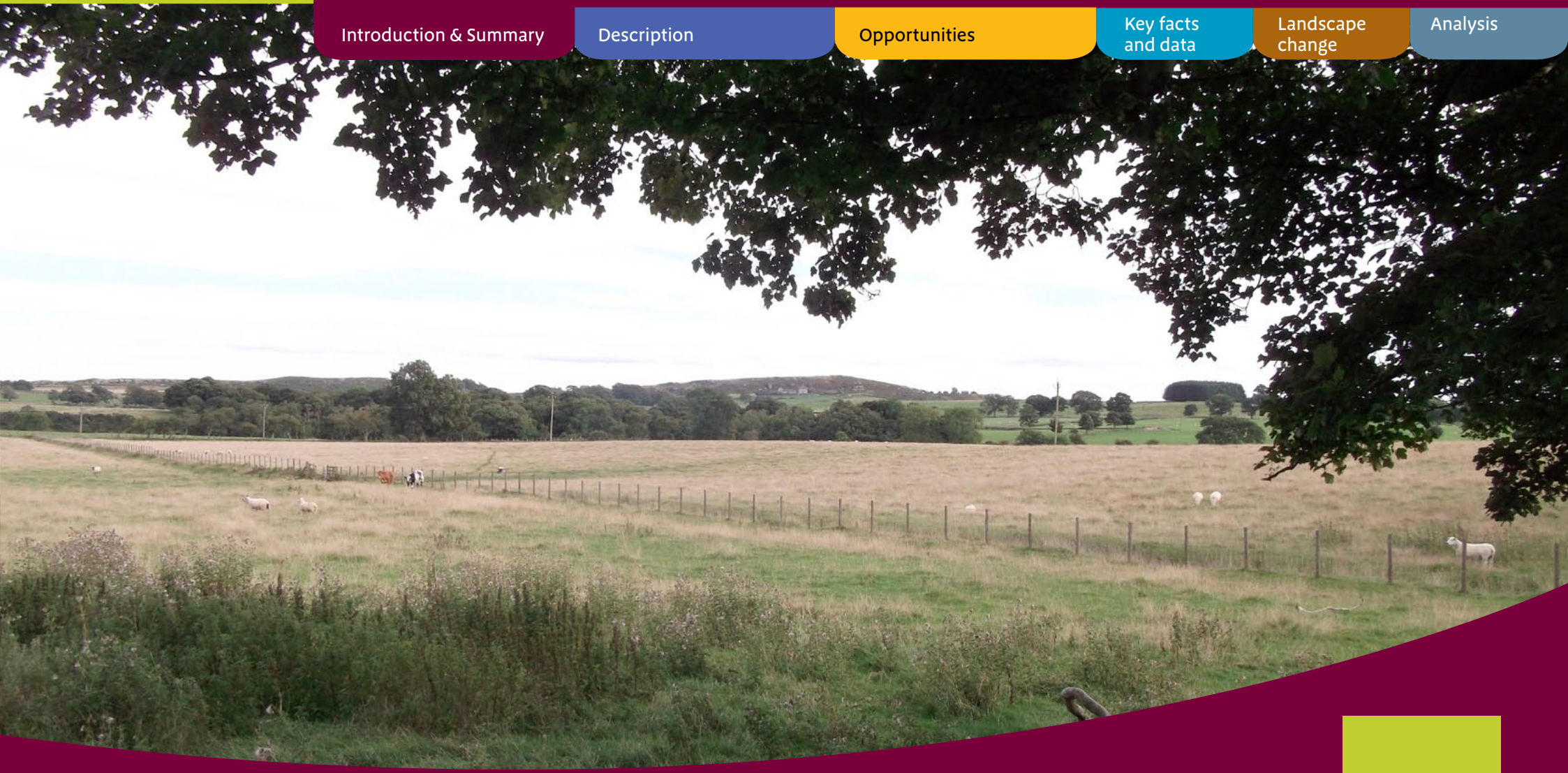
National Character Area profile:

12. Mid Northumberland



NATURAL ENGLAND

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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.

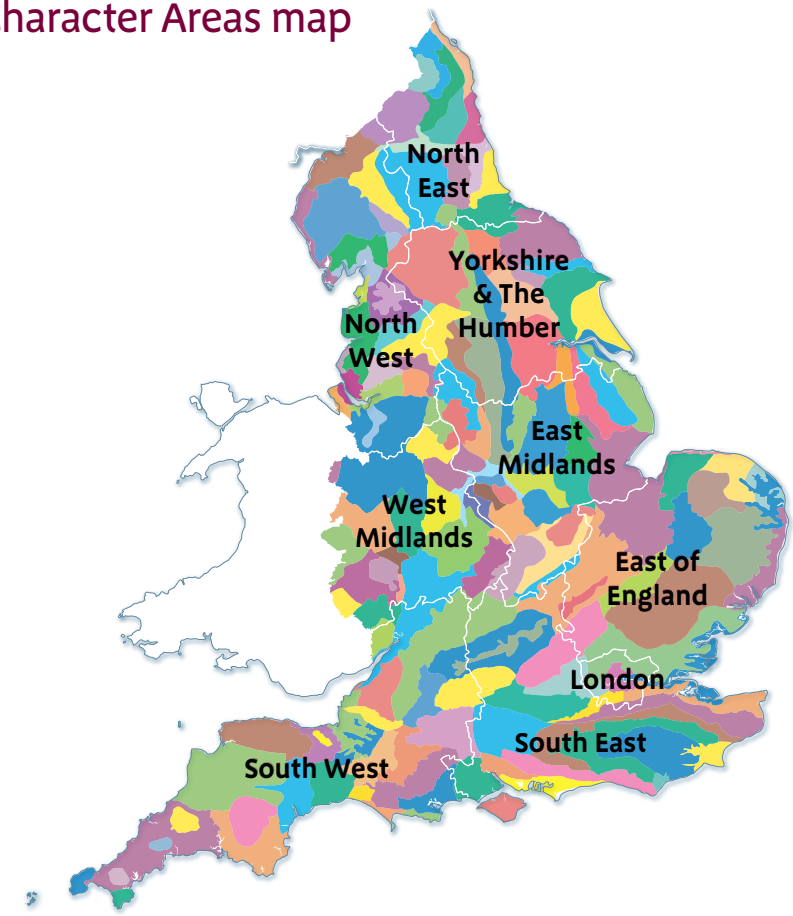
NCA profiles are guidance documents which can help communities to inform their decision-making about the places that they live in and care for. The information they contain will support the planning of conservation initiatives at a landscape scale, inform the delivery of Nature Improvement Areas and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

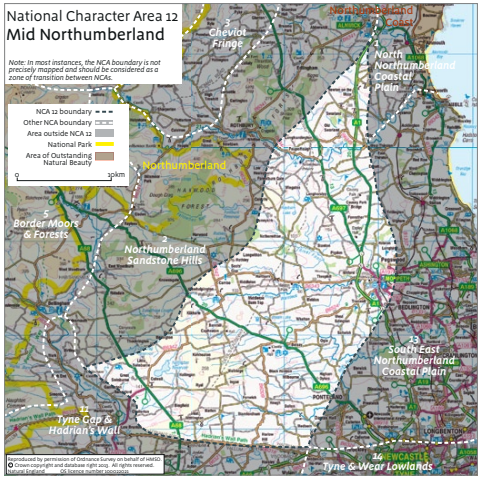
Summary

Mid Northumberland is an intermediate plateau of gently undulating farmland which forms a transitional area between the Northumberland Sandstone Hills to the west and the low-lying coastal plain to the east. A series of ridges and enclosed river valleys in the northern part of the area open out into a broader, flatter landscape in the south. Hadrian's Wall World Heritage Site forms the southern border to the National Character Area (NCA).

The area is dissected by several small rivers which flow eastwards to the sea. The River Coquet flows down from the Cheviots, while the rivers Font, Wansbeck and Blyth and their tributaries wind down from the sandstone hills and upland pastures through wooded valleys and lowland arable areas. Within this predominantly farmed landscape there are many small woodlands and shelterbelts, and a few areas of open water, relatively infrequent within Northumberland.

There are opportunities in this landscape to buffer, expand and link the fragments of semi-natural habitats into a coherent ecological network of woodlands, wetlands, heathland and grasslands, while enhancing the wider public benefits that are received from functioning ecosystems, such as improved carbon storage, better management of soils and water quality thereby supporting sustainable farming, and improved capacity of the land to hold water and thus regulate water flow, flooding being a recurring threat to the town of Morpeth.

This is a rural area of generally high tranquillity, with a great diversity of heritage assets, from the earthworks of prehistoric and medieval settlements to bastles, tower houses, farmsteads and designed parklands. These present the landscape framework and sense of place within which pressures for change will need to be accommodated.



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Statements of Environmental Opportunities:

- **SEO 1:** Work at river catchment scale to protect and enhance the farmed landscape, restoring semi-natural habitats into effective ecological networks, managing soil and water resources for carbon storage, improved regulation of water flow, water quality and biodiversity, ensuring a sustainable future for farming and increasing resilience of native flora and fauna to environmental change.

- **SEO 2:** Secure sustainable management of the woodland within the NCA, including ancient semi-natural woodlands, coniferous plantations and designed parklands, increasing woodland cover to form a coherent habitat network which provides an extensive range of benefits including carbon storage and reducing diffuse pollution, and enhancing sense of place, recreation and tranquillity. Design new woodland to ensure that it supports strongholds of the red squirrel population and other woodland wildlife.

- **SEO 3:** Protect and enhance the rich historic environment and the geological interest of Mid Northumberland, from Hadrian's Wall World Heritage Site to historic parks and gardens, promoting greater awareness, understanding and enjoyment of these.

- **SEO 4:** Protect and enhance the area's traditional farmsteads, houses and other buildings and its landscape and settlement context, ensuring that new development improves biodiversity, is integrated into the rights of way network and makes sustainable use of natural resources, adding to local distinctiveness and protecting the area's high levels of tranquillity.

The National Trust's Wallington Estate walled garden and greenhouses - country houses are characteristic of the area, typically set within designed parklands or ornamental woodlands.

Description

Physical and functional links to other National Character Areas

This is a transitional landscape, lying between the Northumberland Sandstone Hills to the west, the Tyne Valley to the south and the Northumberland coastal plains in the east. The rivers Coquet and Wansbeck provide the main functional links with surrounding NCAs: the Coquet's headwaters rise in the Cheviots NCA, where high rainfall can result in flooding downstream in Mid Northumberland. The rivers Font, Wansbeck, Blyth and Pont all rise in the sandstone hills and flow east to the coastal plain. In the south-west, small tributaries of the North Tyne flow south and west to eventually join the Tyne.

The A68 and A696 transport corridors reflect the general west-to-east connectivity and the A1 and A697 create a strong north–south link. The dominant orientation of landform here, dipping gently to the North Sea, can create particularly striking views from east to west, looking inwards to and outwards from this NCA, including occasional glimpses of the sea and coast. The Tyne Gap and Hadrian's Wall NCA forms the southern boundary.

Small woodland shelterbelt around exposed farm buildings.

Key characteristics

- This intermediate upland fringe plateau comprises a series of ridges and river valleys in the north, opening out into a broader, flatter landform in the south and east.
- Underlain by Carboniferous sedimentary rocks, glacial till covers much of the land, creating gentle undulations, broken by outcrops of sandstone and the igneous Whin Sill.
- Woodland cover is variable, with the well-wooded valleys of the rivers Font, Wansbeck and Coquet containing semi-natural and ancient woodland, mixed woodlands and parklands within the country estates, and small coniferous blocks and belts of trees on the more open farmland to the south. The conifer blocks support populations of red squirrel.
- Dissected by several small rivers which flow eastwards to the sea: the River Wansbeck is home to species such as the black-necked grebe and white-clawed crayfish, while the River Coquet supports salmonids and lamprey.
- A few large reservoirs and ornamental lakes provide distinctive areas of open water, an otherwise uncommon feature in Northumberland.
- Large rectilinear fields are characteristic, enclosed by stone walls at higher altitude, and hedgerows with hedgerow trees on lower-lying land.
- Arable and cattle farming are predominant on the lower land; at higher altitude sheep rearing and fodder crops are characteristic.
- Frequent country houses and fortified defensive structures, typically set in landscaped parklands, including the Kirkharle Estate, the boyhood home of Lancelot 'Capability' Brown.
- Main village settlements radiate from the ancient market town of Morpeth, the only sizeable settlement, linked by a network of minor roads, and with many scattered farmsteads.
- Roman legacy in the landscape including Hadrian's Wall World Heritage Site, and Dere Street, now the A68.
- Farmsteads and villages, the latter often centred on greens, are frequently surrounded by extensive medieval ridge and furrow and earthworks.
- Traditional buildings are generally of sandstone, with gritstone at higher altitudes.
- Major active hard rock quarries, and some small building stone quarries within the NCA.
- A quiet, rural area, with few settlements and few major roads, characterised by a high proportion of 'undisturbed' land. Hadrian's Wall World Heritage Site is a major tourism attraction but low levels of recreational use and provision are more characteristic of the area.

Mid Northumberland today

Mid Northumberland is an intermediate plateau of gently undulating farmland which forms a transitional area between the Northumberland Sandstone Hills to the west and the low-lying coastal plain to the east. A series of ridges and enclosed river valleys in the northern part of the area open out to a broader, flatter landscape in the south. The area is underlain by sedimentary rocks of Carboniferous age, consisting mainly of sandstones, shales and some mostly thin bands of limestone. The Whin Sill, the collective name for a series of horizontal igneous intrusions extending from the Farne Islands to Cross Fell in Cumbria, is intruded into the Carboniferous sediments. Glacial deposits (mainly till) resting on the bedrock create the gently undulating landform and support relatively fertile soils.

The area is dissected by several small rivers which flow eastwards to the sea. The River Coquet rises in the Cheviots and winds across the north of the area, while the Font and Wansbeck and their tributaries flow down from the moorland fringe and upland pastures through wooded valleys and productive lowland farmland. In an exception to this general pattern, the land to the west of Kirkheaton drains westwards into the North Tyne River via a number of small 'burns' and water supply reservoirs. Within this predominantly farmed landscape there are a number of areas of open water, relatively infrequent within Northumberland, including the extensive Hallington Reservoirs, and the landscaped ornamental lakes at Wallington, Belsay, Capheaton and Bolam.

The higher plateau areas to the west are relatively open and windswept, with large rectilinear fields of improved pasture enclosed by traditional stone walls or fragmented hedgerows. By contrast, the northern area is characterised by a series of ridges and intimate wooded valleys, creating a soft and varied landscape. To the south and west of the A696, sheep and cattle graze on mainly improved pasture and grasslands within large rectilinear fields that are characteristic of 18th- and 19th-century enclosures. The landscape here has a distinctive regularity, reflected in a strong pattern of traditional stone walls and hedgerows, the long, straight country roads, and the geometric form of coniferous woodland blocks, often planted to provide shelter to scattered farmsteads within an otherwise exposed landscape. To the east the landscape of the River Pont Valley is relatively open and broad in scale. Here the farmland is intensively cropped with arable crops, and some diversification into horse grazing and livery.

In such a predominantly agricultural landscape, much semi-natural vegetation is now restricted in extent to remnant lowland heath on Longhorsley Moor (the best area of lowland heath in Northumberland) and to the oak, ash and alder woodlands which characteristically line the valleys of the rivers Coquet and Wansbeck. Veteran and hedgerow trees are key features of the agricultural and parkland landscapes, while ash and sycamore are the most frequent roadside hedgerow trees. Small fragments of calcareous grassland remain, associated with the occasional underlying bands of limestone geology. The River Wansbeck is home to species such as the black-necked grebe and white-clawed crayfish. Small coniferous plantations hold populations of red squirrel. Grassland on the thin soils of the Whin Sill supports an unusual and specialised flora, the plant communities

occurring in mosaics with acid grassland species in close association with those of calcareous grassland, for example at Gunnerton Nick Site of Special Scientific Interest (SSSI) and Bavington Crags SSSI.

Rivers are important habitat corridors, and the broadleaved woodlands including alder and ash associated with rivers are features of this landscape that contribute strongly to a sense of tranquillity. The River Coquet and Coquet Valley woodlands form the largest SSSI in the NCA. The rivers in the catchment are important fisheries, especially the Coquet which supports salmonids and lamprey, providing recreational angling opportunities. Loss of soils from fields within the catchment and the related transportation of phosphates into the river have impacted on water quality and salmonid spawning in the Coquet. Since 2006 the Catchment Sensitive Farming Project has provided advice and grants to farmers here to improve soils and nutrient management. At Brinkburn Priory in the Coquet Valley there are notable populations of bats including Daubenton's, Natterer's, Brandt's, noctule and pipistrelle.

Settlements are typically characterised by a pattern of dispersed, small nucleated villages, many of medieval origin or earlier. Some, such as Ryal, Ingoe and Kirkheaton, are sited along ridgetops, while others occupy strategic locations as bridging points within river valleys, for example Netherwitton on the River Font. They include picturesque 'green villages', which were originally developed around a rectangle of open land on which stock could be securely grazed; Kirkwhelpington, Matfen and Stamfordham are particularly well-preserved examples in this area. Country houses and fortified defensive structures (bastles) are frequent and characteristic of the area, typically set within designed parklands and ornamental woodlands on country estates, including Wallington, Dissington Hall, Bolam Hall and Belsay Castle, and Kirkharle Estate, the boyhood home of the eminent landscape gardener Lancelot 'Capability' Brown. Characteristic building materials are the warm-coloured local fell sandstones and gritstone at higher altitudes.

There are some major hard rock quarries within the southern part of the NCA, Barrasford being the largest, but also Divethill, Swinburne and Keepershield, and some smaller building stone quarries. The only major settlement in the area, the ancient market town of Morpeth, is strategically located where the Great North Road crosses the River Wansbeck. It lies at the centre of a radiating pattern of minor roads serving the surrounding villages. The A1 now bypasses Morpeth and the A68 follows the route of the Roman Dere Street, crossing the south-west corner of the NCA. Hadrian's Wall is the most prominent Roman feature evident in today's landscape – this is a World Heritage Site, a popular visitor attraction, and forms the southern boundary to the NCA along with the associated National Trail, the Hadrian's Wall Path.

The landscape through time

Mid Northumberland is a plateau landscape, intermediate in height and tilting gently to the south-east. During the early Carboniferous era, the area formed part of the Northumbria Trough, a subsiding basin in what is now northern England and southern Scotland. Interactions between the subsidence and the supply of sediment from the uplands resulted in an environment that varied between open marine and delta tops, producing the alternations of sandstone, mudstone and limestone that now characterise the bedrock of the NCA. Extension of the crust during the later Carboniferous led to the intrusion of dolerite dykes and sills typified here by the Whin Sill complex.

Extensive ice sheets moved slowly eastwards across the area during the last glacial period. Debris deposited by the ice forms an almost complete mantle of boulder clay or till over virtually the entire area, giving rise to the gently undulating landform of today. Resistant rocks protrude from beneath the till cover, creating locally prominent features such as the sandstone crags of Rothley and Shaftoe, and the Whin Sill crags at Gunnerton.

The Mid Northumberland landscape is rich in the earthwork and buried remains of prehistoric settlement and land use including standing stones, rock art, tumuli, farmsteads, iron-age defended settlements, cairns and beacons which remain as landscape features on prominent ridgetop sites and are also found interspersed across the farmed landscape of the area. The Roman legacy includes Hadrian's Wall, which forms the southern boundary to the NCA, and the site of the modern A68 road, which follows the alignment of the Roman Dere Street. Together with the German Limes and the Antonine Wall, Hadrian's Wall (built from around 122 ad on the orders of the Emperor Hadrian) forms part of the Frontiers of the Roman Empire World Heritage Site. Romano-British settlement was extensive, although its evidence in the landscape has been largely reduced by ploughing, leaving cropmark evidence of settlements, routeways and field boundaries. Enclosed settlements and farmsteads from this period probably continued in use until the 7th–9th centuries when villages were first established in association with large, open arable fields, hay meadows and common grazing.

Modern settlement closely follows this medieval pattern of nucleation, much of which was established and planned in the 12th and 13th centuries: small villages sited on ridges in the south-west or at the crossing points of rivers, and houses clustered around greens where stock were kept, relatively safe from border raids. Despite these intermittent raids, indications are that the area continued to be important for farming. In response to the raids, small castles, high-status tower houses and defensible farmhouses (bastles) were built, both within and away from village settlements. Some, such as at Mitford, Belsay, Shortflatt and Ray Demesne, still form distinctive features in the landscape. Remnants of medieval open field systems and also the remains of deserted villages provide evidence of the 'shrinkage' of larger medieval settlements through the 14th and 15th centuries, particularly within the southern part of the area, while others were abandoned.

This process continued into the 17th, 18th and 19th centuries; the area has a rich survival of country houses, farmsteads and houses from this period which developed within fields resulting from the piecemeal enclosure of medieval farmland and rough ground. This rebuilding and re-organisation of the landscape and the development of farmsteads and dwellings away from villages in newly enclosed fields reflected the more settled border conditions

that increasingly prevailed from the late 16th century and the proximity of the area to emerging industrial centres and export markets further east. Industrial wealth sustained the rebuilding of many estates.

Fine country houses were constructed throughout the area, many of them incorporating original medieval fortified towers and castles. Most of the mansions were located within fine settings in designed parklands laid out with tree-lined drives and ornamental lakes. Belsay Castle is a particularly good example, as is the Kirkharle Estate, which was the childhood home of the great landscape gardener Lancelot 'Capability' Brown. The improvement of farmland for arable and root cropping went hand in hand with the establishment of lime kilns which dot the area and the replanting of woodland and rebuilding of rural farmsteads, using local sandstone and grey slate, for threshing grain and yard-fed cattle.

Between the 17th and 19th centuries many fields were enclosed, creating strong patterns of large, regular rectilinear fields bounded by hedges or, at higher altitudes, drystone walls. Since 1891 Newcastle University's Cockle Park Farm within the NCA has been influential in agricultural management across northern England, running the world's second-oldest continuous grassland experiment, the Palace Leas hay plots, which started in 1896.

Since the 20th century the landscape has continued to be shaped by agricultural change, with enlargement of fields and loss of some boundary features. Mid Northumberland's settlements and roads support a strong commuter function. The growth of Morpeth and Ponteland, pressure to expand villages, changes in use of farm buildings to residence and business premises, and the upgrade of the A1 and other major transport routes such as the A68, A696 and A697 have brought a corresponding decline since the 1960s in the measures of tranquillity and the extent of 'undisturbed' countryside. Quarrying for open cast coal and hard rock has been active in the area from the late 18th century, and occasionally before; there are no active open cast coal sites remaining, some are now restored, while a number of large hard rock quarries remain active in the southern part of the NCA. Growth in the renewable energy sector, particularly wind energy, has introduced this new element in the landscape. Some of the early trials in wind energy technology were carried out in the NCA in the Kirkheaton area; today the pattern of wind energy developments tends to be single or small clusters of turbines.

Bridge over the River Wansbeck, Wallington.

Ecosystem services

The Mid Northumberland 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 Mid Northumberland NCA is contained in the 'Analysis' section of this document.

Provisioning services (food, fibre and water supply)

- **Food provision**: Mid Northumberland supports a mixed farming system, predominantly of livestock and cereal production, alongside cash roots and stock feed, making an important contribution to the rural economy. The rivers in the NCA are important fisheries. Locally produced food has the potential to play an important role in supporting tourism in the area, and in the process to encourage a locally sustainable green economy.

- **Water availability:** The rivers Coquet, Wansbeck and Blyth are the principal sources of water supply in Mid Northumberland – the predominant (80 per cent) use of abstracted water is public water supply, followed by industrial and commercial (11 per cent).

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

- **Regulating soil erosion:** The north of the NCA falls within the Tweed, Aln, Coquet and Coastal Streams Priority Catchment designated under Defra's Catchment Sensitive Farming Project. Land management measures are supported which reduce the run-off of soil from agricultural fields and therefore help to regulate soil erosion.

- **Regulating soil quality:** The Catchment Sensitive Farming Project promotes and supports good soil management in the north of the NCA. This approach to working with the farming community encourages best practice in soil management to improve the structure and quality of soils, and hence the value of soils in food production.

- **Regulating water quality:** The rivers are an important source of water supply for domestic and industrial use; regulating their quality is a critical service. Sustainable management of upper catchments to reduce soil erosion, careful infield nutrient or pesticide application with buffer strips to watercourses and maintenance of farmyard infrastructure will improve the quality of the water provided within the NCA.

- **Regulating water flow:** The physical characteristics of the River Coquet catchment mean that it can often respond rapidly to high rainfall events in its upper reaches and create a high risk of flooding. Improving the biological condition of semi-natural habitats including wetland habitats in the upper reaches of the catchment can assist in mitigating the severity of flood events. Morpeth in the Wansbeck catchment suffered serious flooding in 2008. Morpeth's Flood Alleviation Scheme now seeks to reduce this risk of flooding

by storing floodwater upstream near Mitford and 'debris catching' to prevent bridge blockages in the town. Other opportunities include creating semi-natural wetland habitat upstream to increase floodwater storage capacity and absorb some of the energy associated with peak flow events. Conversely, this may also maintain water flows during periods of drought. Restoring the natural function of river systems which can respond dynamically to increased flow will also alleviate some flood risk.

Cultural services (inspiration, education and wellbeing)

- **Sense of place/inspiration:** Sense of place and inspiration are strongly associated with the area's diversity of woodland, enclosed and unenclosed land, and its numerous parkland landscapes and historic country houses, including Kirkharle Estate which was the childhood home of Capability Brown, and more locally within the wildlife-rich broadleaved woodlands that line the river valleys. Red squirrel is an iconic species of Britain's native fauna and a feature of this local landscape.

- **Sense of history:** The area has a rich diversity of designated and undesignated heritage assets which offer a strong sense of its prehistoric and Roman past, the continuation of settlement into the Anglo-Saxon period, the impact of the Norman invasion on its settlement pattern, cross-border instability and the development of many estates with their parkland settings and improved farmland and farmsteads.

- **Tranquillity:** This is a quiet, rural area, with few settlements and few major roads. While still high at 80 per cent, the area of land classed as 'undisturbed' has declined from 92 per cent since the 1960s. A sense of tranquillity is most likely to be associated with the semi-natural woodlands lining the river valleys and the areas of parkland and open standing water, especially away from the major roads.

- **Recreation:** Recreation is supported by the area's rights of way network, including the Hadrian's Wall Path National Trail which extends for 9 km within the NCA. The access network supports a number of recreational opportunities including angling, horse riding, bird and wildlife watching and walking. Recreational opportunities and access provision in the area provide health and wellbeing opportunities for local people and visitors.

The River Wansbeck is home to species such as the black necked grebe and white clawed crayfish.

Statements of Environmental Opportunity

SEO 1: Work at river catchment scale to protect and enhance the farmed landscape, restoring semi-natural habitats into effective ecological networks, managing soil and water resources for carbon storage, improved regulation of water flow, water quality and biodiversity, ensuring a sustainable future for farming and increasing resilience of native flora and fauna to environmental change.

For example, by:

- Supporting the farming community to ensure good management of soils, nutrients and pesticides and enhanced carbon storage, through employing measures such as crop selection, minimum tillage, increased use of nitrogen-fixing legumes within well-informed crop rotations, managed organic matter levels in soils, and informed nutrient and pesticide application based on regular infield analysis.
- Encouraging the creation of uncultivated margins to arable fields and buffer strips of permanent grassland and scrub alongside watercourses to reduce nutrient and sediment run-off.
- Encouraging arable reversion to protect earthworks and archaeological features, particularly where there is a high risk of damage to important sites.
- Encouraging the use of farm machinery which exerts low ground pressure and controlled stock movements around watercourses and on soils prone to compaction or erosion.
- Maintaining mixed farming and encouraging extensive grazing regimes on semi-natural grasslands.
- Seeking to create permanent grassland or areas of semi-natural habitat within the arable landscape, linking existing semi-natural habitats and improving rainwater infiltration.
- Continuing to promote improvements in farm infrastructure and waste management alongside improvements to wastewater storm overflows, to cope with increased intensity and frequency of rainfall events.
- Improving farmland biodiversity and food security by enhancing the network of semi-natural habitats throughout the farmed landscape, buffering and expanding existing sites, creating conservation headlands and grass margins, and using pollen and nectar and wild bird seed mixes to encourage invertebrates, birds and rare arable plants.
- Improving the long-term condition of designated wildlife sites and core areas of priority habitat such as the Whin grasslands and the lowland heath at Longhorsley Moor, with the species that they support, by expanding or buffering sites, linking them with other areas of semi-natural habitat, and creating a coherent and resilient ecological network across the landscape.
- Managing the network of hedgerows, restoring those which form part of coherent historic field patterns, with particular focus on hedgerows which run across the dip of slopes or within flood plains, to reduce lateral water flows, soil erosion and sedimentation to watercourses.
- Working with the farming community to improve the sustainable use of water through land management practices including crop selection, irrigation techniques and water harvesting, to create greater resilience in times of drought.

SEO1 continued on next page

SEO1 continued from previous page

- Seeking opportunities to protect or restore natural river morphology, reconnecting the rivers with their floodplains, with dense and diverse riparian vegetation, and restoring functioning wetland habitat networks within the flood plains of the Coquet, Font, Blyth and Wansbeck and their tributaries.
- Controlling the spread of invasive species and threats to salmonids, white-clawed crayfish and other native species.
- Extending floodwater storage capacity on the rivers Wansbeck and Coquet upstream of settlements such as Morpeth and Felton, ensuring that flood storage areas are well integrated within the landscape, and also helping to manage water supply during drought conditions, and making a positive contribution to habitat networks and biodiversity.
- Working with land managers in Mid Northumberland and in upstream National Character Areas (NCAs) (Northumberland Sandstone Hills and the Cheviot Fringe) to promote sustainable land management practices which will improve the condition and function of upland habitats, reducing the amount and rate of run-off, erosion and sediment supply to watercourses.

Country houses and fortified defensive structures, typically set in landscaped parklands.

SEO 2: Secure sustainable management of the woodland within the NCA, including ancient semi-natural woodlands, coniferous plantations and designed parklands, increasing woodland cover to form a coherent habitat network which provides an extensive range of benefits including carbon storage and reducing diffuse pollution, and enhancing sense of place, recreation and tranquillity. Design new woodland to ensure that it supports strongholds of the red squirrel population and other woodland wildlife.

For example, by:

- Promoting appropriate management of existing woodland for multiple uses including timber, biodiversity and recreation and, where appropriate, bringing unmanaged woods into management, while ensuring that key components such as deadwood are retained.
- Managing ancient woodlands and restoring native broadleaved species in Plantations on Ancient Woodland Sites.
- Increasing native woodland and scrub cover in appropriate locations such as on steep slopes and in valleys to reduce run-off, erosion and sedimentation, and also helping to regulate water flow, ensuring that this does not replace valuable wetland or grassland habitat or damage archaeological ground features.
- Seeking opportunities to restore or create woodland and scrub within the Coquet, Font, Blyth and Wansbeck valleys, in locations which will extend, buffer or link fragmented woodland into a coherent and robust ecological network which can regulate soil erosion and water quality and strengthen landscape character.
- Where appropriate, restructuring conifer woodlands by increasing the proportion of broadleaved species to enhance landscape character and woodland wildlife; in red squirrel strongholds, blocks of conifer woodland should be retained to help to sustain the population.
- Working with the farming community to identify suitable opportunities for short rotation coppice or miscanthus biocrops, where these may be accommodated within local landscape character without impacting on biodiversity or the many archaeological ground features, and provide enhanced regulation of soil erosion, water flow and water quality.
- Managing trees and woodland within parklands such as Wallington and Belsay, retaining key features of their historic design, restoring wood pasture and managing specimen and veteran trees, and linking these sites within a wider woodland network including hedgerows and hedgerow trees, enhancing local sense of place and tranquillity.
- Enhancing and, where appropriate, extending access provision within forests and woodlands to provide opportunities for walking, cycling, horse riding and wildlife watching, ensuring access for people of all abilities where possible.

SEO 3: Protect and enhance the rich historic environment and the geological interest of Mid Northumberland, from Hadrian's Wall World Heritage Site to historic parks and gardens, promoting greater awareness, understanding and enjoyment of these.

For example, by:

- Maintaining as features of the landscape archaeological evidence including upstanding remains such as standing stones, cairns and beacons, and evidence of medieval and earlier settlement and land use and farming practices.
- Promoting the identification and recording of archaeological features, providing information and access to these as appropriate, while recognising the high potential in this area for undiscovered remains.
- Targeting management and advice to reduce the number of 'at risk' heritage sites.
- Promoting and supporting land management practices such as extensive grassland management, arable reversion and shallow ploughing, to reduce the damage to sub-surface archaeology, particularly remains of Romano-British and medieval settlement, and historic field systems such as ridge and furrow, and to aid in the interpretation of the landscape.
- Maintaining or improving the condition of historic buildings and Registered Historic Parks and Gardens, optimising their biodiversity and amenity value.
- Maintaining Hadrian's Wall World Heritage Site and other Roman remains of national and international significance and their wider setting, promoting appropriate access and interpretation to improve understanding and enjoyment of these features.
- Supporting and assisting the World Heritage Site Committee in implementing the Hadrian's Wall Management Plan.
- Working in partnership with geologists and schools and colleges, identifying sites of local and regional importance for geology and geomorphology, and preparing site-specific management advice.
- Promoting educational opportunities and research at geological sites such as the Whin Sill to increase knowledge, understanding and enjoyment of these features.
- Maintaining the long-term condition of geological and geomorphological sites and features by enabling geomorphological processes to prevail at a more natural rate, including those associated with fluvial processes.

SEO 4: Protect and enhance the area's traditional farmsteads, houses and other buildings and its landscape and settlement context, ensuring that new development enhances biodiversity, is integrated into the rights of way network and makes sustainable use of natural resources, adding to local distinctiveness and protecting the area's high levels of tranquillity.

For example, by:

- Ensuring good management and restoration of Registered Historic Parks and Gardens to retain their historic integrity, protecting key features while adapting to current needs and enhancing biodiversity and amenity value, and providing suitable access for people of all abilities where possible.
- Maintaining and restoring the strong rectilinear patterns of the distinctive traditional stone wall field boundaries and network of minor roads.
- Conserving traditional green villages and isolated farmsteads with their associated ridge-and-furrow earthworks, ensuring that new developments and changes in land use are successfully integrated into the landscape, using local building stone and vernacular styles for restoration of historic buildings, and respecting traditional settlement and historic field patterns.
- Maintaining and developing the rights of way network, including cycle networks, promoting the creation of new 'green infrastructure' to better link communities and publicly accessible sites of interest, such as historic homes and designed parklands.
- Exploring opportunities for circular routes off the Hadrian's Wall Path National Trail, to promote wider access to and appreciation of the area, to reduce localised problems associated with high visitor use and to encourage local economic benefits.
- Protecting and enhancing the area's traditional and historic architecture and settlement patterns by using knowledge of these to inform management of the built and natural heritage, for example in conserving historic buildings and in securing multiple benefits in the provision of high-quality green infrastructure networks.
- Developing opportunities for freshwater angling that can complement riverine and wetland management for biodiversity.
- Working with businesses to improve the sustainable use of water and ensure that sustainable drainage systems are designed as part of multifunctional green infrastructure into new development.
- Protecting the flood plain from development which could reduce ground permeability and increase surface water flows.
- Continuing to promote improvements in farm infrastructure and waste management.
- Seeking opportunities to create semi-natural habitat for birds and invertebrates associated with transport corridors and road verges.
- Managing lighting in settlements and along transport routes to minimise the impacts of light pollution on night skies and biodiversity, while maintaining the safety of users.

Supporting document 1: Key facts and data

Total area: 63,726 ha

1. Landscape and nature conservation designations

There are no National Park or Area of Outstanding Natural Beauty designations within this NCA.

Source: Natural England (2011)

1.1 Designated nature conservation sites

The NCA includes the following statutory nature conservation designations:

Tier	Designation	Name	Area (ha)	Percentage of NCA
International	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
National	Site of Special Scientific Interest (SSSI)	A total of 4 sites wholly or partly within the NCA	144	<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 25 Local sites in Mid Northumberland covering 1,463 ha, 2 per cent of the NCA.

Source: Natural England (2011)

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

1.1.1 Condition of designated sites

SSSI condition category	Area (ha)	Percentage of SSSI in category condition
Unfavourable declining	0	0
Favourable	24	17
Unfavourable no change	0	0
Unfavourable recovering	118	83

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

Elevation ranges from 19 m above sea level to a maximum of 265 m at Kirkheaton. The average elevation is 127 m.

Source: Natural England 2010

2.2 Landform and process

Mid Northumberland forms an intermediate plateau of gentle undulations that falls gradually towards the south and east.

Source: Border Uplands Natural Area Profile, Mid-Northumberland Countryside Character Area description

2.3 Bedrock geology

The area is underlain by sedimentary rocks of the Carboniferous age, mainly sandstone, shales and some, mostly thin, limestone, intruded by the Whin Sill, consisting of bands of dolerite. These rocks form the prominent sandstone crag of Rothly and Shaftoe, and the Whin Sill crags at Gunnerton. There are isolated outcrops of Great Limestone at Ryal. A breakdown of solid geology as a proportion of total land area is as follows: 56 per cent mudstone, sandstone and limestone; 21 per cent sandstone; 12 per cent limestone, sandstone, siltstone and mudstone; 7 per cent limestone; 4 per cent mudstone, siltstone and sandstone; <1 per cent quartz-microgabbro and <1 per cent microgabbro.

Source: Border Uplands Natural Area Profile, Mid-Northumberland Countryside Character Area Description, Natural England (2010)

2.4 Superficial deposits

Glacial deposits form almost a complete mantle of boulder clay across the NCA. This gives rise to a relatively featureless gently undulating landform except in places where outcrops of the bedrock create rocky crags.

Source: Border Uplands Natural Area Profile, Mid Northumberland Countryside Character Area description

2.5 Designated geological sites

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

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

Deposits of glacial till give rise to relatively fertile soils which support managed grasslands and arable farming.

2.6 Soils and Agricultural Land Classification

The majority of the area is classified as Grade 3 land, with relatively fertile soils due to the glacial deposits. This supports intensive arable and improved pasture in the south and east of the NCA. Poorer soils are found at higher altitudes, limiting agriculture to livestock rearing. These merge with fodder crops and arable crops on the lower, better quality land towards the east. 31 per cent of the area is Less Favoured Area (LFA) land.

Source: Natural England (2010)

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

Agricultural Land Classification	Area (ha)	Percentage of NCA
Grade 1	0	0
Grade 2	0	0
Grade 3	52,275	82
Grade 4	9,760	15
Grade 5	1,155	2
Non-agricultural	89	<1
Urban	447	1

Source: Natural England (2010)

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

3. Key waterbodies and catchments

3.1 Major rivers/canals

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

Name	Length in NCA (km)
River Wansbeck	29
River Blyth	22
River Pont	21
River Font	17
River Coquet	16

Source: Natural England (2010)

The rivers generally flow from west to east towards the North Sea and include the Coquet, Wansbeck, Blyth and Pont. Land west of Kirkheaton drains westward through small burns into the North Tyne river. The NCA has a number of ponds and lakes at Bolam, Capheaton, Belsay and Hallington Reservoir. Areas of open water like these are relatively rare within Northumberland.

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

3.2 Water quality

The total area of Nitrate Vulnerable Zone is 22,096 ha covering 35 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 5,414 ha of woodland (8.5 per cent of the total area), of which 793 ha is ancient woodland.

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

4.2 Distribution and size of woodland and trees in the landscape

There are scattered small farm woodlands throughout the area, together with some larger coniferous plantations on the ridges. The valleys of the rivers Font, Wansbeck and Coquet are well-wooded. In addition, there are mixed and ornamental woodlands and parklands within the country estates. Small coniferous blocks and belts of trees occur on the more open farmland to the south. Hedgerow trees are generally few, and are usually ash with some sycamore and oak.

Source: Border Uplands Natural Area Profile, Mid Northumberland Countryside Character Area description

4.3 Woodland types

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

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

Woodland type	Area (ha)	Percentage of NCA
Broadleaved	2,392	4
Coniferous	1,824	3
Mixed	281	<1
Other	917	1

Source: Forestry Commission (2011)

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

Woodland type	Area (ha)	Percentage of NCA
Ancient semi-natural woodland	394	1
Ancient re-planted woodland (PAWS)	399	1

Source: Natural England (2004)

5. Boundary features and patterns

5.1 Boundary features

On the higher plateau to the west field boundaries are generally dry stone walls or fragmented hedgerows. The south of the NCA has a strong pattern of traditional stone walls and hedgerows. Hedgerow trees are a feature of this landscape especially in the east.

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

5.2 Field patterns

These are predominantly regular rectangular field patterns characteristic of the 18th century enclosures. The large fields and strong boundary features give the NCA a distinctive regularity.

Source: Mid Northumberland 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

Grazing livestock accounted for 42 per cent of all farm types in 2009 (relatively constant proportion of farms as in 2000), with 26 per cent of all farms producing cereals and general cropping. There has been an overall reduction in the number of holdings (445 to 420), since 2000, with a 7 per cent decrease in the number of grazing livestock farms (from 173 to 161) and 6 per cent fall in cereal holdings (112 to 105).

Source: Agricultural Census, Defra (2010)

6.2 Farm size

Farms over 100 ha are the most numerous accounting for 206 holdings or 49 per cent, and accounting for 87 per cent of the farmed area. Farms between 50 and 100 ha are the second most common with 70 holdings (17 per cent), covering 9 per cent of the farmed area. Between 2000 and 2009 the number of largest holdings fell by 6 per cent. The biggest change in farm size was in the smallest holdings (less than 5 ha) which fell by 13 per cent. There has been an overall increase in the size of the farmed area by 1,055 ha (2 per cent). The biggest increase is in holdings over 100 ha of 1,641 ha (4 per cent), the biggest reduction is in holdings between 50 and 100 ha of 692 ha (12 per cent).

Source: Agricultural Census, Defra (2010)

6.3 Farm ownership

2009: Total farm area = 55,414 ha; owned land = 29,235 ha
2000: Total farm area = 54,359 ha; owned land = 29,795 ha

53 per cent of the total farmed area is owner occupied. This has remained relatively static since 2000.

Source: Agricultural Census, Defra (2010)

6.4 Land use

The dominant land use is grassland, accounting for 35,444 ha (64 per cent). This is followed by cereals at 14,170 ha (25 per cent). Between 2000 and 2009 there was an increase in the area of grassland by 1033 ha (3 per cent). There were large increases in some of the smaller land uses, cash roots by 134 per cent and stock feed by 57 per cent.

Source: Agricultural Census, Defra (2010)

6.5 Livestock numbers

Sheep are the most numerous livestock type within this landscape (a total of 230,000 animals) followed by 31,800 cattle and 3,100 pigs. Sheep numbers have decreased by 44,400 (-16 per cent) between 2000 and 2009, cattle by 3,800 (-11 per cent) and pig numbers are the same over this period.

Source: Agricultural Census, Defra (2010)

6.6 Farm labour

The figures suggest that the majority of holdings are run by principal farmers. Generally farm labour has reduced slightly across all types of labour between 2000 and 2009, with the exception of farm managers who have increased from 19 to 24 over the same period.

Source: Agricultural Census, Defra (2010)

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

7. Key habitats and species

7.1 Habitat distribution/coverage

Broadleaved woodland - Mainly mixed oak woodlands, ash and sycamore are present in lower areas of the NCA, while much of the woodland is found along the river valleys and stream sides. In these areas, such as the Coquet and Wansbeck valleys, alder trees are common. The low proportion of tree cover across the NCA as a whole means that these areas are very important for supporting populations of a number of bird and bat species. Other semi-natural habitats are only found in small patches across the NCA. The most notable site is Longhorsley Moor which retains an important remnant of lowland heath, and is a mosaic of heather, bracken, acid grassland and gorse communities. Both upland and lowland calcareous grassland patches are found in the NCA along limestone outcrops in the landscape, notably at Ryal.

Source: Border Uplands 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)	Percentage of NCA
Broadleaved mixed and yew woodland (Broad habitat)	1,863	3
Lowland heathland	120	<1
Upland heathland	82	<1
Lowland calcareous grassland	25	<1
Upland calcareous grassland	19	<1
Lowland meadows	10	<1

Source: Natural England (2011)

Maps showing locations of priority habitats are available at

- http://magic.defra.gov.uk select 'Habitats and Species/Habitats'

7.3 Key species and assemblages of species

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

8. Settlement and development patterns

8.1 Settlement pattern

The ancient market town of Morpeth is the only major settlement in the NCA. Dispersed, nucleated settlements, many of medieval origin, are characteristic of the NCA. Some are found along ridgetops, for example, Ryal and Kirkheaton, and others at strategic bridging points within the river valleys such as at Netherwitton. Extensive ridge and furrow around many settlements indicates that villages were previously larger. This is particularly notable in the south of the NCA.

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

8.2 Main settlements

The main settlement in Mid Northumberland NCA is Morpeth. The total estimated population for this NCA (derived from ONS 2001 census data) is: 25,858.

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

8.3 Local vernacular and building materials

Villages often centre on a village green and are surrounded by extensive ridge and furrow. Bastles or fortified houses were built in response to intermittent border raids from 14th to 16th centuries, and these remain distinctive landscape features at Mitford, Belsay, Shortflatt and Ray Demesne. Many of the fine country houses have incorporated these structures into their design. Fell Sandstone is the main source of building materials. In higher altitudes gritstone was used for substantial buildings.

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

9. Key historic sites and features

9.1 Origin of historic features

The ridge tops across the area carry prominent traces of early settlement - cairns, standing stones, tumuli and beacons of iron-age farmers remain as landscape features. Romano-British settlement was extensive; Hadrian's Wall forms the southern boundary of the NCA and Dere Street crosses the landscape marked today by the route of the A68. Much evidence of settlements has been reduced by ploughing to rectilinear cropmarks. As conflict in the area from border raids decreased and prosperity based on farming increased a number of fine country houses and semi-stately homes were built from the 17th to 19th century. These large country homes with their parklands are key features of the landscape, notably Belsay Castle and Kirkharle Estate.

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

9.2 Designated historic assets

Hadrian's Wall, the southern boundary of the NCA, and the buffer zone around it are designated as World Heritage Sites. This NCA contains the following numbers of designated heritage assets:

- 5 Registered Parks and Gardens covering 696 ha.
- 0 Registered Battlefield/s covering 0 ha.
- 89 Scheduled Monuments.
- 957 Listed Buildings.

Source: Natural England (2010)

- More information is available at the following address: www.english-heritage.org.uk/caring/heritage-at-risk/
- www.english-heritage.org.uk/professional/protection/process/national-heritage-list-for-england/

10. Recreation and access

10.1 Public access

- Less than 1 per cent of the NCA 257 ha is classified as being publically accessible.
- There are 643 km of public rights of way at a density of 1 km per km2.
- There is 1 National Trail; Hadrian's Wall Path National Trail runs along the southern boundary of this NCA for a distance of 9 km.

Sources: Natural England (2010)

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

Access designation	Area (ha)	Percentage of NCA
National Trust (Accessible all year)	n/a	n/a
Common Land	75	<1
Country Parks	37	<1
CROW Access Land (Section 4 and 16)	336	<1
CROW Section 15	12	<1
Village Greens	58	<1
Doorstep Greens	n/a	n/a
Forestry Commission Walkers Welcome Grants	1	<1
Local Nature Reserves (LNR)	50	<1
Millennium Greens	<1	<1
Accessible National Nature Reserves (NNR)	n/a	n/a
Agri-environment Scheme Access	21	<1
Woods for People	197	<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.

Mixed woodland and parkland within country estates.

11. Experiential qualities

11.1 Tranquillity

Based on the CPRE map of Tranquillity (2006) the lowest score for tranquillity is at Morpeth, with highest scores towards the northwest away from major roads.

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

Tranquillity	Score
Highest	46
Lowest	-62
Mean	12

Sources: CPRE (2006)

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

11.2 Intrusion

The 2007 Intrusion Map (CPRE) shows the extent to which rural landscapes are 'intruded on' from urban development, noise (primarily traffic noise), and other sources of visual and auditory intrusion. This shows Morpeth to be a focus of disturbed land, together with the A1 corridor and the route of high voltage transmission lines through the middle of the NCA. A breakdown of intrusion values for this NCA is detailed in the table below.

Intrusion category	1960s (%)	1990s (%)	2007 (%)	Percentage change (1960s-2007)
Disturbed	8	19	20	12
Undisturbed	92	81	79	-13
Urban	<1	n/a	n/a	n/a

Sources: CPRE (2007)

Notable trends from the 1960s to 2007 are a considerable increase in the area of intruded or disturbed land by 18 per cent.

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

The western part of Mid Northumberland is characterised by undulating pastures, trees and farm buildings.

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 per cent. The convention <1 has been used to denote values less than a whole unit.

Supporting document 2: Landscape change

Recent changes and trends

Trees and woodlands

- There has been a significant increase in the area of established woodland covered by Woodland Grant Scheme management agreements, some of which target the expansion of lowland broadleaved woodland. New planting in the plateau areas to the north appears to consolidate and reinforce existing patterns. The new planting on the open plateau and farmland landscape of the south is more scattered. Current woodland cover is approximately 8.5 per cent of the NCA.

- About 15 per cent of the woodland cover is on an ancient woodland site. The proportion of these sites managed under a Woodland Grant Scheme agreement increased between 1999 and 2003 (the dates for which data is available).

Boundary features

- Since 2000, the uptake of Countryside Stewardship agreements for linear boundary features tended to lag behind the national average, although hedgerow restoration and management has been a priority. The estimated boundary length for the NCA is 5,567 km. Total length of agreements between 1999 and 2003 was equivalent to about 4 per cent of this total. The total length of boundaries managed under agri-environment schemes at 2011 was over 600 km or nearly 11 per cent.

Agriculture

- The Agricultural census shows that between 2000 and 2009 there has been some consolidation of farm businesses, with a decline in the total area farmed as small holding or by farms of 50–100 ha in size, and an increase in area farmed in holdings of over 100 ha. Stock numbers declined between the two census dates, sheep by 16 per cent, cattle by 11 per cent. There was a 3 per cent increase in the area under grassland, and proportionately large increases in the smaller land uses such as cash roots and stock feed, although total area of these remains low compared with grassland and cereals.

Settlement and development

- Previously, some housing growth was planned for in Morpeth under the former South East Northumberland Growth Point Programme. However the emerging Core Strategy identifies Morpeth as a main town to accommodate development in Northumberland, with the immediate rural hinterland protected by an extension to the Northumberland and Tyne and Wear Green Belt.

- Development pressure has been evidenced by the number of planning applications submitted to the local authority. There is also evidence that there has been scattered development in the rural areas, particularly the open plateau and farmland landscapes of the south.

Semi-natural habitat

- Over the period 2000 to 2009 there was a strong uptake of Countryside Stewardship agreements to manage lowland pastures on neutral/acid soils and upland in-bye pasture. The upper Coquet Valley has been identified by the Northern Upland Chain Local Nature Partnership as a High Nature Value farming area. As at March 2011, 17 per cent of land designated as a Site of Special Scientific Interest was assessed as being in 'favourable' condition, and 83 per cent assessed as 'unfavourable but recovering' condition.

Historic features

- In 1918 about 3 per cent of the NCA was historic parkland. In terms of its share of the resource the NCA was ranked 66. By 1995 it is estimated that 33 per cent of the 1918 area had been lost. About 27 per cent of the remaining parkland is covered by an Historic Parkland Grant, and 30 per cent is included in an agri-environmental scheme. About 76 per cent of historic farm buildings remain unconverted, and about 91 per cent are intact structurally.

Coast and rivers

- The biological river water quality in 1995 was predominantly very good. Since then the method of assessment has changed, and the current (2013) assessment of ecological quality tends to be good for headwaters, moderate or poor elsewhere, though this is due to the change of method and does not indicate deterioration over the period. Most rivers in the NCA do not require assessment for chemical quality, but those that do are currently failing.

Minerals

- Sales of primary aggregates from north-east England in 2011 decreased by 41 per cent when compared with sales in 2005. This includes a 40 per cent decrease in sales of crushed rock, a 36 per cent decrease in sales of land-won sand and gravel and a 51 per cent decrease in sales of marine-dredged sand and gravel. These decreases are considered to be mainly as a result of the economic downturn and the resulting reduction in demand for primary aggregates. It does, however, appear that the decline in annual sales has stabilised somewhat following the significant decline between 2008 and 2009.[4]

- The largest hard rock quarries in the NCA, such as at Barrasford Quarry and Divethill Quarry, remain active, however the Mootlaw Quarry near Matfen and Swinburne Quarry near Colwell are currently dormant inactive, and there are no known new sites proposed, although extending the life or boundary of existing sites remains a possibility.

- The Barrasford and Mootlaw Restoration Plans are good examples of well-designed reclamation schemes which offer landscape enhancement opportunities.

[4] Annual Aggregates Monitoring Report, North East Aggregates Working Party (2011)

Drivers of change

Climate change

It is anticipated that climate change will create the following issues and opportunities:[5]

- The drive for improved food security and increased demand could lead to further increases in the trend to intensify arable production, which could impact on soils and water, increase greenhouse gas emissions while reducing carbon storage in soils, and loss of landscape features associated with a more mixed farming economy, such as traditional field patterns, hedgerows and drystone walls.
- Longer growing season could result in changes to cropping pattern and foods grown.
- Change in soil moisture content during drier summers, may lead to erosion of protective soils and vegetation over historic sites, leading to site damage.
- Changes in rainfall patterns, including more frequent and more intense storm events, are predicted, and river flooding is likely to be an issue in this area, with increased delivery of nutrients and sediment to watercourses from heavy rainfall. Flood risk may increase at Morpeth and Felton. Significant parts of the River Coquet floodplain comprise agricultural land which could experience increased risk of flooding and threats to livestock and crops.
- Reduced river flows in summer months may pose a risk to water quality and may require abstraction licences to be reduced on the River Coquet.
- Reduced river flows and increased temperature could result in loss of important habitats such as wet woodland, and thermal stress to fish, with increased mortality and reduced breeding impacting on the coarse fishing industry with potential implications for local tourism.
- There are a number of historic parklands in this area designed by Capability Brown with veteran trees that are likely to suffer in drier summers as they are not very drought tolerant. The ornamental lakes here are also likely to experience increased incidence of eutrophic blue algal blooms in warmer weather, the effects of which will be especially marked where there are no other wetlands.
- Shifts in species' ranges northwards could result in the appearance of new species within the NCA and the potential loss of some species around the northern boundary.
- Invertebrate pollinators can be very sensitive to climatic change. This could potentially disrupt species phenology, de-aligning the life cycles of pollinator species from the lifecycles of wildflower species for example. Climatic change may also affect pollinator pathogens, while if summer rainfall declines increased exposure of pollinators to pesticides may occur.
- Incidence of tree diseases may increase or spread – ash dieback disease, Chalara fraxinea, is the latest in a number of pathogens to attack native tree species.
- Warmer, drier summers and warmer, wetter winters will create improved conditions for the growth of biomass.

[5] Much of this information is derived from the Mid Northumberland Climate Change Risk Assessments

Other key drivers

- A requirement for increasing renewable energy generation could result in increased pressure for windfarms.
- The Northumberland Core Strategy identifies Morpeth as one of the main towns in the county to become a focus for sustainable new development; this will create additional demands on natural resources, but also the potential for habitat creation and development of green infrastructure closer to where people live and work.
- Increased demand for supply of crushed rock and sand and gravel (Northumberland sub-region has a recommended allocation of a third and a half respectively of the total north-east England supply to 2020, recommendation made by the North East Aggregates Working Party).
- Increased demand for access and recreation opportunities to support leisure pursuits, and to benefit health and wellbeing.

Belsay - buildings constructed from warm fell sandstone.

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.

Country houses and fortified defensive structures, typically set in landscaped parklands.

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	Tranquillity	Recreation	Biodiversity	Geodiversity
SEO 1: Work at river catchment scale to protect and enhance the farmed landscape, restoring semi-natural habitats into effective ecological networks, managing soil and water resources for carbon storage, improved regulation of water flow, water quality and biodiversity, ensuring a sustainable future for farming and increasing resilience of native flora and fauna to environmental change.	↗ **	↗ **	↑ **	o ***	↗ **	↑ **	↑ **	↑ **	↑ **	↑ **	↑ **	↑ **	n/a	↗ **	↔ **	↗ **	↔ **	↑ **	↗ **
SEO 2: Secure sustainable management of the woodland within the NCA, including ancient semi-natural woodlands, coniferous plantations and designed parklands, increasing woodland cover to form a coherent habitat network which provides an extensive range of benefits including carbon storage and reducing diffuse pollution, and enhancing sense of place, recreation and tranquillity. Design new woodland to ensure that it supports strongholds of the red squirrel population and other woodland wildlife.	↘ **	↑ **	↗ **	o ***	↑ **	↑ **	↑ **	↑ **	↗ **	↑ **	↗ **	↗ **	n/a	↑ **	↑ **	↑ **	↑ **	↑ **	↔ *
SEO 3: Protect and enhance the rich historic environment and the geological interest of Mid Northumberland, from Hadrian's Wall World Heritage Site to historic parks and gardens, promoting greater awareness, understanding and enjoyment of these.	↔ *	↔ **	↗ **	o ***	↔ **	↗ **	↗ **	↗ **	↗ **	↑ **	↗ **	↗ **	n/a	↑ **	↑ **	↗ **	↑ **	↗ **	↑ **
SEO 4: Protect and enhance the area's traditional farmsteads, houses and other buildings and its landscape and settlement context, ensuring that new development improves biodiversity, is integrated into the rights of way network and makes sustainable use of natural resources, adding to local distinctiveness and protecting the area's high levels of tranquillity.	↔ **	↔ **	↑ **	o ***	↔ **	↗ **	↑ **	↑ **	↗ **	↑ **	↗ **	↗ **	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.

National Importance; Regional Importance; Local Importance

Landscape attributes

Landscape attribute	Justification for selection
Upland fringe plateau comprising a series of ridges and intimate river valleys in the north, opening out to a broader, flatter landscape in the south and east.	■ The area is dissected by several small rivers which flow eastward to the sea. The rivers Coquet, Font and Wansbeck, and their tributaries, wind through the farmland and wooded valley landscapes. ■ Rivers are important features in the agricultural landscape and form important habitat networks. ■ The broadleaved woodlands including alder and ash woodland associated with rivers are characteristic of the landscape and particularly important in conveying a sense of tranquillity. ■ The River Coquet and Coquet Valley woodlands form the largest SSSI in the NCA ■ The rivers in the catchment are important fisheries, especially the Coquet which supports salmonids and lamprey. ■ The Wansbeck supports nationally significant populations of white-clawed crayfish. ■ The higher plateau areas to the west are relatively open and windswept, with large rectilinear fields of improved pasture enclosed by traditional stone walls or hedgerows.
Glacial till is widespread, and largely blankets underlying geology, except for sandstone and dolerite crags (the latter associated with the Whin Sill) which form local landscape features.	■ Deposits of glacial till give rise to relatively fertile soils which support managed grasslands and arable. ■ Resistant rocks locally emerge from beneath the till cover; particularly prominent are the sandstone crag of Rothley and Shaftoe, and the Whin Sill crags at Gunnerton. ■ Vegetation on the thin soils of the Whin Sill is made up of an unusual and specialised flora. The plant communities often occur as a mosaic with acid grassland species in close association with species more characteristic of calcareous grassland.
Woodland cover is variable at 8.5 per cent of the NCA and made up of small fragmented woodlands, most closely associated with river valleys.	■ This NCA contains 5,414 ha of woodland (where woodlands are over 2 ha in size), including 793 ha of ancient woodland (400 ha are planted ancient woodland sites). ■ The most extensive semi-natural and ancient broadleaved woodlands are found along river valleys. ■ Small plantations of coniferous woodland are found, some of which support populations of red squirrel. ■ There are five Registered Parks and Gardens: Belsay Hall 218 ha, Wallington 167 ha, Capheaton 156 ha, Kirkharle Hall 112 ha, St Mary's Hospital, and Stannington 43 ha with specimen and veteran trees.
Largely a farmed landscape, with few areas of open water, or semi-natural grassland or heath.	■ The few reservoirs and parkland lakes are important features in an otherwise predominantly agricultural landscape. ■ Important for wintering and breeding birds including national important populations of black- necked grebe. ■ Hallington Reservoirs support wintering wildfowl such as wigeon and teal, otter and white-clawed crayfish. ■ Ornamental lakes are associated with country houses at Wallington, Belsay, Capheaton and Bolam. ■ Small isolated area of lowland heathland at Longhorsley Moor, the finest example of lowland heathland in Northumberland. ■ Whin Sill grasslands support an unusual and specialised flora.

Landscape attribute	Justification for selection
Boundaries are typically formed of drystone walls and hedgerows, giving rise to strong rectangular patterns of large fields, dating from the time of the parliamentary enclosures.	■ There are 100 km of drystone walls and 387 km of hedgerows within the NCA. These boundary features provide a sense of structure in the landscape and historically are essential components of the farmed landscape. ■ Hedges are significant features, although many are agriculturally redundant. Hedgerow trees are an important element in the landscape.
Historic landscapes and features of importance, dating from the Iron Age, Roman period, medieval through to designed landscapes of the 18th century onwards.	■ Evidence of iron-age settlement include standing stones, tumuli, cairns and beacons which remain as landscape features on prominent ridge top sites. ■ Roman influence is reflected in the alignment of Hadrian's Wall, which forms the southern boundary, and the modern A68 road, which follows the alignment of Dere Street through the area. ■ There is evidence of a number of Romano-British settlements throughout, now evident as rectilinear cropmarks. ■ Remnants of medieval open field systems provide evidence of the 'shrinkage' of larger medieval settlements, particularly within the southern part of the area. ■ Small castles, fortified farmhouses with towers and bastles were built in response to cross-border raiding. Some, such as at Mitford, Belsay, Shortflatt and Ray Demesne still form distinctive features in the landscape. ■ From the 16th century onwards, fine country houses were constructed throughout the area, many of them incorporating the original medieval fortified towers and castles. Most of the mansions were located within fine settings in designed parklands laid out with tree-lined drives and ornamental lakes. Belsay Castle is a particularly fine example, as is the Kirkharle Estate, Dissington Hall, Wallington Estate and Bolam Hall. ■ 89 Scheduled Ancient Monuments across all periods, for example, Middle Newham deserted village, iron-age enclosure on Whittle Hill, Roman camp near Mitford Steads. ■ World Heritage Site: Hadrian's Wall (72 ha) and 2,315 ha of Hadrian's Wall Buffer Zone.
Pattern of dispersed, small nucleated villages, many of medieval origin or earlier.	■ 'Green villages', which were originally developed around a rectangle of open land on which stock could be securely grazed; Kirkwhelpington, Matfen, and Stamfordham are particularly well preserved examples in this area. ■ Unity provided by use of local building materials such as fell sandstones and gritstones. ■ Dispersed farmsteads.
Tranquillity is a significant feature of this NCA.	■ The features of the area which contribute to high levels of tranquillity include broadleaved woodland associated with rivers, areas of parkland and open waters away from major roads, and low population, few settlements and few roads.

Landscape opportunities

- Conserve the farmed upland fringe plateau landscape, seeking to expand, buffer and link the fragmented areas of semi-natural habitat including valley woodlands and transitional scrub, into a coherent ecological network, to provide increased resilience to environmental change for its native flora and fauna, safeguarding strongholds for red squirrels, and habitats for salmonids, otter and bats.

- Protect and extend semi-natural woodland in the area as a functioning habitat network, enhance wet woodland along the Coquet, Font, Blyth and Wansbeck valleys. Manage ancient woodland sites, restoring those which have been overplanted with non-native timber species, and manage and restore the landscape parkland associated with country houses, as part of a coherent woodland habitat network.

- Seek to maintain or restore natural fluvial processes in the area's rivers, maintaining or improving sufficient flow and quality of both surface and ground waters and controlling invasive species.

- Improve protection to sub-surface archaeological features, protecting under permanent grassland or shallower cultivation, and seek to protect examples of historic field and settlement systems within the farmed landscape.

- Reduce the numbers of heritage at risk sites, and improve the management / encourage restoration of Registered Historic Parks and Gardens to retain their historic integrity and designed parkland features, while also enhancing their biodiversity interest and provide improved access where appropriate.

- Identify, record, and positively manage locally important geological sites, such as those associated with the Whin Sill, using these for research and enhancing public understanding. Seek opportunities on Whin Sill sites to establish the locally characteristic Whin Sill grasslands and promote the design and implementation of high quality restoration plans for quarry sites.

- Maintain the built fabric of the landscape, such as the stone wall and hedgerow field boundaries, and the distinct pattern of small, dispersed, nucleated settlements. Promote sustainable new development which has sustainable resource use at its core and which, in its use of local building materials and settlement pattern can reinforce existing character within this rural area.

- Encourage engagement with the natural environment amongst local communities in and close to Morpeth, together with the nearby larger conurbation of Newcastle, increasing opportunities for educational access, volunteering, and health activities such as walking for health, together with nature-based tourism that deliver benefits to the local economy. Promote sustainable and responsible access and recreation, particularly around sensitive sites, ensuring that suitable provision is made for people of all abilities where appropriate.

Ecosystem service analysis

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

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

Service	Assets/attributes: main contributors to service	State	Main beneficiary	Analysis	Opportunities	Principal services offered by opportunities
Food provision	Grade 3 agricultural soils Biodiversity Mixed farming system Fisheries Game management	Predominantly Grade 3 (good to moderate quality) agricultural land supports mixed farming of livestock and cereal production, with some cash roots and stock feed. The rivers in the NCA are important for fisheries, especially the Coquet which supports healthy populations of trout and salmon.	Regional	This is a productive agricultural area, of livestock rearing and arable, supported by fertile, glacially derived soils. Recent changes have seen a consolidation of farm businesses, a slight decline in livestock numbers and increases in cash roots and stock feed, although these remain low compared with grassland and cereals. Sustainable management of the soils and water in this area are critical to the long term and sustainable success of farming. The Catchment Sensitive Farming Initiative works with farmers in priority catchments, including the Coquet, to reduce the run-off of soils, nutrients and chemicals from agricultural land, thereby protecting resources on the farm, and preventing siltation and nutrient enrichment of water courses. In this way the resources critical to both farming and fisheries, are protected, and wider public benefits (in carbon storage and regulating water flow, for example) are realised. This intensively farmed agricultural landscape has relatively little high-quality habitat to support pollinating insects and other invertebrates, critical to food production such as rapeseed oil, field beans and soft fruit.	Maintain mixed farming, with sustainable grazing regimes on grasslands, preventing soil compaction and aiding water infiltration. Support the farming community to ensure good soil, nutrient and pesticides management, thereby securing the sustainable management of key assets essential to farming and protecting and enhancing other services such as carbon storage and regulating water flow. Develop opportunities for freshwater angling that can complement riverine and wetland management for biodiversity. Enhance pollination services, critical to food production such as rapeseed oil, field beans and soft fruit, by creating conservation headlands and using pollen and nectar mixes, which will also encourage invertebrates, birds and rare arable plants. Promote local farmed produce to support local food production and tourism, helping to encourage a locally sustainable green economy.	**Food provision** **Climate Regulation** **Regulating water quality** **Regulating water flow** **Regulating soil quality** **Regulating soil erosion** **Biodiversity**

Service	Assets/attributes: main contributors to service	State	Main beneficiary	Analysis	Opportunities	Principal services offered by opportunities
Timber provision	Soils Semi-natural woodland cover Plantation woodland	Woodland covers 8.5 per cent of the NCA, including 1,824 ha of conifers, but there is limited commercial timber production.	Local	Existing woodlands are generally small and fragmented. Restoration of plantations on ancient woodland sites (PAWS) offers opportunity to convert to hardwood species with additional benefits in carbon storage and biodiversity. There is some potential for increasing woodland cover which could provide multiple benefits including carbon storage and regulating water flows, if located to expand, buffer or link existing woodlands in and around valleys, avoiding species-rich grasslands and adverse impacts to sub-surface historic features.	Promote appropriate management of existing woodland for multiple uses including timber, biodiversity and recreation. Expand native woodland cover, particularly within the wooded valleys and in small copses or plantations and hedgerows, designed to strengthen the habitat network and avoiding sub-surface historic features, while increasing carbon storage, protection of soils, and regulating peak water flows.	**Timber provision** **Climate Regulation** **Regulating water quality** **Regulating water flow** **Regulating soil quality** **Regulating soil erosion** **Sense of place / inspiration** **Recreation** **Biodiversity**

Service	Assets/attributes: main contributors to service	State	Main beneficiary	Analysis	Opportunities	Principal services offered by opportunities
Water availability	Rivers Coquet, Wansbeck, Font, Blyth and Pont Semi-natural wetland habitats	The NCA does not overlay any major aquifers. Principal surface water resources within the NCA are the River Coquet, the River Wansbeck and its tributary the River Font and the River Blyth and its tributary the River Pont, which all form part of the Northumberland Rivers Catchment Abstraction Management Scheme (CAMS) area. The rivers Blyth and Pont have 'water available' status. The River Wansbeck is also classified as having 'water available' although the River Font, whose flow is regulated by compensation releases from Fontburn Reservoir in Northumberland Sandstone Hills NCA, has 'no water available'. The River Coquet, the greatest source of abstracted water in the CAMS area, is 'over licensed'. Although the predominant land use in the CAMS area is agriculture the predominant (80 per cent) use of abstracted water is public water supply, followed by industrial and commercial (11 per cent).	Regional	While no ecological problems have been reported in the estuary of the River Coquet due to existing abstraction levels the Environment Agency wishes to avoid any increase in abstraction above current levels while further investigations are carried out. Hallington Reservoirs in the south east part of the NCA form part of a complex of reservoirs from Catcleugh on the Scottish border down to Whittle Dene near Newcastle that are interconnected by a series of aqueducts and tunnels, supplying drinking water to Newcastle. Predicted climate change scenarios indicate that to manage water availability in future, new water storage facilities and expanded wetland for flood storage may be needed.	Continue to manage 'available' water resources through the CAMS process, ensuring that sufficient surface and ground waters are maintained to sustain the integrity of rivers and associated features – with any abstractions avoiding disruption to natural fluvial processes and important wildlife species. Seek to improve water availability status by working with farming community and businesses to improve sustainable use of water and sympathetic land management practices, including crop selection and water harvesting. Seek to incorporate water conservation measures and sustainable drainage in to new development. Improve the condition of, and seek to expand the network of semi-natural wetland habitats, to enhance their role in managing water availability. Ensure that water storage facilities are well integrated within the landscape and make a positive contribution to habitat networks and biodiversity, and local landscape character.	**Water availability** **Food provision** **Regulating water quality** **Sense of place / inspiration** **Biodiversity**
Genetic diversity	There is no evidence that this NCA contributes to the provision of genetic diversity services	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
Biomass energy	Soils Woodland cover	The existing woodland cover (8.5 per cent) offers moderate potential for the provision of biomass, both through bringing unmanaged woodland under management and as a by-product of commercial timber production.	Local	There is potential to bring existing woodland into management for woodfuel production. The NCA is considered to have high potential short rotation coppice yield; potential miscanthus yield is medium. For information on the potential landscape impacts of biomass plantings within the NCA, refer to the tables on the Natural England website.[6]	Where consistent with other conservation objectives, bring unmanaged woodland under management to increase the production of woodfuel. Utilise the by-products of commercial timber production as woodfuel. Work with the farming community to identify suitable opportunities to increase the area of miscanthus and short rotation coppice, where this may be accommodated within local landscape character, biodiversity, and avoiding historic ground features, and provide enhanced regulation of soil erosion, water flow, water supply and water quality, and strengthen habitat networks.	**Biomass energy** **Timber provision** **Biomass provision** **Climate regulation** **Regulating water quality** **Regulating soil quality** **Regulating soil erosion** **Biodiversity**
Climate regulation	Soils Semi-natural vegetation cover particularly woodland, heath and wetlands	Soil carbon levels are generally low (0–5 per cent) reflecting the dominance of mineral soils with low organic matter content. Soil carbon is likely to be higher under areas of woodland (8.5 per cent of NCA area), wetlands, and under the limited extent of lowland heathland within the NCA.	Regional	Carbon sequestration can be increased through managing and expanding native woodland cover, and other semi-natural habitats particularly wetlands and permanent grasslands. This can be of wider benefit in reducing diffuse pollution, thereby regulating water quality, and regulating water flow. Carbon storage in mineral soils can be enhanced through careful management of organic matter inputs to soils, by reducing the frequency of cultivation and the reversion of some cultivated areas to permanent grassland or uncultivated margins where permanent vegetation cover will reduce losses of soil carbon.	Increase sequestration of carbon through increasing woodland cover using native species and in appropriate locations mixed planting to sequester carbon more rapidly. Restore and expand wetland habitats within valleys, to improve regulation of water services, including regulating peak flows. Seek opportunities to adopt minimum tillage, increase use of green manure crops within rotations, and create uncultivated margins to arable fields and watercourses, helping reduce sedimentation and diffuse pollution. Seek to revert some cultivated areas to permanent grassland, focusing on areas where this will also help to protect sub-surface archaeological remains of Romano-British and medieval settlement.	**Climate regulation** **Timber provision** **Regulating soil erosion** **Regulating soil quality** **Regulating water quality** **Regulating water flow** **Biodiversity**

[6] www.naturalengland.org.uk/ourwork/farming/funding/ecs/sitings/areas/default.aspx

Service	Assets/attributes: main contributors to service	State	Main beneficiary	Analysis	Opportunities	Principal services offered by opportunities
Regulating water quality (continued on next page)	Soils Semi-natural vegetation Sustainable farming systems	The Environment Agency's (EA) current (2013) assessment of ecological quality tends to be good for headwaters, moderate or poor elsewhere. Most rivers in the NCA do not require assessment for chemical quality under the EA's monitoring system, but those that do are currently failing. Hallington Reservoirs have moderate ecological quality. The chemical status of groundwater is also poor although as stated under 'Water availability' there are no major aquifers in the NCA. The north of the area falls within the Tweed, Aln, Coquet and Coastal Streams Priority Catchment for the Catchment Sensitive Farming Initiative. The rivers Blyth and Pont fall within a Nitrate Vulnerable Zone.	Regional	The rivers are an important supply of water for both domestic and industrial use, so regulating the quality of this water is a vital service in the area. Maintaining water quality will also support freshwater species, and angling interests. Water quality issues within the NCA are influenced by management of the upper catchments in the upstream NCAs of Northumberland Sandstone Hills, Cheviots and Cheviot Fringe, where land drainage has encouraged more rapid run-off, increasing sedimentation and water flows downstream. Factors influencing water quality are sedimentation, resulting from soil loss from both arable fields and grasslands, and related to this nutrient enrichment (phosphate binds to sediment particles and can be transported to water courses in this way). Pesticides in water can also reduce its biological and chemical quality. These factors influence the condition of the River Coquet SSSI, where sediment causes silting up of the gravel stream bed, having an adverse impact on salmonid spawning. Predicted climate change scenarios suggest more intense and frequent storm events, creating conditions for increased washing of sediment and chemicals into watercourses. A number of measures can be taken which will reduce the supply of these materials, and intercept them before reaching watercourses and impacting on water quality. The 'Woodland for Water' map shows the central areas of this NCA to be one of the biggest areas in the north-east where tree planting is recommended to address diffuse pollution. Careful siting of trees and scrub can	Work with land managers in neighbouring upland NCAs (Northumberland Sandstone Hills, Cheviots and the Cheviot Fringe) to improve the condition and functioning of upland wetland habitats, improving their water holding capacity and reducing risk of water discolouring, sedimentation and turbidity. Continue working with the farming community to ensure best practice in soils, pesticides and nutrient management, for example using low pressure machinery, carefully managing stock movements and informed nutrient and pesticides application following regular infield analysis. Work with farmers to manage riparian grazing, including fencing off sections of watercourses to prevent access by livestock, creating permanent grassland strips along watercourses, and creating areas of scrub and woodland. Encourage selection of crops which require lower applications of pesticides and fertilisers, to help protect watercourses from diffuse run-off. Manage organic matter input to soils to improve soil quality and reduce its vulnerability to erosion and generating sediment. Promote use of buffer strips to watercourses, and creation of riparian semi-natural habitat. Continue to promote improvements	**Food provision** **Climate regulation** **Regulating soil erosion** **Regulating soil quality** **Regulating water quality** **Biodiversity**

Service	Assets/attributes: main contributors to service	State	Main beneficiary	Analysis	Opportunities	Principal services offered by opportunities
Regulating water quality (continued from previous page)				help bind the soil making it less prone to erosion, while increasing water infiltration. Trees/scrub and grasslands in riparian zones can also be effective at intercepting runoff, reducing its sediment burden before it reaches the rivers. Careful matching of infield nutrient and chemical applications to crop needs and timing of these applications will reduce their susceptibility to being washed out. Use of 'green manure' legume crops and winter stubble agri-environment options can also protect soils and thus reduce sedimentation. Where livestock are reared, achieving extensive grazing levels will reduce potential for erosion or compaction. Preventing stock access to river banks will also reduce erosion. The Catchment Sensitive Farming initiative has offered advice and grants to farmers in this area, where 80 per cent of soils are classed as vulnerable to compaction or damage when wet, to reduce diffuse pollution of the watercourses, concentrating on improved management of soils and chemical applications, and in farmyard infrastructure.	in farm infrastructure and waste management and improvements to waste water storm overflows. In new developments, promote sustainable urban drainage systems. Use hedgerow planting and wall conservation and restoration across slopes as a means of controlling soil erosion and thereby reduce pollutants entering watercourses.	

Service	Assets/ attributes: main contributors to service	State	Main beneficiary	Analysis	Opportunities	Principal services offered by opportunities
Regulating water flow	Rivers Coquet, Wansbeck and Blyth, and tributaries Semi-natural vegetation cover, particularly woodland and wetland	The principal rivers within the NCA are the rivers Coquet, Wansbeck (with its tributary the River Font) and Blyth (with its tributary the River Pont). The Coquet catchment is naturally fast flowing with its steeply sided headwaters; combined with land drainage of the upland heather and peat moors which it drains in the Cheviot Hills, this creates a river system which responds quickly to rainfall and can lead to a rapid onset of flooding. The main settlement at risk of flooding from the River Coquet in this NCA is Felton on its eastern border with further risks upstream (Rothbury and Thropton in Northumberland Sandstone Hills NCA) and downstream (Warkworth in South East Northumberland Coastal Plain NCA). There has been some localised flooding on low-lying agricultural land. The rivers Wansbeck and Blyth drain a lowland area with mainly gentle gradients, with a tributary of the Wansbeck also draining parts of the Cheviot Hills. The Wansbeck and Blyth catchment is largely rural in nature, and while the river systems have well defined flood plains, these areas are generally undeveloped leading to relatively low flood risk. The majority of properties at risk of fluvial flooding in this NCA are in Morpeth (Wansbeck catchment) which suffered large floods in 1963 and 2008. Downstream in South East Northumberland Coastal Plain NCA, Ponteland (Blyth Catchment) is also at risk.	Regional	Predicted climate change scenarios indicate a likely increase in intensity and frequency of storm events. The Environment Agency's preferred approach to managing this flood risk associated with the River Coquet includes avoidance of inappropriate development in the floodplain, promotion of sustainable land management practices that reduce the amount and rate of run-off and erosion, and investigation of measures upstream of this NCA such floodwater storage in gravel pits upstream of Rothbury as well as the benefits of afforestation in upland parts of the catchment. The Environment Agency's preferred approach to managing flood risk associated with the rivers Wansbeck and Blyth includes storing floodwaters in designated areas of the upper Wansbeck catchment where it will not increase risk to people or property but will benefit the town of Morpeth by controlling downstream flows. Native crayfish are present in the Wansbeck and efforts should be made to ensure they are not adversely affected. In the upper Blyth and Pont, the Environment Agency will promote sustainable land management, for example extensive grazing and careful siting of trees/scrub to increase rates of water infiltration, and reduce the amount and rate of run-off. Enabling rivers to maintain or restore a natural morphology and course within the floodplain will enhance the natural regulation of some of the energy in peak water flows.	Work with land managers in Mid Northumberland and in upstream NCAs (Northumberland Sandstone Hills, Cheviots and Cheviot Fringe) to promote sustainable land management practices which will improve the condition and function of upland habitats, improving its water storage capacity, and reducing the amount and rate of run-off, erosion, and sediment supply to watercourses. Seek to increase wetland habitat within the floodplains of the Coquet, Font, Blyth and Wansbeck, avoiding built development in the floodplain which would reduce ground permeability and increase surface flows. Seek opportunities to restore a more natural river morphology which is able to absorb some of the excess energy during peak flow events. Increase native woodland and scrub cover in appropriate locations on steep slopes to reduce run-off and sedimentation, ensuring that this does not replace valuable wetland or grassland habitats, contributes to the woodland habitat network and strengthens local landscape character and sense of place. Investigate measures such as floodwater storage upstream of Morpeth and Felton, seeking to integrate new flood storage within the local landscape character and maximising its contribution to the wetland habitat network. Develop sustainable urban drainage systems as part of multifunctional green infrastructure and new developments.	**Regulating water flow** **Timber provision** **Water availability** **Climate regulation** **Regulating soil erosion** **Regulating water quality** **Biodiversity**

Service	Assets/attributes: main contributors to service	State	Main beneficiary	Analysis	Opportunities	Principal services offered by opportunities
Regulating soil quality	Soil types Geological and geomorphological processes Semi-natural habitats	There are four main soilscape types in this NCA: ■ Slowly permeable seasonally wet slightly acid but base-rich loamy and clayey soils, covering 50 per cent of the NCA. ■ Slowly permeable seasonally wet acid loamy and clayey soils (38 per cent). ■ Slightly acid loamy and clayey soils with impeded drainage (5 per cent). ■ Freely draining slightly acid loamy soils (4 per cent).	Regional	80 per cent of soils within the NCA are classed as vulnerable to compaction or capping and hence damage when wet. Poor soil structure and low organic matter content in arable fields have been identified by the Catchment Sensitive Farming Initiative as issues affecting water quality in this area.[7] Soil quality can be maintained or improved by managing organic matter content levels, and by timing of operations and adopting practices which will protect soils from damage when they are most vulnerable during wet weather. For example using low pressure machinery and managing livestock movements.	Continue working with the farming community to encourage best practice in soil management to improve structure and quality of soils. Encourage the use of minimal tillage and fallow and green manure crops such as nitrogen-fixing legumes within arable systems to replace nutrients and bind soils, manage organic matter levels in soils, and support informed infield nutrient application. Ensure habitats are grazed at sustainable levels to avoid erosion and soil compaction. Continue to promote improvements in farm infrastructure and waste management.	**Regulating soil quality** **Food provision** **Climate regulation** **Regulating water quality** **Regulating water flow** **Biodiversity**
Regulating soil erosion	Soil type Good soils management Semi-natural habitat	Soils over a large part (88 per cent) of this NCA have a low risk of erosion. Of the remaining soils, the slightly acid loamy and clay soils with impeded drainage are easily compacted by machinery or livestock when wet and therefore prone to capping or slaking, increasing the risk of erosion by surface water run-off, especially on steeper slopes. The freely draining slightly acid loamy soils can erode easily on steep slopes, particularly where vegetation has been removed or organic matter content is low following continuous cultivation. This is then prone to wind erosion.	Regional	Predicted climate change scenarios suggest more intense, greater frequency of storm events, which will increase the risk of soil erosion, particularly on steeper slopes or where continuous cultivation has depleted organic matter content of soils. The north of the area falls within the Tweed, Aln, Coquet and Coastal Streams Priority Catchment designated under Defra's Catchment Sensitive Farming Initiative, offering advice and grants to farmers to reduce soil loss. The risk of soil erosion can be mitigated by retaining permanent vegetation cover on steeper slopes, managing the organic matter content of soils, minimising vehicle or livestock movements on wet soils and managing livestock access to watercourses to prevent bankside erosion.	Continue working with the farming community through Catchment Sensitive Farming and other agri-environment initiatives to promote good soils management, including shallow cultivation and creating permanent grassland or areas of semi-natural habitat within the arable landscape. Manage riparian habitats to allow a dense and diverse bankside vegetation to become established, with unfertilised grass buffer strips that are ungrazed or extensively grazed, preventing erosion of river banks and sedimentation of watercourses. Use hedgerow planting and wall conservation and restoration across slopes as a means of controlling soil erosion. Encourage the use of green manure crops within arable systems to replace nutrients and bind soil, along with winter stubble. Manage organic matter content of soils. Minimise vehicle and stock movements in wet conditions.	**Regulating soil erosion** **Food provision** **Climate regulation** **Regulating soil quality** **Regulating water quality** **Regulating water flow** **Pollination** **Biodiversity**

[7] Catchment Sensitive Farming, Northumbria and Solway Tweed River Basin District Strategy, 2011 to 2014, Natural England (2012)

Service	Assets/attributes: main contributors to service	State	Main beneficiary	Analysis	Opportunities	Principal services offered by opportunities
Pollination	Limited areas of semi-natural habitats and arable margins Hedgerows	The intensively farmed agricultural landscape of this NCA has relatively little high quality habitat to support pollinating insects and other invertebrates.	Local	There is an opportunity to increase food security by increasing the areas and connectivity of suitable habitat for pollinators, including hedgerows. This also contributes to climate adaptation in both food production and biodiversity. The habitat corridor along the A1 and verges alongside minor roads could be managed to increase berry, seed and nectar provision and structural diversity for birds and insects.	Seek opportunities within the agricultural landscape, particularly in proximity to oilseed rape, to promote nectar-rich margins and species-rich semi-natural habitats, within a coherent network. This could also include wildlife-friendly gardening, management of allotments and community agriculture. Manage and restore the network of hedgerows throughout the NCA. Seek opportunities to create linear areas of habitat for birds and invertebrates, in particular using linear transport corridors and road verges.	**Pollination** **Food provision** **Regulating soil erosion** **Pest regulation** **Sense of place / inspiration** **Biodiversity**
Pest regulation	Limited areas of semi-natural wetland, grassland habitat and hedgerows	Small areas of semi-natural habitat are interspersed with productive agricultural land, provide limited habitat for beneficial species.	Local	Semi-natural habitat within productive agricultural landscapes may support species which prey on pest species, thereby regulating the potential damage of these to food production. Hedgerows are the most common field boundary, providing some habitat for beneficial predator species.	Enhance the network of semi-natural habitats throughout the agricultural landscape so they may provide habitat for predator species within close proximity of main food production areas. Manage and restore the network of hedgerows.	**Pest regulation** **Food provision** **Regulating soil erosion** **Pollination** **Sense of place / inspiration** **Biodiversity**

Service	Assets/attributes: main contributors to service	State	Main beneficiary	Analysis	Opportunities	Principal services offered by opportunities
Sense of place/ inspiration	Quiet farmed landscape with mixed livestock and cropping Rivers and valley woodlands Geological features such as the Whin Sill crags Parkland and historic buildings and connection with Capability Brown Traditional patterns of settlement and field boundaries Red squirrel	Sense of inspiration and escapism are likely to be associated with the quiet, rural, farmed nature of the area, its wooded valleys, and the area's numerous parkland landscapes and historic country houses, including Kirkharle Estate which was the childhood home of Capability Brown. Red squirrel is an iconic species of Britain's native fauna. Local stone is in evident use in prominent buildings and drystone walls, in particular the soft, warm-coloured Fell Sandstone and the gritstone of higher altitudes.	Regional	Pressure for change in this landscape, associated with new housing and intensification of agricultural production could alter the sense of place in this predominantly rural landscape. Historic buildings and designed parklands require ongoing maintenance and may require restoration to maintain their important contribution to the NCA's sense of place. Restoring hedgerows including hedgerow trees, and increasing the area of native woodland will strengthen landscape character and sense of place, while protecting soils and providing components of a wider restored habitat network. Traditional green villages with their associated ridge and furrow earthworks are characteristic of the area, as is the use of fell sandstone and gritstone as building material. These are elements that can be reinforced through sensitive land use planning. There is very limited public access within this landscape, which if sensitively expanded would increase opportunities to experience the essential character of the area.	Maintain the strong presence of historic buildings and designed parkland within this landscape, restoring degraded features, and promoting public access and appreciation. Maintain and enhance the strong linear character of the existing landscape, its distinctive regularity, reflected in a strong pattern of traditional stone walls and hedgerows, and of minor roads within an otherwise exposed landscape. Ensure that new developments and changes in land use are successfully integrated into the landscape, that they respect historic settlement and field patterns and in the use of local building stone and vernacular style can reinforce the character of the area. Promote the design and implementation of high quality restoration plans for quarries. Seek to increase the area of semi-natural woodlands in ways which will provide multiple benefits including stabilising soils, regulating water flow, and contributing to a wider restored habitat network. Retain some blocks of conifer woodland as reserves for populations of red squirrel and as part of the woodland features of the NCA. Protect and where possible enhance natural features and processes, particularly those associated with the rivers and floodplains and the area's geodiversity.	**Sense of place / inspiration** **Timber provision** **Sense of history** **Tranquillity** **Biodiversity** **Geodiversity**

Service	Assets/attributes: main contributors to service	State	Main beneficiary	Analysis	Opportunities	Principal services offered by opportunities
Sense of history	Archaeological remains – upstanding or subsurface evident in field markings Historic buildings and designed parkland landscapes Hadrian's Wall World Heritage Site	A sense of history is evident in numerous iron-age, Roman and medieval remains throughout the landscape, including Hadrian's Wall, rectilinear cropmarks reflecting Romano-British settlement and remnants of medieval open field systems. Historical features that are most likely to be evident to the general public include the iron-age standing stones, tumulii, cairns and beacons that remain as landscape features on prominent ridge top sites, and in particular the Roman alignment of Hadrian's Wall (a World Heritage Site) that forms the southern boundary of this NCA. Other prominent historic features include the large country houses and parkland landscapes, such as Belsay Castle and the Kirkhale Estate, including fortified farmhouses that were built with towers and 'bastles' in response to border raids. The large rectilinear fields of the later enclosure period of 18th and 19th centuries are also a very present feature in today's landscape.	National	Aspects of the area's history that are likely to be most visible or understood by the public include upstanding remains, such as standing stones and cairns, and historic buildings and their designed parkland settings. Upstanding historic remains, and also the less obvious sub-surface or ground features, for example evidence of Romano-British settlement and extensive medieval field systems, require protection as these are vulnerable to damage from cultivation. Shallow ploughing or protecting under permanent grassland will reduce the potential for damage. Historic buildings and parklands require ongoing management to prevent degradation of features, and these sites offer potential to further interpret and provide increased, appropriate public access. The presence of fortified structures and 'bastles' is a clear link to the area's experience of border raids up to the 17th century fields, demarcated by stone walls or hedgerows, create a strong pattern in today's landscape which is directly related to the history of land management over the past few centuries. Maintaining these boundaries as strong landscape features will retain that historic link.	Reduce the number of 'at risk' heritage sites through targeted management and advice. Reduce the damage caused to archaeological sites and features by cultivation; seek to protect under permanent pasture or reduce plough depth. Maintain as features in the landscape, standing stones, tumulii, cairns and beacons. Seek opportunities to preserve and where appropriate interpret these features to encourage greater understanding and enjoyment. Ensure good management and restoration of Registered Historic Parks and Gardens to retain their historic integrity, protecting key features while adapting to current needs and enhancing biodiversity and amenity value; provide improved access for all abilities where possible. Support the maintenance of historic field boundaries. Ensure that new developments and changes in land use are successfully integrated into the landscape, that they respect historic settlement and rectilinear field patterns and do not compromise the rural character of this landscape. Maintain and enhance Hadrian's Wall and other Roman remains of national importance in the NCA.	**Sense of history** **Regulating soil erosion** **Sense of place / inspiration** **Biodiversity** **Recreation**

Service	Assets/attributes: main contributors to service	State	Main beneficiary	Analysis	Opportunities	Principal services offered by opportunities
Tranquillity	Semi-natural valley woodlands Designed parklands and open water Agricultural landscape Low population in small villages and dispersed farmsteads Traditional rural settlement pattern and vernacular building style	Tranquillity is a significant feature of the NCA. The areas of greatest tranquillity are in the west away from Morpeth and the Newcastle hinterland. According to CPRE, around 80 per cent of Mid Northumberland NCA is classified as 'undisturbed'.	Regional	Levels of undisturbed areas are still high at 80 per cent, though have declined from 92 per cent since the 1960s. A sense of tranquillity is most likely to be associated with the semi-natural woodlands lining the river valleys and the areas of parkland and open standing water, especially away from the major roads. The low, dispersed population, lack of settlements and few roads also contribute.	Manage woodland and parklands, extending and linking these within the habitat network, to enhance local sense of enclosure and tranquillity. Maintain open views into and out of the NCA. Retain the character and quality of historic villages through appropriate development which is sensitive to the vernacular. Manage lighting in settlements and along transport routes to minimise the impacts on the night sky and biodiversity, while maintaining safety of users.	**Tranquillity** **Regulating soil erosion** **Regulating water flow** **Sense of place / inspiration** **Biodiversity**
Recreation	Rights of way network Open access land Hadrian's Wall Path National Trail Bolam Lake Country Park and a number of Local Nature Reserves around Morpeth The Reiver's Cycle Route	Recreation is provided by 643 km of rights of way (at a density of 1 km per km^2), including the Hadrian's Wall Path National Trail along the southern boundary, as well as around 257 ha of open access land (just 0.4 per cent of the NCA).	Regional	There is a very low provision for public access in this NCA, and a small resident population. Tourism along the Hadrian's Wall National Trail brings large numbers of walkers and associated localised problems of erosion, while there are also tourism opportunities associated with access to the many country houses and gardens that have been opened to the public. Hallington Reservoirs and the rivers all offer angling and other recreation opportunities.	Maintain and develop the rights of way network, including the creation of new green infrastructure to better link communities and publically accessible sites of interest, such as historic homes and designed parklands. Explore opportunities for circular routes off the Hadrian's Wall Path National Trail to relieve pressure on the World Heritage Site, to promote wider access to and appreciation of the area, and to encourage benefits to the local economy. Maintain and extend where appropriate, access and recreational opportunities in forests, woodlands and other natural environments for walkers, cyclists, horse riders and other users, providing suitable provision for all abilities. Develop opportunities for freshwater angling that can complement riverine and wetland management for biodiversity.	**Recreation** **Regulating soil erosion** **Sense of history** **Biodiversity**

Service	Assets/attributes: main contributors to service	State	Main beneficiary	Analysis	Opportunities	Principal services offered by opportunities
Biodiversity	SSSI and Local Sites Priority/ semi-natural habitats Native species such as white-clawed crayfish and red squirrel	A limited extent of priority habitats exist within this NCA, the largest being 1,863 ha of 'broadleaved mixed and yew woodland', with small amounts of lowland heath, calcareous grasslands and lowland meadow. Around 50 per cent of the ancient semi-natural woodland in the area has been replanted with commercial/non-native timber species. The NCA contains no internationally designated biodiversity sites and 142 ha nationally designated within the River Coquet and Coquet Valley Woodlands, and Longhorsley Moor SSSI. There are 25 locally designated sites, covering 1,463 ha, 2.3 per cent of the NCA area. The River Wansbeck supports nationally important population of native crayfish. The area is a stronghold for red squirrel.	Regional	The fragmentation of much semi-natural habitat means that the best wildlife-rich areas tend to be isolated and so they tend to lack the resilience of being part of a more robust ecological network. The river corridors link the western upland fringe with the eastern lowlands, a crucial element in a strengthened ecological network within the area. Managing the existing fragments of native woodland within the river valleys, buffering and extending these to form a coherent network and similarly managing valuable grasslands, and riparian/floodplain habitats, can achieve these benefits, which also help to regulate soil erosion, water quality and water flows, and improve flood storage capacity. The Whin Sill grasslands are localised in extent, confined to this geological intrusion. There may be opportunities to expand the extent of this grassland along the Whin Sill, buffering and linking to other species-rich grassland within the farmed landscape. There may be similar opportunities to buffer and link heathland habitats. The River Coquet is an important area for salmonid spawning.	Improve the long term condition of designated wildlife sites and core areas of priority habitat and the populations of native fauna and flora they support, by ensuring that underlying contributors to site condition are understood and managed appropriately, including invasive non native species, and that these contributing factors are also considered in light of anticipated environmental change. Seek opportunities to expand and buffer these sites, building more robust ecological networks, particularly for woodland, Whin Sill grassland and wetlands. Seek opportunities to restore plantations on ancient woodland sites to a native species mix. Seek opportunities to restore more natural river morphology, control the spread of invasive species and threats to white-clawed crayfish and other native aquatic species. Manage conifer woodlands in red squirrel strongholds to maintain populations.	**Biodiversity** **Regulating soil erosion** **Regulating water quality** **Regulating water flow** **Sense of place / inspiration**

Service	Assets/attributes: main contributors to service	State	Main beneficiary	Analysis	Opportunities	Principal services offered by opportunities
Geodiversity	Geological or geo-morphological interest features, including the Whin Sill and sandstone crags	There are currently no sites formally designated at national or local level for their geological or geomorphological interest.	Local	There is scope for identifying and designating key features in the landscape that are of geological interest (such as the sandstone crags and Whin Sill exposures) or the river channels themselves which may be of geomorphological interest. These may also offer opportunities for research and education, and opportunities to increase people's understanding and enjoyment of the landscape. Allowing geomorphological processes to function naturally, such as those associated with rivers, may enhance a variety of habitats, as well as improving the value and range of geomorphological features within the NCA.	Encourage the identification of sites of local and regional importance for geology and geomorphology and where appropriate prepare management advice to maintain or restore their interest; provide access and interpretation where possible. Maintain the long-term condition of geological and geomorphological sites and features through their appropriate management and the natural functioning of geomorphological processes. Promote the importance of such features through local partnerships with geologists, schools, colleges and other interested parties and encourage research and educational opportunities in order to raise awareness, increase understanding and enjoyment of geodiversity.	**Geodiversity** **Sense of place / inspiration** **Biodiversity**

Photo credits

Cover photo:Resistant rocks protrude from beneath the till cover, creating locally prominent features such as the sandstone crags at Shaftoe.

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