO 4:** Protect and manage the varied rural landscape of small urban areas amid gently rolling arable and pasture, and thick hedges interspersed with small woods, securing wide-ranging views, reinforcing landscape character, preventing soil erosion, promoting sense of place and tranquillity, and providing recreational benefits.

Description

Physical and functional links to other National Character Areas

The Avon Vales form a low-lying, clay-dominated open landscape, with the higher ground of the Salisbury Plain and West Wiltshire Downs National Character Area (NCA) to the south, Berkshire and Marlborough Downs NCA to the east, and the Cotswolds NCA to the west. In the south and north there is a gradual merging with the clay of the Blackmore Vale and Vale of Wardour NCA and the Upper Thames Clay Vales NCA respectively. The town of Frome forms a 'gateway' to the eastern tip of the Mendip Hills NCA.

There are wide views over the Vales from these adjoining, more elevated areas, to the west and south.

There is an extensive road network within the NCA, with links generally to all directions, but the historic links east–west between Bristol and London remain strong. The main rail connections are still on this route, although connections to Warminster and Weymouth to the south also pass through the area.

The main river connection is the (Bristol) Avon, meandering somewhat from its source north of Malmesbury and flowing generally south to Trowbridge, where it heads west towards the Bristol, Avon Valleys and Ridges NCA. The (Somerset) Frome rises in the NCA and flows through the town of Frome to the north, joining the Avon near Bath in the Cotswolds NCA.

The NCA is largely underlain by hard rock aquifers, with little scope for greater water extraction; it also benefits from access to water from the adjoining chalk of the Salisbury Plain and West Wiltshire Downs NCA to the south.

Lock at Seend on the Kennet and Avon Canal.

Key characteristics

Looking east towards Horsingsham, Wiltshire.

- An undulating clay vale with a mix of arable and pasture.
- Small- and medium-sized fields with mostly hedgerow boundaries with few hedgerow trees, varying in shape from irregular piecemeal enclosure to rectilinear planned enclosure.
- Numerous low ridges with local views over towns and villages.
- Wide River Avon corridor, with an ancient pattern of flood meadows and closely associated settlements and more recent development.
- Transport corridors along roads and watercourses, heavily influential on all development in the NCA.
- Large historic parks and mansions, often established from former monastic establishments.
- Attractive stone-built centres to market towns that reflect the former agricultural productivity and wealth of the area.
- Wide views across whole area from higher areas of surrounding chalk downs.

Avon Vales today

The distinctiveness of the Vales lies as much in the settlement pattern and building styles along the (Bristol) Avon as in the countryside. The areas next to the Avon Vales – the dip slope of the Cotswolds to the west, the North Wessex Downs to the east, and Cranborne Chase and West Wiltshire Downs to the south-east – have been designated for their outstanding scenic and natural beauty; in a few, very small areas, these landscapes extend into the Avon Vales.

It is a varied landscape, with much open arable land with low hedgerows and many areas of smaller fields, often under pasture. The mean height of this NCA is 78 m above sea level, and the landform is generally flat, rising to long, low ridges with small streams between them, often with willow pollards and alders. The open quality is emphasised by the lack of hedgerow trees in some areas, a consequence of Dutch elm disease in the later 20th century. There is, however, considerable local, subtle variation in the landscape. The farms are mostly mixed or solely grazing livestock. There is a small horticultural presence in the central area around Bromham, and some poultry production. There was a rise in arable farming generally in the early 21st century, with the national decline in dairy farming being reflected in this NCA.

The towns contribute much to the distinctiveness of the area, mainly through the range of stone used in their historic centres. Most towns, including Calne and Chippenham, are dominated by centres built of limestone ashlar, reflecting their post-medieval prosperity as centres of the wool trade or their location on trade routes. Particularly relevant here are the A4 – formerly the Great West Road – and the M4, linking London and the West Country; the A361, which links important market towns from Oxfordshire to Somerset and beyond; and the A350, a spine for more modern development, north to south. Some are more ancient still: Malmesbury may be the longest continually inhabited town in England as a borough, since the time of Alfred the Great, and hosts the country's oldest operating purpose-built hotel (inherited from the medieval abbey); and Frome dates back to the Saxon period. Many towns contain exceptional collections of buildings, and most lie close to the Avon and thus along the historical lines of communication. There was much urban development in the late 20th century, and towns are much larger in population than was the case immediately post war. In particular, Chippenham has prospered from its position on the Bristol to London train line built in the mid 19th century and being, as a result, within the London travel-to-work area.

Lacock: an estate village in the clay vale near Chippenham, a honeypot for tourism.

Within a short distance of many of the towns are large landscaped parks with aristocratic connections, for example Bowood. Some of these parks reflect the work of major landscape designers such as Lancelot 'Capability' Brown, and it is around these parks that many of the few larger woodlands are found.

The River Avon is of importance both as a historical transport corridor and due to the water quality, which is judged responsible for much of the sediment that reaches Bristol harbour to the west. The Avon drains most of the area directly and through a network of tributaries. Near the Avon and its tributaries are pleasant, compact, stone-built villages with spired churches. The flood plain is still marked by the low mounds of abandoned flood meadows and there are many attractive and remote areas with pollards, alders and much lush pasture. It also includes small areas of tranquillity and remoteness, qualities not otherwise generally found in this NCA. The (Somerset) Frome and the Biss are the other rivers of interest; they are both tributaries of the Avon. The former rises west of the town of Frome and joins the Avon near Bath; the latter rises on Salisbury Plain and flows through Trowbridge (where its meadows now serve as welcome green infrastructure) onward beyond Bradford on Avon, to join the Avon near Staverton.

This NCA includes several geological Sites of Special Scientific Interest (SSSI), with exposures of richly fossiliferous sandstone. The Seend Ironstone SSSI is one of the (Cretaceous) ironstone exposures of the Greensand – the rock lies unconformably on the (Jurassic) Kimmeridge Clay. Although there are few places designated for their biological scientific interest, there is much to appreciate, with many rare bird species to be found in the farmed and parkland landscapes, such as the yellowhammer. Rare greater horseshoe bats forage here from their roosts in nearby areas of Wiltshire.

The Kennet and Avon Canal was once a major communication and trade route between Bristol, the West Country and London, along the NCA's central east–west axis. Long neglected after the decline in canal trade, in the later 20th century it was the beneficiary of much local volunteer enthusiasm. It is restored and is an attractive feature of the NCA, now popular and in use for recreation and tourism.

The landscape through time

The Avon Vales are dominated by Middle and Upper Jurassic clays (some around 160 to 150 million years old), including both Oxford Clay and Kimmeridge Clay. These are the fossil-rich deposits of tropical sea floors.

Prehistoric occupation is evident, with the area overlooked by hill forts and barrows (notably Cley Hill) on the surrounding high ground of the Cotswolds and the chalk downs. There is limited evidence of Roman presence within the NCA. In the Saxon period the locations of the later towns such as Calne along – or easily accessible from – the Avon began to emerge as major centres. Malmesbury was one of the great ecclesiastical and pilgrimage sites of pre-conquest England. Although much of the area lay within the later medieval forests of Chippenham and, to the south-west, Selwood, the place names indicate that by the Saxon period much of the land had been cleared. The principal settlements of the '–tons' and '–hams' were along the river and low-lying ground, but there were considerable patches of woodland marked by '–leah' and '–wood' names. Commons were also frequent and, in the high Middle Ages, there were probably extensive open fields around most settlements.

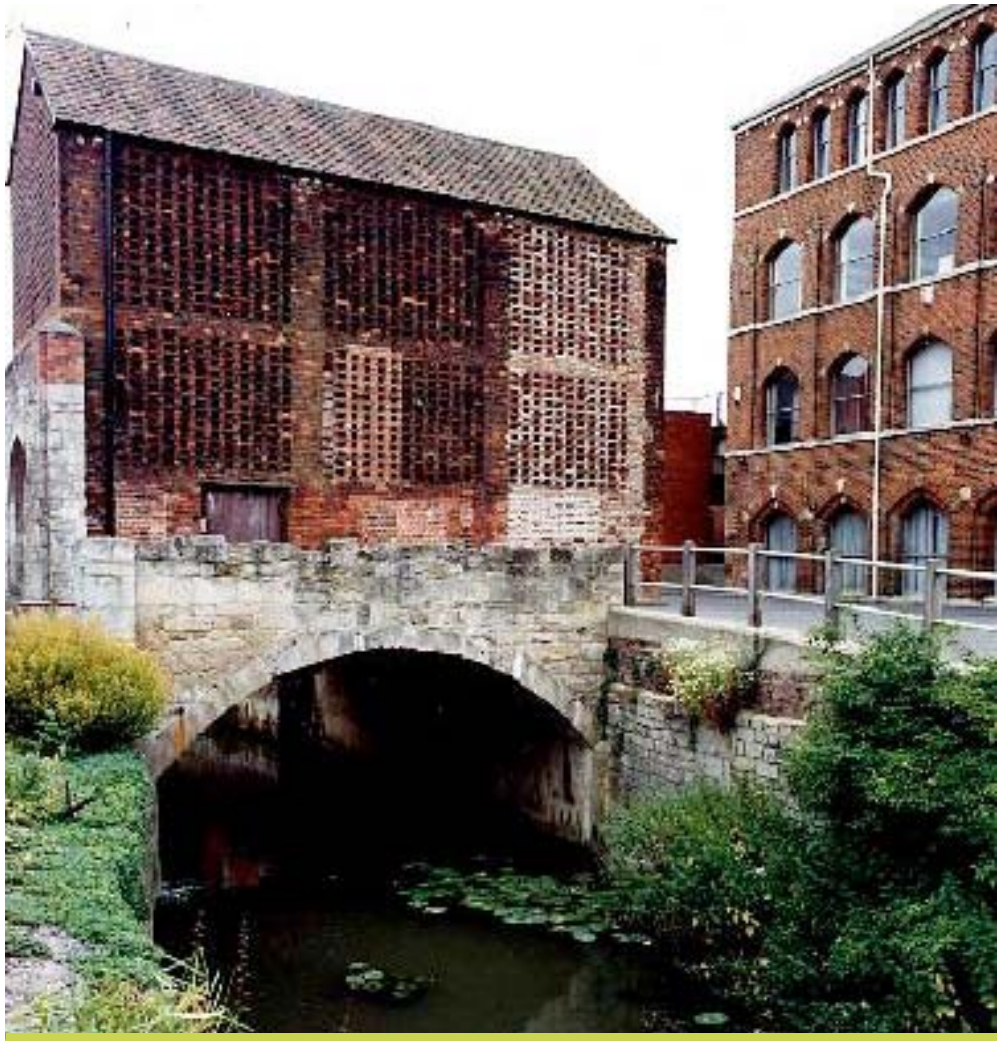
During the later Middle Ages new monastic sites were founded at places such as Lacock, in addition to the growth of the ancient foundations of Malmesbury and Frome. Much of their wealth was founded in the pastoral landscapes of the Vales, producing sheep for wool and dairying. The land acquired by gentry and noblemen following the Dissolution of the Monasteries in the mid 16th century formed the basis of large, wealthy estates and ultimately of the imposing landscaped parks such as Spye and Bowood. Although in the Middle Ages wool and cloth had been important industries throughout Wiltshire, in the post-medieval period the processing and sale of cloth became concentrated along

the Avon Valley and the 'wool towns'. Prosperity continued through the 18th century and is reflected in the area's town houses, civic buildings and mansions. Although it remained competitive during the 19th century, the cloth industry gradually lost out to northern manufacturers.

Areas of extensive open fields around settlements have been subject to piecemeal enclosure from the 14th century. As with the settlement pattern, there is considerable variation to the field boundaries and shapes – small and irregular to areas of ancient enclosure, but more varied in areas of later, piecemeal enclosure. This process was generally complete by the late 18th century, including areas of large-scale and regular enclosure.

The Avon continued as the main communication axis until the late 18th century, with turnpike roads and canals gradually taking over, and then, in the mid 19th century, the railways. The Bristol–London rail connection was made by Isambard Kingdom Brunel, and his name for the line – the Great Western Railway – has returned to that route, which traverses the NCA's centre, past Chippenham. Much of the urban landscape dates from the mid19th century onwards and the arrival of the railways, together with later 20th century development. Wiltshire now sees much development in this NCA, since it includes so few designated and/or protected sites.

Some of the development since the mid 20th century is sprawling and, in places, unsympathetic to the landscape and the fringes of historic towns and villages. Until the millennium it was also often ad hoc, as at the northern edges of Calne and Chippenham. Expansion – much of which follows the spine of the A350 – has been largely met by the demands for residential and light industrial uses at the outer areas of settlements, rather than within their historic cores. With the building of the M4, which has little noise impact over any distance, there has been a major expansion to the adjacent towns.



Handle House in Trowbridge; a building for storage of teazles, used in cloth finishing from the medieval period until the modern era and thus revealing a trace of the NCA's industrial cloth trade heritage.

Ecosystem services

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

Provisioning services (food, fibre and water supply)

- **Food provision**: The NCA provides dairy products, although this is in decline, with beef and sheep products. Since the early 21st century arable production has increased. More than 15 per cent of the soil in the NCA (particularly towards the centre) is of high agricultural quality (Grades 1 or 2).

- **Timber provision**: The NCA contains 3,990 ha of woodland (6 per cent of the total area), of which 1,754 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 1,580 ha of this NCA. The aspiration is to increase woodland cover if possible, increasing the potential for sustainable timber provision.

- **Water availability**: There is not believed to be any potential for increased abstraction from groundwater sources or from the rivers Avon or Frome. Areas east of Chippenham and west of Malmesbury are Source Protection Zones, and this will add to concerns about supply as the development of towns in this NCA increases.

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

- **Regulating soil quality**: Much of the soil in the NCA is clayey and has proved fertile in the past. With careful land management it should remain so, with reduced compaction and the resulting reduced levels of sedimentation and diffuse pollution.

- **Regulating soil erosion**: This has not been a major issue in the NCA, as the soil types are broadly not susceptible and the landform unsuitable. There is concern, however, as some erosion occurs to the detriment of the Avon and areas downstream, such as Bristol harbour. Work to address this issue commenced in the early 21st century and the impact is uncertain.

- **Regulating water quality**: The water quality has been assessed as good in this NCA, both for chemical and biological status. While 81 per cent of the NCA is a nitrate vulnerable zone, the nitrate and phosphates are currently broadly at acceptable levels.

- **Regulating water flow**: The NCA has a long history of river flooding, affecting particularly Malmesbury (which is surrounded by rivers in steep valleys), Chippenham, Melksham and Frome. The urban and industrial development taking place in these settlements in the early 21st century allows scope to implement green infrastructure to (among other aims) reduce flooding impacts. Trowbridge is already well served. The Wiltshire Core Strategy, in place from 2013, placed flood risk management and sustainable drainage at the core of new development and sees the River Avon corridor as a key multifunctional space, notably for flood management.

Cultural services (inspiration, education and wellbeing)

- **Sense of place/inspiration**: The NCA has a strong settlement pattern, and the towns are distinctive in their stone construction. Most were market towns, developing with the prosperous medieval wool trade, and many have royal connections (Frome, Chippenham and Melksham, for hunting) or were developed on communication routes or crossing points (Trowbridge, Chippenham, Melksham and Calne). Frome and Malmesbury were from an early stage heavily influenced by local monastic interests. There is a wealth of historic features, from relic and surviving field systems to parklands. The wet grasslands and woodlands are also characteristic of this area and not its surroundings. There is little cultural history inspired by this NCA, although the agricultural landscape has and continues to have a clear influence on the area.
  Elements of landscape history are well supplied, with the foundations of the monastic seats through to the work of 'Capability' Brown. When discovered, they create a strong sense of place. Frome is now prominent in 'alternative' culture.

- **Sense of history**: The ancient towns show the long settlement history here and the use made of the landscape over time. Canal restoration and management is popular with volunteers, both on the Kennet and Avon and on the Wiltshire and Berkshire canals. Lacock (where the village is now commonly a film location) is the site of pioneering work in photography carried out in the mid 19th century, and Malmesbury has been identified as the location of the first flight in England, by a medieval monk. The agricultural landscape also shows the past, with medieval field patterns still plain, for example at Whaddon, and there is much remaining ridge and furrow.

- **Recreation**: As is typically prominent throughout Wiltshire, there is a strong rights of way network, with a density of some 2.3 km per km^2, and much fishing, not least in the Kennet and Avon Canal and in the (under restoration) Wiltshire and Berkshire Canal. Fishing is common both in the canals and in the River Biss.

- **Biodiversity**: The NCA has few designated sites; those sites that are designated are mostly meadow lands. It is rich in birdlife, with species such as the linnet, corn bunting and yellowhammer found locally. It also serves as a feeding ground for many bats, notably the greater horseshoe bat, which arrives from the Special Area of Conservation at Winsley and Box, in the nearby Cotswolds NCA. Spye Park is designated for lichens and bryophytes. Parkland in the NCA in general is a notable habitat, under-represented in designations, the continuity of tenure and land management creating reserves of biodiversity within the otherwise farmed landscape.

- **Geodiversity**: There are many geological SSSI, largely in favourable condition, and the area is rich in fossils. They provide a valuable educational resource.

Seend Ironstone Quarry SSSI; view of the Cretaceous ironstone.

Statements of Environmental Opportunity

SEO 1: Protect, manage and enhance the semi-natural habitats, including the pastoral waterside landscape of permanent pasture and wet grassland, calcareous and neutral grasslands, and (as site appropriate) ponds, and investigate and pursue opportunities to create such habitats, to increase resilience to climate change, reduce soil erosion and provide benefits to the water environment and biodiversity in general.

For example, by:

- Maintaining, extending and linking fragmented areas of species-rich calcareous and neutral grassland largely on the nearby limestone hills and in the river valleys where they can both enhance biodiversity (particularly invertebrate and landscape) and help to reduce soil erosion and nutrient run-off.
- Restoring, maintaining and extending flood meadows and wet woodland, to enhance the landscape and cultural environment and the sense of place, and to increase water retention capacity for the benefit of flood alleviation.
- Restoring and re-creating ponds, for the benefit of wildlife in general and the enhancement of the landscape character.
- Reinstating riverine habitats such as backwaters and reedbeds, lost largely through engineering work, to provide refuges for aquatic species, in the interests of biodiversity, and, by assisting with water filtration, to benefit water quality and water flow.
- Reinstating and managing hedgerows to restore the local landscape character, to help reduce soil erosion and to foster linear habitat networks for pollinators and pest regulation for the benefit of agriculture, biodiversity generally and – notably – farmland birds.
- Creating grassland buffer strips across slopes and alongside watercourses to help reduce soil erosion and nutrient run-off in areas of arable production and grazing.
- Protecting and encouraging planting of riverside trees, to help stabilise river banks, managing these by pollarding for longevity and aiding adaptation to climate change.

Yellowhammer; a Red-listed species, often seen in this area.

SEO 2: Protect and manage the area's woodlands and parklands for their rich ecological, historical and archaeological resource, to foster a sense of place and to provide benefits to wildlife, and work to establish appropriate access, thus enhancing cultural, health and recreational benefits for local residents.

For example, by:

- Protecting and encouraging arable reversion and scrub removal over ridge and furrow, in the interests of buried archaeology and other historic earthworks.
- Maintaining, restoring and extending existing woodland, including ancient woodland, to enhance wildlife networks and enhance resilience of existing woodland habitats, in particular in relation to the bat communities.
- Maintaining and restoring historic parkland landscapes and, in particular, nurturing and replacing veteran trees, especially where they are vulnerable to changes in agricultural practices and where they are important for lichens, invertebrates and fungi, while encouraging deadwood management as appropriate.
- Maintaining access to important geological features, ensuring that they are kept free of material or vegetation and promoting educational use and awareness through interpretation.
- Developing access on foot, and where possible on bicycle and horse, for recreation and other use, in the interests of reducing traffic (to benefit the climate) and the health and enjoyment of residents and visitors to the area.
- Exploring and developing any potential for recreational use of the woodland in general.

SEO 3: Plan for the creation of new landscapes associated with the expansion of towns such as Chippenham, Melksham and Trowbridge, while incorporating the existing landscape features into green infrastructure planning. This will serve the interests of local landscape character, access and recreation, biomass provision, biodiversity and water flow regulation.

For example, by:

- Planting short rotation coppice and miscanthus locally where this can link into existing woodland and can screen and (where site appropriate) soften the edge of new development while serving as a local source of biomass energy.
- Developing woodlands and new wetland habitat within and around new development as a recreational resource and as part of sustainable urban drainage systems, to help regulate water flow.
- Seeking to provide community food growing opportunities within the planned open space associated with new development.
- Promoting the use of sustainable materials and integrated renewable energy technologies within new low carbon developments, to be fostered as reflecting local character.
- Developing accessible open spaces and making provision for their sustainable management.
- Ensuring the provision of green corridors for wildlife along canal and river banks and in any development sites, and generally to explore and expand linkages between the natural landscapes of the area.
- Promoting green travel schemes, such as cycle paths between neighbouring urban areas, in the interests of the environment generally.

Volunteers working on the viewing platform for the observation pond in Biss Meadows Country Park, Trowbridge. The pond works in part to act as flood alleviation for this still developing town.

SEO 4: Protect and manage the varied rural landscape of small urban areas amid gently rolling arable and pasture, and thick hedges interspersed with small woods, securing wide-ranging views, reinforcing landscape character, preventing soil erosion, promoting sense of place and tranquillity, and providing recreational benefits.

For example, by:

- Protecting against insensitive development and/or alterations that would impact on the rural character, ensuring that buildings reflect traditional styles and methods such as limestone ashlar.
- Maintaining the distinctive stone-built centres to larger settlements and the overall settlement pattern of clustered villages along stream sides, linked with narrow winding lanes.
- Working with the local community to foster the mixed agriculture and the sense of place that this brings, as well as in the interests of food production.
- Retaining and managing roadside ditches in the valleys and (on the higher land in the east) the drystone walls, where they can assist in the prevention of soil erosion, in keeping with local styles and management traditions.
- Working to develop permissive access linking existing settlements, and developing circular routes, in the interests of sustainable transport and tourism, engaging local residents with their environment and for the benefit of recreation generally.

Organic produce from Wiltshire, for sale at Frome Farmer's market.

Supporting document 1: Key facts and data

Area of Avon Vales National Character Area (NCA): 64,285 ha

1. Landscape and nature conservation designations

The Avon Vales NCA contains a small proportion of the Cotswolds and the Cranborne Chase and West Wiltshire Downs Areas of Outstanding Natural Beauty (AONB). They cover 3 per cent and 1 per cent of the NCA area respectively. The Avon Vales NCA also contains a small proportion (<1 per cent) of the North Wessex Downs AONB.

Management plans for the protected landscape can be found at:

- www.cotswoldsaonb.org.uk/
- www.ccwwdaonb.org.uk/

Source: Natural England (2011)

1.1 Designated nature conservation sites

The NCA includes the following statutory nature conservation designations:

Tier	Designation	Name	Area (ha)	% of NCA
International	Ramsar	n/a	0	0
European	Special Protection Area (SPA)	n/a	0	0
	Special Area of Conservation (SAC)	n/a	0	0
National	National Nature Reserve (NNR)	n/a	0	0
	Site of Special Scientific Interest (SSSI)	A total of 17 sites wholly or partly within the NCA	328	<1

Source: Natural England (2011)

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

There are 247 local sites in the Avon Vale NCA covering 2,802 ha which is 4 per cent of the NCA.

Source: Natural England (2011)

- Details of individual Sites of Special Scientific Interest can be searched at: http://www.sssi.naturalengland.org.uk/Special/sssi/search.cfm
- Details of Local Nature Reserves (LNR) can be searched at: http://www.lnr.naturalengland.org.uk/Special/lnr/lnr_search.asp
- Maps showing locations of Statutory sites can be found at: http://magic.Defra.gov.uk/website/magic/ – select 'Rural Designations Statutory'

1.1.1 Condition of designated sites

SSSI condition category	Area (ha)	Percentage of NCA SSSI resource
Unfavourable declining	17	5
Favourable	109	33
Unfavourable no change	7	2
Unfavourable recovering	195	59

Source: Natural England (March 2011)

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

2. Landform, geology and soils

2.1 Elevation

At its lowest the area is about 26 m above sea level rising to a maximum height of around 233 m. The mean height is about 78 m.

Source: Natural England 2010

2.2 Landform and process

The landform is generally flat, rising to long, low ridges with small streams between them. The Avon Vales are a low-lying clay-dominated landscape bounded by the dip slope of the Cotswolds to the west and by a band of Corallian Limestone and Greensand to the east, with the Salisbury Plain and West Wiltshire Downs beyond. In the south there is a gradual merging with the clay of Blackmore Vale and the Vale of Wardour.

Source: Thames and Avon Vales Natural Area Profile, Avon Vales Countryside Character Area Description

2.3 Bedrock geology

The Avon Vales are dominated by Middle and Upper Jurassic clays (around 160 to 150 million years old), including both Oxford Clay and Kimmeridge Clay. These are the deposits of tropical sea floors and have an abundance of fossils.

Source: Thames and Avon Vales Natural Area Profile, Avon Vales Countryside Character Area Description

2.4 Superficial deposits

There are gravels and other alluvial deposits along the River Avon.

Source: Thames and Avon Vales Natural Area Profile, Avon Vales Countryside Character Area Description

2.5 Designated geological sites

Tier	Designation	Number
National	Geological Site of Special Scientific Interest (SSSI)	9
National	Mixed Interest SSSI	0
Local	Local Geological Sites	15

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

This undulating area is dominated by the Oxford Clay. There are 9 main soilscape types in this NCA; slowly permeable seasonally wet slightly acid but base-rich loamy and clayey soils covering 46 per cent of the area; shallow lime-rich soils over chalk or limestone (15 per cent); lime-rich loamy and clayey soils with impeded drainage (9 per cent); freely draining lime-rich loamy soils (8 per cent); freely draining slightly acid loamy soils (7 per cent); slightly acid loamy and clayey soils with impeded drainage (7 per cent); loamy and clayey flood plain soils with naturally high groundwater (4 per cent); freely draining slightly acid sandy soils (2 per cent) and freely draining slightly acid but base-rich soils (1 per cent).

Source: Avon Vales Countryside Character Area Description, Thames and Avon Vales Natural Area Profile, Natural England (2010)

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

Grade	Area (ha)	% of NCA
Grade 1	1,647	3
Grade 2	8,479	13
Grade 3	39,653	62
Grade 4	10,106	16
Grade 5	56	<1
Non-agricultural	1,312	2
Urban	3,120	5

Source: Natural England (2010)

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

3. Key water bodies and catchments

3.1 Major rivers/canals

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

- River Avon 49 km
- River Frome 16 km
- Kennet and Avon Canal 16 km

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.

This undulating area is dominated by the Oxford Clay and is cut through by numerous tributaries of the river Avon which drain westwards to join it on its generally southward course.

3.2 Water quality

The total area of Nitrate Vulnerable Zone is 52,262 ha, or 81 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 3,990 ha of woodland (6 per cent of the total area), of which 1,754 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 1,580 ha of this NCA, which is 3 per cent of the area.

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

4.2 Distribution and size of woodland and trees in the landscape

Woodland is concentrated in a few areas, notably the large complex of mixed and deciduous woodland between Chittoe and Studley. However, it is also present on former commons and on the steeper slopes around places like Lyneham. Some areas are very open, affected by the clearance of hedgerows and loss of trees to Dutch elm disease, such as the land just north of the M4. Hedgerow trees are

common in pastoral areas but rare in arable areas. Many of the large woodlands are concentrated in landscape parks, for example Bowood Park.

Source: Thames and Avon Vales Natural Area Profile, Avon Vales Countryside Character Area Description

4.3 Woodland types

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

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

Woodland type	Area (ha)	% of NCA
Broadleaved	2,963	5
Coniferous	493	1
Mixed	284	<1
Other	250	<1

Source: Forestry Commission (2011)

Area and proportion of ancient woodland and planted ancient woodland within the NCA.

Type	Area (ha)	% of NCA
Ancient semi-natural woodland	1,007	2
Planted Ancient Woodland (PAWS)	747	1

Source: Natural England (2004)

5. Boundary features and patterns

5.1 Boundary features

The extent of hedgerows on the arable land is often poor; however, in the pasture areas, especially the lower lying meadows around the many small streams, hedgerows are frequent and often overgrown. Hedgerow trees are also characteristic. Agricultural intensification has led to hedgerow loss and neglect.

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

5.2 Field patterns

Areas of extensive open fields around settlements have been subject to piecemeal enclosure from the 14th century. As with the settlement pattern, there is considerable variation to the field boundaries and shapes; small and irregular in areas of ancient enclosure, the fields in dairying areas in particular becoming smaller in the post-medieval period; and more varied in areas of piecemeal enclosure (generally complete by 18th century, but including areas of large-scale and regular enclosure).

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

6. Agriculture

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

6.1 Farm type

The NCA supports a wide range of farm types but the largest by number of holdings is grazing livestock; 220 grazing livestock, mainly cattle (27 per cent); 129 cereals (16 per cent); 103 dairy (13 per cent); 31 specialist poultry (4 per cent); 30 mixed (4 per cent); 22 horticulture (3 per cent); 11 general cropping (1 per cent); and 9 specialist pigs (1 per cent). Many farm types decreased significantly in numbers of holdings between 2000 and 2009 with dairy farming losing the

most holdings; down by 87 holdings or 46 per cent followed by mixed farms with 33 holdings or 52 per cent. 'Other types' were one of the few farm types to see an increase in holdings by 34 holdings as were cereals by 16 holdings.

Source: Agricultural Census, Defra (2010)

6.2 Farm size

Farms between 5 and 20 ha form the largest proportion (by number) of holdings within the NCA with 217 holdings or 27 per cent of farms covering 2,312 ha. Between 2000 and 2009 farms across most size brackets decreased in numbers, the greatest decrease being in farms between 50 and 100 ha which decreased by 41 holdings and farms between 20 and 50 ha which decreased by 32 holdings. The exception was farms over 100 ha in size which increased in number by 18 holdings.

Source: Agricultural Census, Defra (2010)

6.3 Farm ownership

Sixty-six per cent of the total farm area is owned while the remainder is held in tenancy. Between 2000 and 2009 owned land decreased by 11 per cent while land held in tenancy increased by 11 per cent.

2009: Total farm area = 51,591 ha; owned land = 33,832 ha.
2000: Total farm area = 50,736 ha; owned land = 38,047 ha.

Source: Agricultural Census, Defra (2010)

6.4 Land use

Grass and 'uncropped' land is the largest land use within the Avon Vales. Coverage of 'uncropped' land is 31,956 ha, or 62 per cent of the farmed area. Cereals are the second most prominent land use covering 10,429 ha within the NCA in 2009, or 20 per cent of the farmed area. Between 2000 and 2009 most crop types decreased. Cereals showed the steepest reduction in area by 1,348 ha or 11 per cent. Other arable crops showed a sharp increase by 1,195 ha or 38 per cent as did oilseeds by 687 ha or 31 per cent.

Source: Agricultural Census, Defra (2010)

6.5 Livestock numbers

Cattle are the most numerous livestock in the NCA (numbering 52,900 in 2009), followed by sheep (27,600) then pigs (12,800). All livestock numbers declined between 2000 and 2009, but the steepest decrease was seen in pigs with a decline of 17,700 animals, with cattle decreasing by around 7,900 and sheep by 2,900.

Source: Agricultural Census, Defra (2010)

6.6 Farm labour

The overwhelming majority of holdings in this NCA, 1,114, are run by owner farmers with just a few, 59, managed by salaried managers. There are more full-time workers (267) than casual/gang workers (178) or part-time workers (177). Between 2000 and 2009, numbers fell across most job types. The numbers of full-time and part-time workers decreased by 88 and 10 respectively between 2000 and 2009. The exception were the number of casual/gang workers which increased by 22.

Source: Agricultural Census, Defra (2010)

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

7. Key habitats and species

7.1 Habitat distribution/coverage

Priority habitats are largely scattered across the NCA though there is a concentration south-east of Chippenham around the Spye Park SSSI. Many of the larger woods are found around the large landscaped historic parks such as Bowood. Flood plain grazing marsh, calcareous grassland and lowland meadow are concentrated around the river corridors in the northern part of the NCA.

Source: Thames and Avon Vales Natural Area Profile

7.2 Priority habitats

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

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)	% of NCA
Broadleaved mixed and yew woodland (broad habitat)	2,247	3
Coastal flood plain and grazing marsh	251	<1
Lowland meadows	151	<1
Lowland calcareous grassland	95	<1
Lowland heathland	14	<1
Purple moor grass and rush pasture	8	<1

Source: Natural England (2011)

Maps showing locations of priority habitats are available at

- http://magic.Defra.gov.uk/website/magic/ select 'Habitat Inventories'

7.3 Key species and assemblages of species

- Maps showing locations of priority habitats are available at: http://magic.Defra.gov.uk/website/magic/
- Maps showing locations of S41 species are available at: http://data.nbn.org.uk/

8. Settlement and development patterns

8.1 Settlement pattern

Most of the major settlements lie along the Avon, which would have been the major axis of communication until the turnpike roads and the Kennet and Avon Canal were built.

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

8.2 Main settlements

The main settlements within the NCA are; Trowbridge, Chippenham, Frome, Warminster, Melksham, Westbury, and Calne. The total estimated population for this NCA (derived from ONS 2001 census data) is: 214,658.

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

8.3 Local vernacular and building materials

Stone buildings use a wide range of materials from Corallian Rag to more finely-worked Bath and Cotswold stone. 17th century and earlier timber frame buildings can be found, but now tend to be concentrated in towns. Brick was increasingly used from 18th century, often in conjunction with stone facades.

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

9. Key historic sites and features

9.1 Origin of historic features

At the dissolution of the monasteries the land acquired by gentry and noblemen formed the basis of large estates and ultimately of the imposing landscape parks like Spye and Bowood. Although in the Middle Ages wool and cloth had been important industries throughout Wiltshire, in the post-medieval period the processing and sale of cloth became concentrated along the Avon Valley and the 'wool towns'. Prosperity continued through the 18th century and is reflected in the town houses and the mansions as well as the civic buildings. Although it remained competitive during the 19th century the industry gradually lost out to northern manufacturers.

Although the area's association with writers and artists, apart from regional novelists, are few, it has great cultural significance as the location of many designed historic parks and the work of Lancelot 'Capability' Brown in particular.

Source: Draft Historic Profile, Avon Vales Countryside Character Area description

9.2 Designated historic assets

This NCA has the following historic designations:

- 10 Registered Parks and Gardens covering 1,232 ha
- 1 Registered Battlefield covering 18 ha
- 65 Scheduled Monuments
- 4,204 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

- One per cent of the NCA 834 ha is classified as being publically accessible.
- There are 1,476 km of public rights of way at a density of 2.3 km per km^2.
- There are no National Trails within the NCA.

Sources: Natural England (2010)

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

Access designation	Area (ha)	% of NCA
National Trust (Accessible all year)	42	<1
Common Land	39	<1
Country Parks	0	0
CROW Access Land (Section 4 and 16)	132	<1
CROW Section 15	13	<1
Village Greens	9	<1
Doorstep Greens	0	0
Forestry Commission Walkers Welcome Grants	594	1
Local Nature Reserves (LNRs)	57	<1
Millennium Greens	2	<1
Accessible National Nature Reserves (NNRs)	0	0
Agri-environment Scheme Access	29	<1
Woods for People	646	1

Sources: Natural England (2011)

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

11. Experiential qualities

11.1 Tranquillity

Based on the CPRE map of tranquillity (2006) the NCA is not very tranquil. In particular there is considerable disturbance around the M4 and the towns of Chippenham, Frome, Trowbridge and Warminster.

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

Category of tranquillity	Score
Highest value within NCA	42
Lowest value within NCA	-66
Mean value within NCA	-5

Sources: CPRE (2006)

- More information is available at the following address: **http://www.cpre.org.uk/what-we-do/countryside/tranquil-places/in-depth/item/1688-how-we-mapped-tranquillity**

11.2 Intrusion

The 2007 Intrusion Map (CPRE) shows the extent to which rural landscapes are 'intruded on' from urban development, noise (primarily traffic noise), and other sources of visual and auditory intrusion. This shows much of the NCA is quite disturbed particularly around the M4, but also around the other main roads that run through it.

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

Category of intrusion	1960s (%)	1990s (%)	2007 (%)	% change (1960s-2007)
Disturbed	29	49	68	39
Undisturbed	68	47	25	-43
Urban	3	4	7	4

Sources: CPRE (2007)

Notable trends from the 1960s to 2007 are the considerable increase in the area of disturbance by more than a third.

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

12. Data sources

- British Geological Survey (2006)
- Natural Area Profiles, Natural England (published by English Nature 1993-1998)
- Countryside Character Descriptions, Natural England (regional volumes published by Countryside Commission/Countryside Agency 1998/1999)
- Joint Character Area GIS boundaries, Natural England (data created 2001)
- National Parks and AONBs GIS boundaries, Natural England (2006)
- Heritage Coast Boundaries, Natural England (2006)
- Agricultural Census June Survey, Defra (2000,2009)
- National 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

Trees and woodlands

- A quarter of the woodland is on ancient woodland sites, including within parklands. At the end of the 20th century small areas of new woodland planting were approved under the Woodland Grant Scheme. Such new woodland planting was carried out mainly in small blocks, such as in the valley of the Avon below Trowbridge, which added around 3 per cent to the then woodland stock.

Oak tree in the parkland at Spye, near Lacock.

- At that time, the proportion of established, eligible National Inventory of Woodland and Trees woodland stock covered by management schemes was some 25 per cent but the trend was for this to increase.

- Overall, the largely broadleaved woodland character of the NCA appeared to be slowly improving from a low base, in particular alongside watercourses and on the steeper slopes and former common land. Wet woodland was a particular feature of this landscape and the aspiration remains to restore this, where site-appropriate, and to increase the overall level of woodland in this NCA.

Boundary features

- Overall the length of the NCA's boundary features is estimated at more than 5,250 km, over 90 per cent of which were hedgerows, and these were somewhat neglected in the latter years of 20th century, possibly as a result of the agricultural intensification of the time. The NCA's hedgerows were also badly affected in the late 20th century by the loss of elm trees and thus there was a perceived need to pursue hedgerow planting and restoration. Substantial funds were spent in the early 21st century under agri-environment schemes on fencing, hedgerow and general boundary protection features. Some 85 per cent of this was on hedgerow work but there was also an increase in electric fencing, to reflect the increase in livestock.

- To an extent, overgrown hedgerows and their trees can be seen as characteristic of pasture and wet grassland and so appropriate for this NCA, but better management to secure a long-term future for hedgerows, that would enhance landscape character and wildlife, is necessary.

Agriculture

- A mixture of arable and pasture dominates the landscape with pasture often in smaller fields; this mixed farming is traditional for the NCA and persists.
- Loss of permanent and rough grass continued in the latter years of the 20th century, although at a slower rate than seen earlier. There was also some shift to lowland cattle for beef and sheep, and reductions in dairy farming – this last, in common with the industry nationally.
- There was also an increase in the number of smaller holdings, those under five hectares.
- There remains some scope for enhancement of the more degraded agricultural landscapes, particularly in tandem with the growing management of arable and grassland areas to arrest the decline of farmland birds.
- Evidence suggested that the mixed farming character of the area, with a mosaic of arable and pasture, may have been slowly eroding but the early 21st century saw signs of recovery. The most common agri-environment option has proved to be lowland pasture management on neutral/acid soils.

Settlement and development

- The NCA is surrounded by high-quality designated landscapes which are strongly protected. This, and the construction-friendly landform of the Avon Vales, means that there has, since the Second World War, been intense pressure on the NCA for all forms of development, and this continues with the plans for a 21st-century expansion in housing in Wiltshire.
- The area shows moderately high rates of change to urban, not least with residential development pressure. There has been marked expansion into the peri-urban zone around Trowbridge, Melksham, Chippenham, Westbury, Calne, and Malmesbury. The travel-to-work areas of many such towns extend to London thanks to the railway connections.
- There has also been development in the more rural parts, especially in the south of the NCA between Warminster and Frome. These developments, occasionally insensitive, have transformed the once agricultural character of the NCA. Diversity across the area needs to be respected to maintain a sense of place.
- Most of the major settlements lie along the Avon, linked by valley bottom and ridge roads, showing the commercial history of the Bristol/London corridor. Watercourses continue to be an important feature in the landscape closely connected to settlement patterns and future development opportunities.
- Several major roads cut through the area – notably the M4 between Wales and Bristol/London – and there has been pressure for roadside development, including infill between settlements.
- Early 21st-century pressure for renewable energy has led to considerable interest in solar farms, by way of diversification in the farmed environment.

Semi-natural habitat

- Levels of Countryside Stewardship uptake for annual area features (mostly for grassland or hay meadows) were below the national average and this will probably have limited the work done in the late 20th century on habitat management.
- Although the Avon's wide river corridor is influenced by modern development, there are ancient patterns of flood meadows, pollards, alders and rich wetland pasture. The ambition is to restore and maintain such landscapes, discouraging any further field enlargement, and allow further regeneration of trees along water courses, where site-appropriate and possible.

- Overall little of this NCA is designated SSSI: less than one per cent of the area, including 17 SSSI, 9 of which are geological sites. The overwhelming majority of these sites are in favourable, or unfavourable recovering condition. Three per cent of the NCA (2, 247 ha) is broadleaved and yew woodland, a priority habitat, scattered over the NCA with some concentration around the south-east of Chippenham.

Historic features

- The NCA features evidence of human occupation over a long period, and the archaeological resource is not yet fully explored and realised. It includes prehistoric barrows and occupation sites such as hill forts, such as Cley Hill, together with the later medieval forests of Melksham, Chippenham and Selwood. Extensive areas of ridge and furrow (which it is hoped to be retained in the landscape) suggest that the area was dominated by arable cultivation, mainly in open field systems. More recent periods offer large historic mansions and parks, often surrounded by woodland, such as Bowood.

- In 1918 about five per cent of the NCA was historic parkland. By 1995 it is estimated that more than half that had been lost. Almost half, 43 per cent, of the remaining parkland is covered by a Historic Parkland Grant, and about seven per cent is included within an agri-environment scheme.

- About 70 per cent of listed historic farm buildings remain unconverted. Most are intact structurally and may still see conversion to other purposes, although this late 20th century trend may now have declined.

- Distinctive towns such as Malmesbury, Calne and Trowbridge are dominated by attractive centres built of limestone ashlar, reflecting their medieval prosperity as centres of the wool trade, and have a continuing role in the community. Some have since benefitted economically from their location along the M4 corridor and the resultant growth.

Cley Hill hill fort, now also a Site of Special Scientific Interest.

- Arable intensification since the mid 20th century, and contemporaneous agricultural improvements to pasture, threatens areas of ridge and furrow, buried archaeology and other historic earthworks.

- The trends in the change to the area's heritage assets suggest the need for extensive and proper management not limited to the built environment or scheduled monuments.

Rivers

- The biological river water quality of the main rivers, the Avon and Frome, in the early years of the 21st century was predominantly good. The levels of nitrates and phosphates were moderate to high. The chemical water quality was predominantly very good.

- The overall resource in ponds remains neglected at the start of the early 21st century, and with limited uptake of pond options in agri-environment schemes this is unlikely to change quickly.

- There has been a rise in diffuse pollution of the waterways, and the need for work to address this has been noted. A catchment management plan for the (undesignated) Bristol Avon was in preparation in the early 21st century.

Minerals

- Some provision was made (in Wiltshire's 2009 Minerals Plan) for continuing with soft sand supply from the area around Chippenham and east of Trowbridge. The plan also designated a large area east and south of Chippenham as needing to be safeguarded for possible later exploitation, and borne in mind when considering other development.

- This area also includes much high-quality agricultural land to be safeguarded in response to proposals for minerals winning.

- There is some history of provision of building stone, but nowhere in that market in Wiltshire is now active.

- The south-western corner of the NCA – the Frome area – adjoins the Mendip Hills, from where there is a substantial national supply of aggregates, but this has little impact within the NCA beyond increased heavy through traffic.

Drivers of change

Climate change

- The predicted drier summers associated with climate change will lead to changes in the ground flora found in wet woodlands, as the water levels drop. –The need to seize opportunities for habitat creation and connectivity of suitable habitat along watercourses or flood storage land created as green infrastructure will be an important.

- Increasing temperature and altered patterns of rainfall will lead to changes in the hydrology of the catchment, which in turn will lead to changes in the character of river meadows and associated wetland habitat.

- Drier summers are likely to accelerate the succession of wet woodland towards dry woodland. Increases in abstraction of water from catchments during dry periods would exacerbate the direct effects of climate change.

- An increased frequency of drought and storms pose a threat to veteran trees within parkland and historic parks such as Bowood. Ensuring appropriate management decisions, such as replanting and the appropriate selection of tree species, will become increasingly important.

- Increased incidence of extreme events such as heavy rainfall events and heat waves may increase the demand for green and blue infrastructure in and around new and existing development, such as sustainable urban drainage, over and above any current plans.

- Hotter summers will make the hedgerow growing season longer, this may adversely impact any shaded flora and change resident insect species - unless this is accompanied by drought which may instead lead to die back. There are possible adverse consequences (in either eventuality) for pests and/or pest regulation and in any event on insect species and thus for bird predators.

- Longer growing seasons will also impact on historic parks and gardens and their management and indeed on ground flora in woodland.

- Warmer winters may impact on the regeneration requirements of some plant species, or lead to changes in berry abundance even if only in its timing. This may affect pests and/or pest regulation, and birds. There will need to be careful planting for species diversity to allow for this, as there are risks of species mismatch between consumer and provider of food.

- Should summer rainfall reduce, there will be a deficit in soil moisture, and a possible increasing demand for water abstraction. Any development of drainage and/or irrigation needs to be handled with care lest there be adverse consequences for the ditch habitat. This may also cause difficulties for any restoration of wet grassland and woodland.

- Wetter or stormier winters may lead to increased flooding, an issue for the northern part of the NCA (in particular Malmesbury, already flood-prone) and also its ditches and any restored flood plains. Extreme weather events are in general more likely to occur, and management for these needs to be considered.

- Increased flooding may provide opportunities to restore wetland habitats within river corridors to alleviate problems with water storage and flow. It is also likely to increase the demand for hard flood defences and engineered solutions that will need to be designed not to have adverse impacts on the riverine system and adjacent semi natural habitat. Any prolonged increased prevalence of low flows, poor water quality, and the consequent reduced habitat space could lead to increased competition and predation, thermal stress, siltation (due to reduced flushing), increased effluent pollution, and reduced dissolved oxygen levels in both sediments and overlying water in the Avon and its tributaries.

Other key drivers

- The growth along the M4 corridor or the A350 (for example around Chippenham) is likely to continue and there may as a result be encroachment by development of all kinds on the open countryside. This will need careful management, although no designated sites are likely to be affected. The past, current and projected development makes the NCA score poorly for tranquillity and intrusion.

- The continued pressure to expand housing provision in Wiltshire will be felt more here than in most adjoining areas, as they are designated landscapes.

- Changes in farm funding will inevitably have an impact, even though this NCA is not dominated by any one kind of farm operation and has more, smaller units than the national average.

- Pressure for solar farms and panels is already intense and there is concern for the impact on the landscape should they become widespread and established. There may be wide views over seemingly unused fields, and little farm traffic, but at an uncertain cost.

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.

Common liverwort found in Spye Park SSSI, a woodland site rich in lichen and bryophytes.

Statement of Environmental Opportunity	Food provision	Timber provision	Water availability	Genetic diversity	Biomass provision	Climate regulation	Regulating water quality	Regulating water flow	Regulating soil quality	Regulating soil erosion	Pollination	Pest regulation	Regulating coastal erosion	Sense of place/inspiration	Sense of history	Tranquility	Recreation	Biodiversity	Geodiversity
	Ecosystem Service																		
SEO 1: Protect, manage and enhance the semi-natural habitats, including the pastoral waterside landscape of permanent pasture and wet grassland, calcareous and neutral grasslands, and (as site appropriate) ponds, and investigate and pursue opportunities to create such habitats, to increase resilience to climate change, reduce soil erosion and provide benefits to the water environment and biodiversity in general.	↗ *	↗ **	↔ **	↔ ***	↔ ***	↑ ***	↗ ***	↗ ***	↔ ***	↑ ***	↔ ***	↔ ***	n/a	↑ ***	↔ ***	↑ ***	↗ ***	↑ ***	↔ ***
SEO 2: Protect, manage and enhance the area's woodlands and parklands for their rich ecological, historical and archaeological resource, to foster a sense of place and to provide benefits to wildlife, and work to establish appropriate access, thus enhancing cultural, health and recreational benefits for local residents.	↔ ***	↑ ***	↔ ***	↔ ***	↔ ***	↗ ***	↔ ***	↔ ***	↔ ***	↔ ***	↗ ***	↗ ***	n/a	↑ ***	↗ ***	↗ ***	↑ ***	↑ ***	↔ ***

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

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

Statement of Environmental Opportunity	Ecosystem Service: Food provision	Timber provision	Water availability	Genetic diversity	Biomass provision	Climate regulation	Regulating water quality	Regulating water flow	Regulating soil quality	Regulating soil erosion	Pollination	Pest regulation	Regulating coastal erosion	Sense of place/inspiration	Sense of history	Tranquility	Recreation	Biodiversity	Geodiversity
SEO 3: Plan for the creation of new landscapes associated with the expansion of towns such as Chippenham, Melksham and Trowbridge, while incorporating the existing landscape features into green infrastructure planning. This will serve the interests of local landscape character, access and recreation, biomass provision, biodiversity and water flow regulation.	↗ ***	↔ ***	↗ ***	↔ ***	↗ ***	↑ ***	↔ ***	↑ ***	↔ ***	↗ ***	↔ ***	↔ ***	n/a	↗ ***	↔ ***	↗ ***	↑ ***	↗ ***	↔ ***
SEO 4: Protect and manage the varied rural landscape of small urban areas amid gently rolling arable and pasture, and thick hedges interspersed with small woods, securing wide-ranging views, reinforcing landscape character, preventing soil erosion, promoting sense of place and tranquillity, and providing recreational benefits.	↗ ***	↗ ***	↔ ***	↔ ***	↔ ***	↗ ***	↗ ***	↔ ***	↔ ***	↑ ***	↗ ***	↔ ***	n/a	↑ ***	↗ ***	↗ ***	↗ ***	↗ ***	↔ ***

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

Landscape attributes

Landscape attribute	Justification for selection
Historic parklands and wood pasture.	■ Substantial estates with parklands and designed landscapes, some being important visitor attractions in addition to being important for biodiversity with their ancient woodland and species diversity. ■ Wood pasture, a priority habitat, survives in many estates. ■ Associated concentrations of notable buildings and estate architecture, and preservation of other heritage assets both above and below ground.
Woodlands largely concentrated in small area.	■ Pockets of semi-natural, often ancient woodlands, mainly in the centre of the NCA near Chippenham. ■ Numerous scattered 'farm' woodlands and copse present isolated patches of woodland in a predominantly agricultural landscape.
Settlement pattern closely related to rivers and transport corridors.	■ Settlements with stone-built centres mainly following old trade routes along Bristol/London axis, many now subject to major growth from the late 20th century onwards. ■ Scattered farmsteads, 19th-century model farms and nucleated villages reflect the agricultural development and historical land use of the area.
River valleys with a diverse range of habitat, notably wet woodland and flood plain grazing.	■ The (Bristol) Avon and some of its tributaries flow in the west and centre of the NCA at the heart of the vale landscape. ■ Fragmented and isolated wetland habitats remain along the river corridors, including flood plain grazing, wet woodland and riverside trees. ■ The earthworks of remnant flood meadow systems are preserved in many existing grassland sites. ■ Localised flooding and the need for alleviation have created and will provide further opportunities for habitat restoration and creation.
Mixed farmland.	■ Food production is, and has long been, an important service in this NCA underpinning the distinct agricultural character of much of the area. ■ Where the soil is heavy, pasture predominates. Elsewhere larger fields of arable dominate the landscape. ■ Livestock was historically more important, but remains a defining element across much of the area.

Landscape attribute	Justification for selection
Kennet and Avon Canal and Wiltshire and Berkshire Canal.	■ Evidence of man's long interaction with the landscape and of recycling features of interest. ■ Evidence of the major contribution to landscape restoration that can be made by enthusiastic volunteers.
Largely a tranquil agricultural landscape away from the settlements, under pressure to accommodate further development.	■ A well ordered landscape with numerous small villages, but being surrounded by land designated an AONB, and with much military land to the south, it faces development pressures on its small towns such as Trowbridge and Melksham.

Landscape opportunities

- Appropriately manage watercourses, wet woodlands, grasslands and meadows, bankside trees and other vegetation to help restore and reinforce the character of the river corridors, and protect them as areas of tranquillity.
- Manage the restoration and replanting of hedgerows and hedgerow trees both to reinforce the traditional field patterns and the local landscape character and in the interests of biodiversity and habitat connectivity.
- Manage and conserve ancient woodlands while exploring opportunities to expand the area and number of small broadleaved woodlands throughout the farmed environment where site-appropriate.
- Plan to engage local communities in the work to accommodate development pressure in towns such as Melksham, Calne, Westbury and Trowbridge by designing and establishing a network of multi-functional greenspaces which both respects the current landscape and increases opportunities for people and nature.
- Foster the development of cycle routes to serve as sustainable transport between the many small urban centres in the NCA and to act as spines for green infrastructure generally.
- Manage arable cropping to encourage rare arable plants and farmland birds, maintaining profitable agriculture while restoring or adding interest to the farmed landscape.
- Protect the many small well-established villages, particularly their historic cores, settlement pattern, green spaces and notable buildings, and the narrow winding lanes that connect them aiming to retain their sense of isolation while ensuring viable and vibrant local communities.
- Seek to maintain the connections between settlements and their agricultural and historical origins.
- Manage heritage assets which provide a sense of history and contribute to the landscape. Plan for, where necessary the change of use of historic buildings to respect local character and distinctiveness.
- Maintain and where possible enhance, the existing geological exposures by agreeing management plans with respective land managers and owners, and seek to develop access to them and their educational potential where possible.

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	Fertile clayey soils Mixed farming Level topography	Mixed farming, with principally livestock grazing, both historically and presently, predominates with pasture on heavier, wetter clay soils and increased levels of cereal production on lighter soils. Smaller fields, with often permanent pasture, are found on the valley floors. Cattle, at around 50,000 animals, are the principal livestock produced from the area. Some fruit growing and market gardening is found in the Bromham area, with open fields.	Regional	The predominance of livestock grazing across much of the area has remained consistent. More than 60 per cent of the area has remained under grass in recent decades. The numbers of holdings principally occupied with cereal production, and the area of land under arable cultivation have also remained consistent at around 20 per cent of holdings and 20 per cent of the farmed area. Holding size is fairly consistent, although the largest holdings are increasing slightly as a percentage of the total. Dairying has seen a marked reduction, by nearly 50 per cent, in the number of holdings in recent years. This is in line with national trends. There has been a greater than 50 per cent reduction in the numbers of pigs reared in the area, again in line with national trends.	Explore possibilities for increasing food production from the area, ensuring the historical balance of pasture and arable cultivation is used to inform where potential may exist. Work with land owners and farmers to identify the most appropriate stocking levels and cultivation methods to maintain or improve soil quality and condition. Seek to maintain the levels of grazing animals particularly where they can be used to help improve the quality and condition of traditional, wet and semi-natural grassland sites.	**Food provision** **Sense of place/ inspiration** **Regulating soil quality** **Regulating soil erosion**

Service	Assets/ attributes: main contributors to service	State	Main beneficiary	Analysis	Opportunities	Principal services offered by opportunities
Timber provision	Broadleaved woodland, often ancient Small farm woods, copse and shelterbelts	Woodland cover is approximately six per cent of the total area, with almost half identified as ancient semi-natural woodland or plantation on an ancient woodland site. Three-quarters of woodlands are broadleaved and there are only 493 ha of conifer plantation. Some ecologically important wet woodlands occur along the margins of the rivers.	Local	Timber provision is low as the current stock is limited and predominantly broadleaved, ancient and generally unmanaged woodlands. There is some scope for expansion in the total area of woodland but this would be insufficient to radically change the character of the area or require much additional infrastructure; however, competing demands for productive farmed land and new development around towns may limit realisation. Some timber for local wood fuel and traditional artisan products could be generated if broadleaved woods and particularly ancient woodlands are brought back into positive management. A one-off crop of timber would be generated by the reversion of plantations on ancient woodland sites to a more appropriate structure and mix. There are practical drawbacks at present with harvesting much timber from woodland associated with watercourses.	Explore opportunities to bring ancient semi-natural woodlands back into positive and traditional management to provide some timber for local wood fuel supply and artisan products. Explore and reinstate traditional coppicing to woodlands where appropriate for making products such as hurdles, fencing and charcoal. Realise all possible opportunities for integrating new woodland into proposed and existing developments around towns and along transport corridors to provide valuable green infrastructure, and reinforce the timbered character of the landscape where appropriate.	**Timber provision** **Biomass energy** **Biodiversity** **Sense of place/ inspiration** **Tranquillity** **Recreation**

Service	Assets/ attributes: main contributors to service	State	Main beneficiary	Analysis	Opportunities	Principal services offered by opportunities
Water availability	Rivers Avon, Frome and Biss, and their tributaries Oolitic aquifer in north-west of NCA	The fringes of the area are underlain by the limestones of the Cotswolds to the west and the, Mendips Hills to the south-west, and chalk to the east. Groundwaters are over abstracted to the north and surface waters from the rivers are not able to make up the difference in supply and demand. In the north-west and around Malmesbury the Jurassic oolitic aquifer forms a major public water source. Quarrying to the south-west of and within the area depletes natural water sources and planning controls are in operation as a means of regulation. There is some use of groundwater to enhance river flows in periods of drought.	Regional	Until recently there has been adequate provision of water from aquifers and groundwater sources, but this is under strain as towns along the M4 corridor expand. Increasing water capture, storage and infiltration potential across the landscape, and particularly in and around the expanding towns, is required. Policy is being developed in the Catchment Management Strategy for the (Bristol) Avon as part of work on the whole Severn River District to limit abstraction in low flow periods. The (Somerset) Frome is affected by discharges of groundwater originally extracted for quarry dewatering. This is a pulsed flow and affects the natural flow patterns, limiting opportunities for further abstraction. The impact of the slowly developing restoration of the Wiltshire and Berkshire Canal is not yet known nor the possible water needs; however, abstraction from the Avon will be required to some extent and in some locations, to be determined.	Work in partnership to develop the Catchment Management Strategy, in particular work with land managers to make maximum, sustainable use of current water resource. Work with land owners and farmers to identify areas where water run-off can be slowed and, through appropriate land management, infiltration rates increased, and where new water capture and storage facilities can be created. Pursue and develop green infrastructure projects, and particularly sustainable drainage systems (SuDS), in new and existing developments and in the catchments affecting urban areas.	**Water availability** **Regulating water quality** **Regulating water flow** **Biodiversity** **Recreation**

Service	Assets/ attributes: main contributors to service	State	Main beneficiary	Analysis	Opportunities	Principal services offered by opportunities
Biomass energy	Woodland concentrated in a few areas only	There has been little uptake of energy crop schemes in this area, with little or no short rotation coppice or miscanthus planting. Plantations and woodland blocks are found (including on former common land and on ancient woodland sites) notably in the vale itself, in blocks and islands that may produce small volumes of biomass used locally. It is not generally encouraged in the Cotswolds AONB.	Local	Potential yields for both miscanthus and short rotation coppice are predicted to be high from this area. However, such planting is likely to be heavily constrained by visual intrusion into a predominantly flat, if undulating, landscape; adverse impacts on the current pattern of enclosure; loss of productive pasture and arable land; further fragmentation of sites of wildlife value; and, risk to heritage assets and archaeological features (ridge-and-furrow and flood meadow earthworks) from cultivation . This may make such planting impractical and unattractive to land managers. Planting of short rotation coppice may be useful in parts to screen more urban development, and may be worthwhile on a site-specific basis. The NCA has however many narrow lanes which would make harvesting a challenge.	Identify suitable locations for biomass planting, taking care not to obscure field boundaries and patterns, or to impede use of flood plains and meadows and their existing and potential ecological and heritage value.	**Biomass energy**

Service	Assets/ attributes: main contributors to service	State	Main beneficiary	Analysis	Opportunities	Principal services offered by opportunities
Climate regulation	Soils low in organic matter Woodland cover of some 3,990 ha Semi-natural habitats, particularly wetlands Permanent grassland	The NCA soils are generally low in organic matter and therefore have low carbon storage potential. Initiatives to improve green infrastructure around modern developments are promoted, in part, to enhance carbon storage.	Local	There is scope to increase the carbon storage potential of the NCA by careful management of soil organic content and structure, expansion of semi-natural habitats, particularly woodlands and wetlands, and by encouraging retention of permanent grassland and where possible reversion of arable to grassland, particularly where this will also help to protect sub-surface archaeology. Bringing woodlands into sustainable management may offer opportunities to enhance carbon storage.	Work with the farming community to promote best practice in soils management, using low pressure machinery and stock management where needed to prevent compaction. Encouraging the use of green manure crops such as nitrogen fixing legumes within arable systems to replace nutrients and bind soils. Seek to restore and reconnect wetland habitats in the flood plain, and expand native woodland into appropriate locations. Seek opportunities to protect vulnerable soils by placing them under permanent grasslands, particularly where this will also protect sub-surface archaeology.	**Climate regulation** **Regulating water flow** **Regulating water quality** **Regulating soil quality** **Sense of place/ inspiration**

Service	Assets/attributes: main contributors to service	State	Main beneficiary	Analysis	Opportunities	Principal services offered by opportunities
Regulating water quality	Soils Semi-natural habitat Farming and other land management practices	Applying Water Framework Directive standards, the chemical and biological quality for the rivers Avon and Frome is generally good. There are some areas within the wider catchment which are classed as moderate or poor ecological status.	Regional	Some analysis suggests that intensive agriculture has led to soil erosion and the resulting levels of sediment reaching the watercourses. There are associated concerns over diffuse pollution impacting on water quality in the NCA. Investigation into sedimentation problems in Bristol harbour suggests that much of this may be the result of activities in/near the Avon within this NCA.	Work with the farming community to ensure best practice in managing soils, nutrients and pesticides. Investigate scope for further targeted Catchment Sensitive Farming initiatives to help protect water quality and the valuable soil resources which farming depends upon. Seek opportunities to implement the Avon Catchment Management Plan when it is finalised; ensure that the needs of Bristol Harbour are taken into consideration with those of other interests, in finding ways to reduce pollution and/or sedimentation.	**Regulating water quality** **Regulating soil erosion** **Biodiversity**

Service	Assets/attributes: main contributors to service	State	Main beneficiary	Analysis	Opportunities	Principal services offered by opportunities
Regulating water flow	Semi-natural vegetation cover, particularly wetlands	There is a long history of flooding, and surface water drainage issues in the urban areas, with limited flood defences in place. Existing flood management is currently seen as effective, though it does not cater for increased risks under predicted climate change. There are some flooding concerns in the Malmesbury area, as it is surrounded by higher land from which many rivers/tributaries flow. Properties in Chippenham, Malmesbury, Melksham and Trowbridge are at risk of flooding.	Local	The main flood risk is from the River Avon – especially in Chippenham, Malmesbury, Melksham, and Trowbridge. Local flood defences exist and are used to help reduce the risk. Opportunities here are set out in the Catchment Flood Management Plan (CFMP) and these include restoring and expanding water meadows and wet woodlands. Wiltshire Council is pursuing green infrastructure in modern developments, with one of its aims being the regulation of water flow. This is an issue throughout the NCA, as the soil is very clayey, water infiltration is limited and there are numerous watercourses.	Work at catchment scale, including with authorities and land managers in adjoining NCAs, to increase the ability of the wider catchment to intercept and store increased volumes of precipitation, regulating the peak flows reaching settlements and farmland in Avon Vales. Pursue opportunities in the Avon CFMP. Seek opportunities to expand wetland habitats in the floodplain, and woodland habitats in appropriate locations which will intercept/hold sediment and excess water flow. Seize opportunities to work in partnership with Wiltshire County Council and developers, to create multi-functional green infrastructure, in particular within the Avon corridor, designed to assist with flood management.	**Regulating water flow** **Regulating water quality** **Regulating soil erosion** **Biodiversity**

Service	Assets/attributes: main contributors to service	State	Main beneficiary	Analysis	Opportunities	Principal services offered by opportunities
Regulating soil quality	Soil type Extensive pasture Hedgerows Woodlands	Nine soilscape types are found in the NCA, the majority including: ■ Slowly permeable seasonally wet, slightly acid but base-rich loamy/ clayey soils (46 per cent of the area) ■ Lime-rich soil over chalk and limestone (15 per cent). The remaining soils are mostly lime-rich but some acid, of varying permeability and thus drainage, mostly clayey and little sand.	Regional	The main soil type is easily damaged when wet by compaction or capping, and this may lead to poor water infiltration, more surface water run-off and thus diffuse pollution. The lime-rich soils in contrast are shallow and are more resilient due to their calcareous nature. Maintaining or enhancing soil structure will aid aquifer recharge (in the western region of the NCA). Careful management of soil organic matter content will ease soil compaction issues and nutrient concerns.	Work with the farming community to ensure best practice in soil management to improve structure and quality of soils. This may be achieved through use of low pressure machinery and managing stock movements to prevent compaction. Encourage the use of green manure crops such as nitrogen-fixing legumes within arable systems to replace nutrients and bind soil, and follow best practice in informed infield nutrient application.	**Regulating soil quality** **Regulating soil erosion** **Regulating water quality** **Regulating water flow** **Carbon storage**

Service	Assets/ attributes: main contributors to service	State	Main beneficiary	Analysis	Opportunities	Principal services offered by opportunities
Regulating soil erosion	Soil type Topography Semi-natural vegetation, including hedgerows Sustainable farming practice and smaller field sizes	The NCA has experienced low levels of soil erosion generally due to the soil type and topography. There is an increased risk of erosion from arable cultivation of lime-rich soils over chalk/ limestone. These soils are commonly unstable and prone to erosion, particularly on slopes: however there is relatively little of this in the NCA. However, some analysis suggests that sediment arising from soil erosion in this area contributes to problems in Bristol Harbour, downstream of the NCA.	Local	The Catchment Sensitive Farming Initiative operates in the south west of the NCA in the Somerset Frome catchment. Objectives for this area include controlling the potential damage to soil and associated sediment run-off arising from trafficking by stock and vehicles, limiting the pathway for soil wash entering watercourses, and protecting the watercourse by fencing to exclude livestock.	Seek opportunities to promote more widely within the NCA the best practice in soils management advocated in the Catchment Sensitive Farming Initiative. Seek to expand networks of semi-natural habitats within the farmed landscape, and promote reversion of arable land to permanent grassland in areas of higher erosion risk, to reduce the risk of exposure and loss of soils.	**Regulating soil erosion** **Regulating water quality** **Regulating water flow** **Sense of place/ Inspiration** **Biodiversity**

Service	Assets/ attributes: main contributors to service	State	Main beneficiary	Analysis	Opportunities	Principal services offered by opportunities
Pollination	Semi-natural grassland Hedgerows	The habitats of this NCA offer fragmented nectar sources for pollinators: hedgerows and areas of species-rich calcareous and neutral grassland and grazing marsh.	Regional	Fruit growing and market gardening is an important contributor to the local economy, for example in the Bromham area. There is potential to expand this industry, which is reliant to some extent on natural pollination. The network of nectar-rich habitat is poor and limits pollination services. This could be improved through hedgerow restoration and greater use of nectar-rich field margins within the farmed landscape. Expanding the network of species-rich grassland habitats within the NCA would also support pollinators and their services to local food production.	Support the expansion of local soft fruit and market gardening enterprises through the creation of an extended network of species rich grasslands and hedgerows across the NCA. Ensure that permanent pasture is maintained and woodlands and hedgerows are restored and managed. Encourage increased use of nectar mixes in field margins to encourage diversity in flowering plants.	**Pollination** **Pest regulation** **Food provision** **Biodiversity** **Sense of place/ inspiration**
Pest regulation	Areas of semi-natural habitat Field margins and hedgerows	For most of the beneficial species which can help in regulating pests, habitat in the Avon Vales is fragmented.	Local	Semi-natural habitats within productive agricultural landscapes may support species which prey on pest species, thereby regulating the potential damage of these to food production. In particular, field margins and hedgerows will foster a variety of species to serve as pest regulators and pollinators.	Enhance the network of semi-natural habitats throughout the farmed landscape of the Avon Vales so they may provide habitat for beneficial predator species in close proximity to main food production areas. Enhance the hedgerow network through restoration and new planting, particularly where this also strengthens local landscape character.	**Food provision** **Pest regulation** **Pollination** **Biodiversity** **Sense of place/ inspiration**
Regulating coastal erosion	n/a	n/a	n/a	n/a	n/a	n/a

Service	Assets/ attributes: main contributors to service	State	Main beneficiary	Analysis	Opportunities	Principal services offered by opportunities
A sense of place/ inspiration	Rivers and riparian features Townscapes and vernacular building style Productive farmed landscape	The undulating valley landscape with its watercourses, including canals, creates a strong setting and sense of place. This valley character is further enhanced by the string of settlements along the Avon, with once-small nucleated towns clustered along its banks. This is an agrarian landscape; fertile and productive.	Regional	Watercourses have shaped the land and led to the distinctive settlement pattern in the Avon Vales, including the historic stone built towns of Calne and Malmesbury. The towns were largely founded on and developed with the medieval wool trade. Some (Melksham) prospered from royal connections, some from being on communications routes. Chippenham is now more a commuter town as a result, rather than a trading town. The NCA has in large part a clear riparian character, which although now influenced by modern development, retains characteristic features such as wetland pastures and wet woodland which are of biodiversity and landscape importance.	Ensure that new developments or changes in land use are successfully integrated into the landscape, using vernacular materials and styles. Seek to expand the riparian semi-natural habitats in the NCA into a coherent ecological network, offering multiple benefits in regulating water flow, recreation and biodiversity. Work with local communities to recognise and celebrate what is characteristic and special about the Avon Vales.	**Sense of place/ inspiration** **Regulating water flow** **Sense of history** **Recreation** **Biodiversity**

Service	Assets/ attributes: main contributors to service	State	Main beneficiary	Analysis	Opportunities	Principal services offered by opportunities
Sense of history	Settlements/village estates Large historic mansions with landscaped parks and influence of 'Capability' Brown Historic (and well restored) canals	Bronze-age and iron-age barrows and occupation sites (such as Cley Hill) have not been fully explored. There is little trace of pre-Anglo-Saxon settlement. In contrast the medieval heritage is widespread and notable in the landscape, with numerous listed buildings, and evidence of agricultural history in the ridge and furrow field topography and the pattern of flood meadows. Place names suggest past wood cover for example Chippenham and Chelwood. The industrial heritage of the area, particularly its canals and railways is reasonably well understood, and much has been done to restore this during the late 20th century.	Regional	Much can be learnt from late 20th-century work on restoring canals and their infrastructure, and the appeal of industrial archaeology can be overlooked; traces of the past wool trade remain for example at Handle house in Trowbridge, a rare teazel drying facility. There may be opportunities for local groups and businesses to draw on the history of the towns in the NCA to foster a sense of community and provide local benefits in sustainable tourism initiatives. Lacock, as site of earliest photography in England, and as surviving estate village of considerable local character, offers opportunities to interpret and enhance the educational and recreational experience of the area's history.	Develop opportunities to increase access to and understanding of the industrial and commercial history of the Avon Vales. Seek opportunities to explore bronze and iron- age sites and increase understanding of early settlement in the Avon Vales. Explore (with locals and National Trust) potential to develop interpretation of Lacock and its status as a site of the earliest photography in England. Investigate opportunities around Malmesbury, with the oldest purpose-built hotel in the country dating from medieval times, as a 'hook' for medieval interest tourism. Seek to restore historic parkland landscapes, and positively manage their veteran trees.	**Sense of history** **Sense of place / inspiration** **Recreation** **Biodiversity**

Service	Assets/ attributes: main contributors to service	State	Main beneficiary	Analysis	Opportunities	Principal services offered by opportunities
Tranquillity	Landform Rivers, streams and riparian corridor Semi-natural habitats, particularly woodlands Historic parkland	Intrusion levels are high throughout much of this NCA, with the M4 corridor and Brunel's railway being a particular focus for disturbance. Higher levels of disturbance are also associated with the towns of Chippenham, Frome, Trowbridge and Warminster.	Local	The NCA has experienced a significant decline in tranquillity since 1960s due to urban expansion and development of roads such as the M4 and A361. The features of this area which contribute to a sense of tranquillity, such as rivers and streams, are therefore of value and importance locally, and opportunities should be sought to protect and enhance these.	Seek to incorporate green spaces and tranquil areas within new development, and to use these to help minimise further noise intrusion or light spill. Seek opportunities around transport corridors to extend and link semi-natural habitats into a coherent network which can aid screening and enhance the local access network. Look to restore wetland habitats in the riparian corridor to enhance the contribution of these areas to an overall feeling of tranquillity within the Avon Vales.	**Tranquillity** **Sense of place/ inspiration** **Biodiversity**

Service	Assets/ attributes: main contributors to service	State	Main beneficiary	Analysis	Opportunities	Principal services offered by opportunities
Recreation	Rights of way network Historic sites	There are many potential recreational assets within the NCA, many of these historic. However, few of these outside the main towns are well developed, and able to compete with the provision in nearby protected areas. There are 2.3 km per km2 of public rights of way. Less than one per cent of the NCA area is open access land.	Local	The best opportunities for enhancing recreation and recreational experiences within the Avon Vales would appear to be around the canals, particularly fishing and boating opportunities on the Kennet and Avon Canal, and improving small attractions, such as at historic visitor sites.	Seek opportunities to enhance recreational use at appropriate levels along the rivers and waterways of the Avon Vales. Seek opportunities to develop sustainable tourism, focused around short journey times and local features of interest, such as a medieval or photography focus. Identify opportunities to create new sections in the rights of way network to improve access for all abilities and facilitate improved and sustainable access to local tourism businesses and attractions.	**Recreation** **Sense of history**

Service	Assets/ attributes: main contributors to service	State	Main beneficiary	Analysis	Opportunities	Principal services offered by opportunities
Biodiversity	Designated sites: 17 SSSI wholly or partly within the NCA (9 being of geological interest); 247 local sites Semi-natural habitat Foraging area for bats from SAC site in neighbouring Cotswolds NCA	Only 0.5 per cent of the NCA is designated SSSI, with a further four per cent designated as local sites. There are 1,000 ha of wet woodland and under 300 ha of flood plain grazing marsh and minimal reedbeds remaining in the NCA.	Regional	Historic land drainage for agriculture has led to the loss and fragmentation of much semi-natural habitat, though the core of a wetland habitat network remains. There are opportunities to buffer and expand these sites to create a more resilient network for a range of habitats and species, and supporting a number of other ecosystem services including regulating water flow and water quality.	Explore potential for restoring wet woodlands, reedbeds and other wetland habitats into a coherent wetland habitats network, supporting bird populations in addition to regulating water services, strengthening sense of place and landscape character and enhancing this feature of the NCA to visitors. Work with the farming community to improve biodiversity within arable systems, such as for farmland birds and pollinators, and explore biomass opportunities in particular where these will enhance biodiversity.	**Biodiversity** **Regulating water flow** **Regulating water quality** **Sense of place/ inspiration** **Recreation** **Biomass energy**
Geodiversity	9 geological SSSI 15 Local Geological Sites	The SSSI are largely in favourable condition. Designated sites protect exposures of a variety of rocks and can help explain their role in the area's industrial history.	Local	The geological sites resource continues to develop as motorway cuttings are now designated. There is an opportunity to further enhance awareness and understanding of the area's geology through further research and other educational developments.	Work with universities, schools and colleges to increase research into and understanding of geological sites within the Avon Vales, seeking to promote this more widely and facilitating access to sites where appropriate.	**Geodiversity** **Sense of place/ inspiration**

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