National Character Area profile:

03. Cheviot Fringe

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NATURAL ENGLAND

Introduction

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

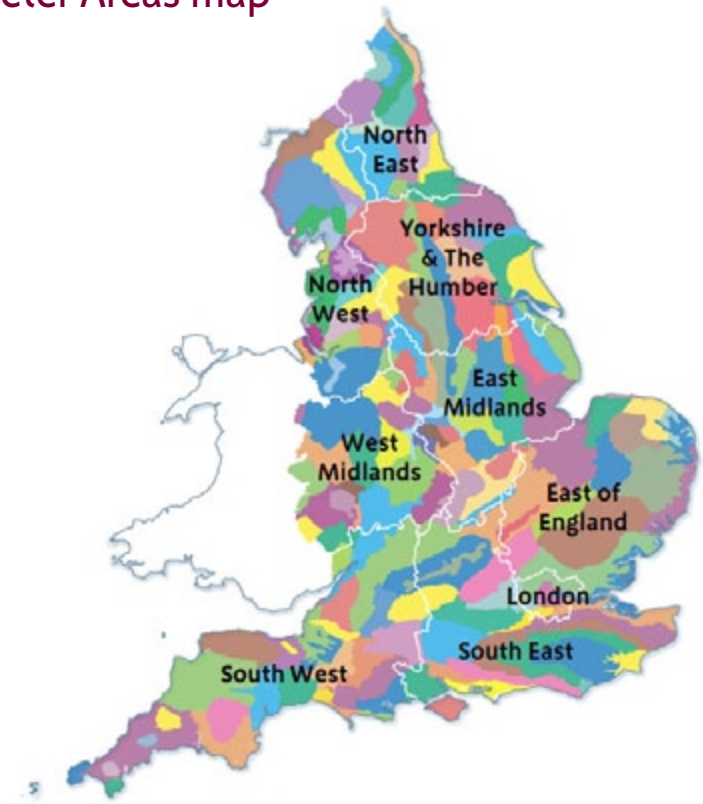
NCA profiles are guidance documents which can help communities to inform theirdecision-making about the places that they live in and care for. The informationthey contain will support the planning of conservation initiatives at a landscape scale, inform the delivery of Nature Improvement Areas and encourage broader partnership working through Local Nature Partnerships. The profiles will also help to inform choices about how land is managed and can change.

Each profile includes a description of the natural and cultural features that shape our landscapes, how the landscape has changed over time, the current key drivers for ongoing change, and a broad analysis of each area's characteristics and ecosystem services. Statements of Environmental Opportunity (SEOs) are suggested, which draw on this integrated information. The SEOs offer guidance on the critical issues, which could help to achieve sustainable growth and a more secure environmental future.

NCA profiles are working documents which draw on current evidence and knowledge. We will aim to refresh and update them periodically as new information becomes available to us.

We would like to hear how useful the NCA profiles are to you. You can contact the NCA team by emailing ncaprofiles@naturalengland.org.uk

National Character Areas map



[1] The Natural Choice: Securing the Value of Nature, Defra (2011; URL: www.official-documents.gov.uk/document/cm80/8082/8082.pdf)
[2] Biodiversity 2020: A Strategy for England's Wildlife and Ecosystem Services, Defra (2011; URL: www.defra.gov.uk/publications/files/pb13583-biodiversity-strategy-2020-111111.pdf)
[3] European Landscape Convention, Council of Europe (2000; URL: http://conventions.coe.int/Treaty/en/Treaties/Html/176.htm)

Summary

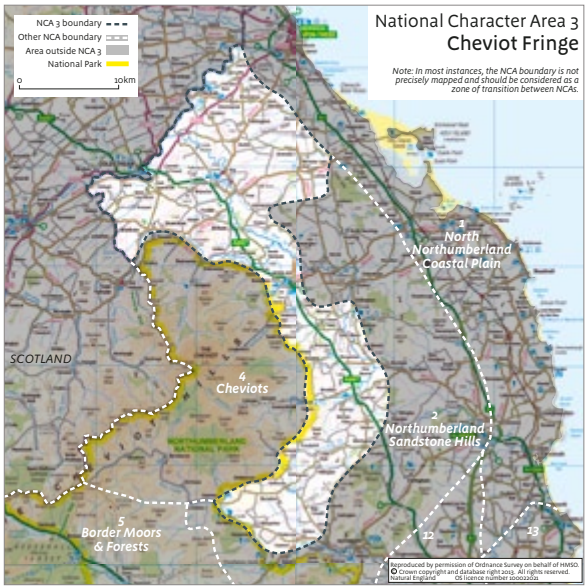
The Cheviot Fringe National Character Area (NCA) is a tranquil, undulating, lowland landscape, framed by the Cheviots NCA to the west and the Northumberland Sandstone Hills NCA to the east. The western edge falls within the Northumberland National Park and encompasses the edge of the Cheviot Hills.

The importance of glacial processes in shaping this landscape is shown by the extensive array of glacial lake and fan deposits, sinuous ridges, eskers, kames and kettle holes. Weathering of the underlying bedrock combined with the widespread blanket of glacial and alluvial deposits have resulted in fertile soils that support the agriculture which dominates this area, and the river valleys provide much of the North East region's sand and gravel resources.

The vales to the south are a patchwork of arable farmland, pasture and meadows with the regular field pattern still strong, delineated by hedgerows punctuated with trees. To the north, arable cultivation dominates and the fields are flatter and larger with fewer hedgerows. Conifer blocks and shelterbelts are prominent in the landscape with broadleaved woodland predominantly along watercourses.

Three river systems, all originating in the Cheviots, meander tree-lined across the plains and vales. The rivers Coquet, Till and Tweed are designated as Sites of Special Scientific Interest and the River Tweed is designated as a Special Area of Conservation due to the support that that both these areas provide to internationally and nationally threatened species such as Atlantic salmon, sea trout, otter, lamprey, water vole and water crowfoot, and are important for their invertebrate assemblages and riparian habitats.

Settlements take the form of nucleated villages, small hamlets and isolated farmsteads connected by a network of narrow, rural lanes. The town of Wooler, the largest in the area, is situated on the A697 which is the only major road that runs the length of the NCA.



Click map to enlarge; click again to reduce.

The area contains a wealth of heritage assets. The Milfield Plain in particular is exceptionally rich in buried archaeology, revealing evidence of settlement from Mesolithic through to early-medieval times. Fortified castles, bastle houses, tower houses and battlefields are scattered throughout much of the NCA – the legacy of three centuries of border conflict.

There are likely to be challenges in managing the agricultural environment to secure a sustainable future for farming while protecting the geodiversity and heritage assets of the area, improving water quality and responding to pressures from flooding, but this creates opportunities to expand and restore semi-natural habitats, creating ecological networks that are more resilient to climate change, and that can support other ecosystem services.

Statements of Environmental Opportunity

- **SEO 1:** Manage the agricultural landscape to secure viable and sustainable farming, strengthening historic landscape character and protecting heritage assets, protecting soils and water quality in the rivers and Fell Sandstone aquifer, supporting the farmland birds and wintering wildfowl that are dependent on this area, and enhancing biodiversity through improved connectivity of semi-natural habitats, creating ecological networks that are resilient to environmental change

- **SEO 2:** Manage and enhance the network of streams and rivers, improving water quality, restoring natural river morphology, promoting natural flood management and assisted natural recovery, and extending semi-natural habitat to increase flood storage capacity, protect nationally and internationally important species, create more resilient ecological networks, and strengthen landscape character while ensuring rivers maintain the international recognition they have attracted as important game fisheries.

- **SEO 3:** Protect, enhance and extend the mosaic of semi-natural habitats, including wet woodland, upland heath, fens, blanket bog and grazing marsh as a way of contributing to ecological networks that are more robust to environmental change, as well as supporting the nationally important farmland bird assemblage found in this NCA, increasing the water and carbon storage capacity of soils, reinforcing landscape character and perceptions of tranquillity, and improving amenity for local communities.

Rivers and streams are key features of this landscape. Man-made structures such as this ford at Haugh Head on Wooler Water make it difficult for species like salmon to negotiate the rivers.

- **SEO 4:** Protect and sustainably manage the wealth of geodiversity and heritage assets, such as the nationally important glacial and archaeological landscape of the Milfield Plain; recognising the value they provide in contributing to our understanding of the landscape and its history, local distinctiveness and sense of place, and promoting knowledge and understanding of these important resources.

Description

Physical and functional links to other National Character Areas

The majority of the Cheviot Fringe National Character Area (NCA) is a narrow corridor of lowland plains formed on softer sedimentary bedrock. The western edge of the NCA, however, encompasses the more resistant igneous rocks of the Cheviots which rise smoothly and steeply above the plains, and the eastern edge overlies the coarse sandstone of the Northumberland Sandstone Hills NCA which rises more gently to the east.

The western edge (3 per cent) of the Cheviot Fringe NCA falls within the Northumberland National Park which also covers all of the Cheviots NCA and parts of the Northumberland Sandstone Hills, Border Moors and Forests, and Tyne Gap and Hadrian's Wall NCAs.

The Cheviot Fringe extends northwards to the Scottish border where the northern part of the River Tweed basin is framed by the Lammermuir Hills of the Southern Uplands and to the north-west the Tweed basin opens into the North Northumberland Coastal Plain NCA and Northumberland Coast Area of Outstanding Natural Beauty.

This lowland landscape, dominated by views of the Cheviots and Northumberland Sandstone Hills, is dissected by three major river systems, all radiating from the Cheviot Hills, which cross the broad valleys and plains of the Cheviot Fringe before flowing into adjacent NCAs. The rivers Coquet and Aln in the south flow eastwards and on through the Northumberland Sandstone Hills. The River Breamish/Till flows east before meandering northwards in the centre of the NCA, joined by the waters of the River Glen before flowing into the Tweed and east out to sea at Berwick-upon-Tweed.

From the hills above Harbottle, looking south-east across the southern end of the NCA: the Cheviot Fringe is a lowland landscape framed by the Cheviots (foreground) and the Northumberland Sandstone Hills (distance).

The eastern edge of the NCA overlies a significant proportion of the Fell Sandstone aquifer which provides much of the public water supply for this part of Northumberland. Sand and gravel are quarried and exported from the river valleys of this NCA and the largest potential resource in the North East region is the Milfield Plain.

The NCA is bisected by the A697 from Morpeth to Coldstream – historically one of the main routes between England and Scotland – and by one of the major National Grid transmission lines that runs from Newcastle upon Tyne up the length of the Cheviot Fringe NCA and across into Scotland.

Key characteristics

- Corridor of softer mudstones, sandstones and limestones forming a lowland landscape of valleys and plains between the more resistant rocks of the Cheviot Hills to the west and the Northumberland Sandstone Hills to the east.
- Many landscape features shaped by glaciation and deposition, including extensive clay and sand deposits on the Milfield Plain, drumlin fields within the Tweed valley lowlands, and distinctive hummocky kettle moraines, sinuous eskers and kames within the gently undulating vales.
- Agricultural landscape of mixed farmland on good quality loamy soils, combining pasture and meadows for livestock with arable, and interspersed with parklands.
- Strong pattern of hedgerows, with many hedgerow trees within the undulating vales, contrasting with flatter, more open, arable farmland to the north.
- Strong rectilinear pattern of small, coniferous woodland blocks and shelterbelts with deciduous woodland more prevalent along watercourses.
- Many meandering rivers and streams, often flowing between raised terraces and flat, gravel benches, supporting internationally and nationally threatened species such as Atlantic salmon, sea trout, otter, lamprey, water vole and water crowfoot, and providing one of England's most important game fisheries.
- Farmed environment supporting a nationally important assemblage of farmland birds and providing important roosts and feeding grounds for wintering wildfowl on the coast, with wet woodland and grazing marsh occurring along streams and rivers, and pockets of fens, mires and heath scattered within the landscape.
- Small, traditional villages strategically sited at river bridging points and on the break of slope of the surrounding uplands and the flatter vale floor, and isolated farm hamlets and farmsteads.
- Sandstone, either rubble or dressed, is the predominant building material, with blue-grey roof slates and orange pantiles.
- A wealth of heritage assets – extensive buried artefacts from Mesolithic, Neolithic, bronze-age, iron-age and Anglo-Saxon settlements – and upstanding defensive structures such as fortified castles, bastle houses and tower houses associated with three centuries of border conflict.
- Tranquil, rural landscape with small, nucleated villages linked by minor roads; only one major road (A697) links to adjacent NCAs.

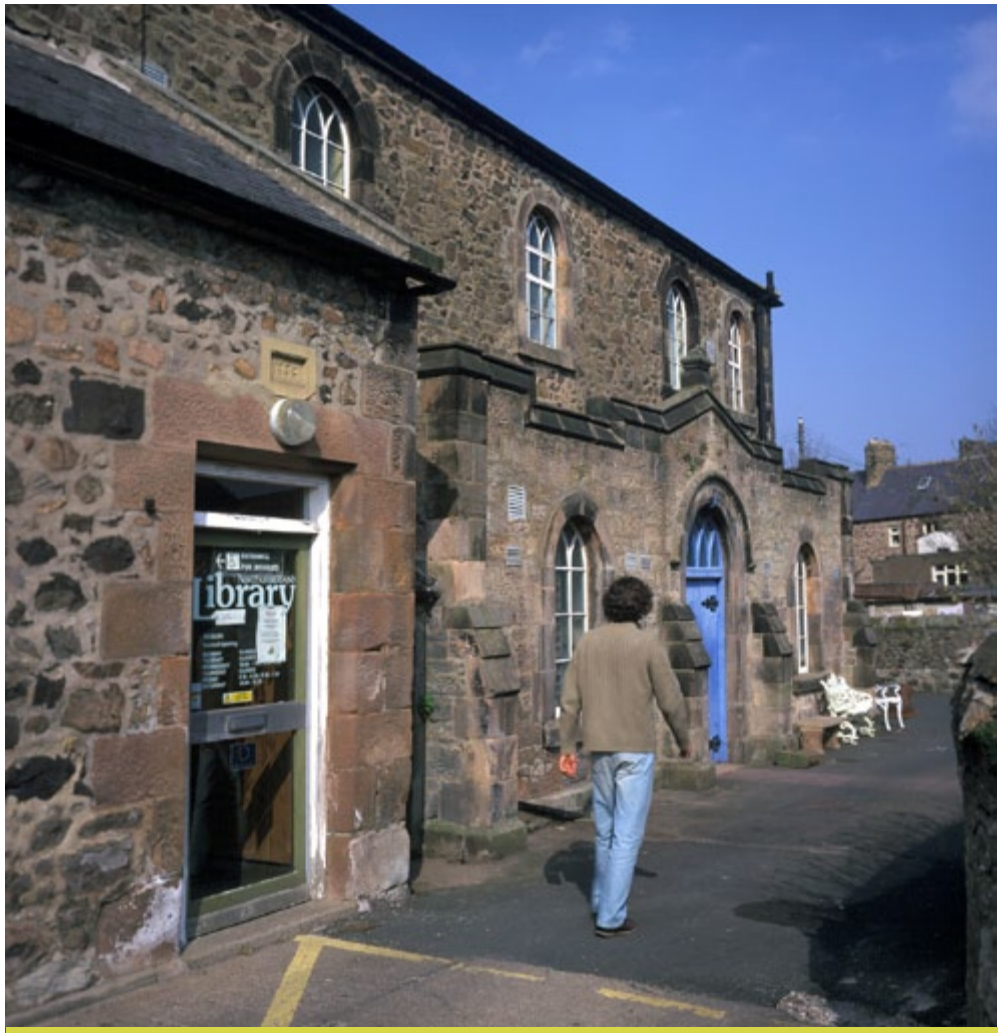
Arable cultivation dominates on the alluvial terraces of the Milfield Plain. Large fields are enclosed by fragmented hedgerows.

The Cheviot Fringe today

The Cheviot Fringe is a tranquil, agricultural landscape overlooked by the Cheviot Hills to the west and the Northumberland Sandstone Hills to the east, and extending northwards to the Scottish border. The softer mudstones, sandstones and limestones underlying much of this area have eroded to form a lowland corridor of valleys and plains between the more resistant volcanic rocks of the Cheviots (the eastern edge of which falls within this NCA) and the coarse sandstone of the Northumberland Sandstone Hills which rise dramatically on either side. The Fell Sandstone lies in an arc round the Cheviot Hills, along the eastern edge of the NCA, forming the aquifer which provides the public water supply for much of this part of Northumberland.

The landscape has been heavily influenced by glaciation and deposition; drumlin fields are frequently found within the Tweed valley lowlands while hummocky kettle moraines, sinuous eskers and kames are features of the gently undulating, lowland valleys of Coquetdale and Whittingham Vale to the south. The extensive layer of boulder clay that overlays the whole of the area, combined with the underlying sedimentary bedrock and alluvial deposits, gives rise to fertile agricultural land.

Three major river systems, all radiating from the Cheviot Hills, flow across these valleys and plains and are excellent examples of dynamic montane river systems, characterised by active meandering, large depositional features and connected and active flood plains. In the south of the area, the rivers Coquet and Aln flow eastwards across the broad, undulating valleys of Coquetdale and Whittingham Vale, and on through the Northumberland Sandstone Hills. The River Breamish, which eventually becomes the Till, also flows eastwards from the Cheviots, before swinging northwards at Powburn on a long meandering



This Grade II-listed building in Wooler, formerly the Western Chapel but rebuilt in 1818 as a Masonic Hall is typical of the area, constructed from rubble and dressed sandstone with the pink hue characteristic of the Milfield Plain.

course in the centre of the NCA to join the Tweed, flowing through the Milfield Plain, collecting the waters of the River Glen and its tributaries en route. These rivers all have their steep headwaters draining upland heather and peat moors in the Cheviot Hills which means they respond quickly to rainfall; much of the valley floors form the natural flood plains of these dynamic, mobile rivers and occasional flooding of agricultural land and a small number of residential properties is an issue. The rivers provide important riparian habitats such as river shingle, wet woodland and grazing marsh, and support internationally and nationally threatened species such as Atlantic salmon, sea trout, otter, lamprey, water vole, water crowfoot and river jelly lichen, as well as being important for their invertebrate assemblages. Consequently, the rivers Coquet, Till and Tweed are designated as Sites of Special Scientific Interest and the River Tweed is also a Special Area of Conservation (SAC).

The Northumberland Sandstone Hills frame the arable plain near Ford with the English/ Scottish border in the distance.

Other small pockets of semi-natural habitat are scattered within this agricultural landscape: ice-age kettle holes have formed complexes of fens and raised bogs such as Ford Moss SAC, and where the NCA abuts the Cheviots and the Sandstone Hills, outliers of upland heath and blanket bog occur, while an area of lowland heath can be found near Whittingham.

Arable cultivation dominates much of the good quality farmland found in the Cheviot Fringe NCA and the area supports a nationally important assemblage of farmland birds. Within the 'haughs' or alluvial terraces of the intensively farmed Till valley, the landscape of the Milfield Plain is generally flat and open, with large fields enclosed by fragmented, largely treeless hedgerows. These flat, low-lying fields are important roosts and feeding grounds for wildfowl, especially geese, wintering on the coast. Woodland cover is sparse in this area and largely confined to deciduous woodland along watercourses and mixed coniferous belts and blocks associated with large estates such as Ewart Park and Fenton House; at Ford and Etal Estates these are managed for red squirrels which are still found in this area.

The vale landscapes to the south have a more varied appearance. Here the pattern of enclosure is still strong: regular, medium-sized fields, enclosed by hedgerows with many broadleaved hedgerow trees form a patchwork of arable land, grazing pasture and meadows cut for silage. Many rivers and streams weave their way across the vales and these are frequently lined with broadleaved trees and woodland, adding colour and natural variety to

the landscape. Small, mixed coniferous plantations and mixed copses are prominent landscape features.

The western edge of the NCA incorporates the edge of the Cheviot Hills and falls within the Northumberland National Park. It contrasts with much of the rest of the area as the predominant land use is sheep farming rather than arable cultivation.

To the north lie the flatter, more open Tweed lowlands. The meandering River Tweed defines a rich valley landscape which is both varied and colourful; in places broad and open, in others enclosed and intimate, the valley combines farmland and deciduous woodland with castles, bridges, small settlements and large country houses such as Tillmouth Park.

Farmsteads, farm hamlets and small villages are widely dispersed, often occupying strategic locations such as river fording points, and parklands associated with the large estates are still scattered throughout the landscape. Buildings are traditionally constructed from local materials: single-storey cottages built from stone rubble won from the overlying glacial till deposits, larger houses constructed in dressed sandstone, blue-grey slates or stone slabs for roofs and, on the Milfield Plain, buildings constructed in sandstone of a pinkish hue and roofed in local orange clay tiles.

Wooler is the largest town in the area, located on the A697 which is a key route running north–south and linking Morpeth with Coldstream. Owing to its proximity to the English/Scottish border, this landscape features many historic defensive structures including iron-age hill forts, fortified castles, bastle houses and tower houses, and Flodden Field and Homildon Hill battlefields are important tourist attractions. The rivers also draw visitors from far afield as they represent some of the most important game fisheries in England; the

Small, nucleated villages, dispersed farmsteads and farm hamlets are scattered throughout this rural landscape. Like many of the settlements in this area, Wooler is situated at the break of slope between the uplands and the flatter vale floor.

River Tweed is world famous for salmon and the River Till is noted mainly for its sea trout fishery. Relatively little of the NCA is publicly accessible and access is predominantly confined to public rights of way. Wooler, referred to as 'the gateway to the Cheviots', is a popular base for walkers and St Cuthbert's Way from Melrose to Lindisfarne and a national cycle route both pass through the town. The area scores moderately highly for tranquillity and remains little disturbed by modern development.

The landscape through time

The landscape of the Cheviot Fringe NCA has been greatly influenced by glaciation and owes much to a widespread mantle of glacial deposits. The 'solid' rocks – limestones, mudstones and sandstones – which underlie much of the area belong chiefly to the Ballagan Formation of Lower Carboniferous age, deposited in a peritidal or lagoonal environment. Pre-glacial erosion of these rocks, which lie between the more resistant volcanic rocks of the Cheviot Hills and the Northumberland Sandstone Hills, reduced most of the area to a low elevation.

Deposition of rock debris during the last glacial period has left an extensive mantle of boulder clay (till), some of which is moulded into characteristic drumlins. Glacial meltwaters cut channels into the underlying solid rock and transported sand and gravel which were deposited as vast spreads across parts of the area. The distinctive hummocky surface of these deposits commonly carries hollows known as kettle holes, fine examples of which may be seen west of Wooperton. Sinuous ridges, eskers and kames of sand and gravel are also distinctive landscape features.

The huge amounts of glacial meltwater released into this low-lying area became trapped locally, producing temporary lakes. Within these were deposited thick accumulations of sands and clays. Glendale on the Milfield Plain was formed in this way as the site of one of the largest hollows in England, in which more than 160 m of finely laminated lacustrine clay was deposited.

There is much surviving evidence of early settlement in the Cheviot Fringe; the Milfield Plain in particular is exceptionally rich in buried archaeological remains and is regarded as one of the most important archaeological sites in the British Isles, revealing extensive artefacts from the Mesolithic through to the early-medieval

Grand houses set in parklands were established on many of the large estates in the late-18th and 19th centuries at the same time as the landscape was reorganised and transformed by agricultural improvement. Many of these parklands, such as this at Weetwood, are still in existence today.

period. The Milfield Plain provided attractive sites for farmers from as early as the Neolithic period due to the fertile soils and shelter provided by the Cheviot Hills.

Enclosed settlements and farmsteads probably continued in use until the 7th to 9th centuries when villages were established in association with large, open, arable fields with associated hay meadows and common grazing. The pattern

of small nucleated villages further developed through systematic planning in the 12th and 13th centuries. The three major river systems which cross the Cheviot Fringe from the Cheviot Hills have played an important role in the location of settlements; many of the villages are situated at fording points or at the break of slope between the Cheviots and Sandstone Hills and the vale floor, out of reach of flooding.

Proximity to the English/Scottish border has also strongly influenced the location of settlements and historic character of the area; many existing landscape features have their origins in the need for defence. These include the earthwork remains of iron-age hill forts, which line the break of slope between the lowland vales and plains and the surrounding high ground, and the defensive structures, such as Norham Castle, which form a chain along the frontier. The present A697 from Morpeth to Coldstream was originally a Roman road. It became an important military route during the three centuries of border conflicts between the English and the Scots, which continued until the accession of James I united the two kingdoms in 1603. It was along this 'Kings' Highway' that most of the great battles of the Border Wars took place, including the battle of Flodden Field in 1513, during which James IV of Scotland was killed.

The present pattern of dispersed settlement, with isolated farmsteads and farm hamlets, dates from when the landscape was hugely altered, reorganised and redistributed in the late 18th and 19th centuries, driven by the large estates which formed the backbone of farming in the area. Grand country houses such as Pallinsburn House, Ewart Park, and Lilburn Tower, were built, surrounded by the estates' farmland. These large houses sometimes incorporated older fortified structures into the fabric of the buildings, and were often set within parkland, much of which can still be seen. Farmsteads consisted of large fields well-fenced with quicksets and blocks of conifer plantation interspersed with some older deciduous woodland which is still prominent in the landscape today. Traces of the older Anglian and medieval strip fields can still be found, and in some places there are remains in the form of earthworks, and more rarely buildings of the village-based settlements that preceded these changes.

The Lower Breamish Valley where small mixed and coniferous woodland copses, blocks and shelterbelts are prominent features in the landscape.

More recent defensive structures were erected during the 20th century, most notably the Second World War pillboxes that encircle the village of Wooler.

Post-war demand for food followed by pressures to produce food more cheaply led to an intensification of production methods; more land was brought into cultivation, reducing broadleaved woodland cover, and fields were made larger by the removal of hedgerows to improve efficiency in arable farming. More recently there has been a reversal in these trends with some hedgerow restoration, woodland planting and grazing marsh re-creation undertaken through agri-environment schemes and other initiatives. In a few places such as Fenton, work has been done to re-create active flood plains, creating important wetland habitats and restoring a more natural river morphology.

While there has been relatively little expansion of settlements, the 20th and 21st centuries have brought a number of other landscape-scale changes including extensive sand and gravel extraction on the Milfield Plain, the establishment of a number of caravan parks and the introduction of vertical structures such as electricity pylons, mobile phone masts and television masts which are now prominent features of the open landscape. Access to electricity and developments in lighting technology have increased the prevalence of light pollution; light pollution from the Cheviot Fringe has greatly altered the night-time landscape of the Northumberland National Park.

Ecosystem services

The Cheviot Fringe 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 Cheviot Fringe NCA is contained in the 'Analysis' section of this document.

Provisioning services (food, fibre and water supply)

- **Food provision:** Agriculture is dominant in this NCA due to the widespread fertile soils; 93 per cent of the land is cultivated. Some 52 per cent of the land is grazed, 26 per cent is used for cereals and 9 per cent for oilseeds, cash roots, stock feed and other arable crops. The north of the area is predominantly arable, whereas grazing for sheep and cattle is more prevalent along the western edge and in the south.

- **Water availability:** The eastern edge of the NCA overlies much of the Fell Sandstone aquifer which is currently classified by the Environment Agency as having 'water available' (although with a strategy to move to 'no water available' in coming years) and from which 80 per cent of abstractions are for public water supply. The Rivers Coquet and Aln in the south provide water for public supply and agriculture; the River Aln has 'water available'. The River Till and tributaries form the major catchment in the NCA and provide important water for irrigating root crops but, as part of the River Tweed SAC, abstractions are subject to restrictions.

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

- **Regulating soil erosion:** Existing hedgerows, buffer strips, woodland and other riparian vegetation bind and stabilise soil, helping to reduce damage, but soil erosion is still recognised as a concern, particularly for the River Till SSSI and River Tweed SAC, as the freely-draining soils are particularly prone to erosion. Consequently, there are opportunities to improve this service and the Till/Tweed, Coquet and Aln catchments are a focus area for catchment sensitive farming which aims to reduce sediment and nutrient input to the watercourses through good soil management and agricultural practice.

- **Regulating soil quality:** Maintaining and improving soil quality are important in sustaining the productivity of this area. Areas of semi-natural habitat contribute to the organic content and structure of soils where land is under sustainable management, but as large areas are under arable cultivation, good soil management and agricultural practice are essential. The slowly permeable loamy and clayey soils are easily damaged when wet, so careful timing of activities and use of machinery to reduce the likelihood of soil compaction, and increasing levels of organic matter are vitally important. Managed flooding could help to replace depleted nutrient-rich alluvial soil.

- **Regulating water quality:** The ecological and chemical qualities of the majority of the rivers which arise in the Cheviots and flow through this NCA were last assessed as 'Good', benefiting habitats and users in this and downstream NCAs. Some stretches (River Glen, River Till from the Glen to the Tweed, and Wooler Water from Harthope Burn to the Till), however, failed to meet 'Good' status due to diffuse pollution from agricultural land. The Riverweed SAC condition assessment revealed elevated phosphate levels.

  Groundwater quality within the Fell Sandstone aquifer is poor: elevated levels of nitrate, sulphate, potassium and volatile compounds that are attributed to diffuse pollution from agriculture, localised industrial contamination and surface water contamination from mine water discharges.

- **Regulating water flow:** The headwaters of the River Till and tributaries and the River Coquet drain the heather moorlands of the Cheviots and respond quickly to rainfall, resulting in a long history of river flooding in the Cheviot Fringe NCA and downstream. A limited number of properties are at risk from flooding, particularly in Wooler, although flood defences currently protect some of these, but due to the rural nature of this area the greatest damage is to crops and stock rather than residential properties. The preferred approach to managing flood risk as detailed in the Catchment Flood Management Plans includes restoring natural flood plains, promotion of sustainable land management practices that reduce the amount and rate of run-off and erosion, and investigation of measures such as floodwater storage.

The River Glen in flood; much of the Cheviot Fringe forms the natural flood plains of the numerous rivers and streams that meander across it.

- **Pollination:** The existing network of hedgerows, arable margins and semi-natural habitats benefits pollinators which are important for high crop yields of certain crops such as oilseed rape. Improving the extent and quality of these networks will improve the provision of this service.

Cultural services (inspiration, education and wellbeing)

- **Sense of place/inspiration:** A sense of place is provided by the broad valleys and plains of this landscape, dissected by rivers and streams, and framed by the Cheviots to the west and Northumberland Sandstone Hills to the east. Scattered throughout the tranquil, agricultural landscape, which is characterised by a patchwork of smaller hedgerow-lined fields in the vales and larger arable fields in the north, are defensive structures associated with its proximity to the English/Scottish border, and isolated rural villages and farmsteads.

- **Sense of history**: A strong sense of the area's history is captured in the wealth of archaeological remains dating back to the Mesolithic; the Milfield basin is regarded as one of the most important archaeological landscapes in the British Isles. Most prominent are the relicts of centuries of border conflict – a landscape scattered with battlefields, fortified castles, bastle houses, tower houses and other defensive structures. The area's farm hamlets are also, along with those extending to the North Sea and into Scotland, distinctive in a national context.

- **Tranquillity:** Tranquillity represents a significant feature of the NCA with 92 per cent of the area identified as undisturbed.

- **Recreation:** Angling is an important recreational activity in this NCA, drawing visitors from far afield; the River Tweed is world famous for salmon and the River Till is noted mainly for its sea trout fishery. In addition to the long-distance walking route and national cycle trail that pass through the area, the Cheviot Fringe NCA acts as a gateway to the Cheviots and Northumberland National Park.

- **Biodiversity:** Many of the numerous rivers and streams that meander, tree-lined, through this landscape are designated for their riparian habitats, particularly woodland, and the nationally and internationally important populations of species such as water crowfoot, Atlantic salmon, lamprey and otter, and invertebrate assemblages that they support.

  The small pockets of semi-natural habitats and linear features such as streams, woodlands and hedgerows provide permeability in the wider agricultural landscape, allowing crucial movement of wildlife. The area is nationally important for its assemblage of farmland birds and the area around the Milfield Plain provides important roosts and feeding grounds for wildfowl, especially geese, over-wintering on the coast. Red squirrels are found in the area with reserves in adjacent NCAs.

- **Geodiversity:** Geology and glacial history have shaped the landscape and cultural heritage of the area. The softer sedimentary bedrock underlying much of the area has eroded to form plains and alluvial terraces with fertile soils sheltered by the volcanic rocks of the Cheviots. These continue to provide good quality agricultural land. The majority of the North East region's sand and gravel resources is found in the Coquet, Breamish, Glen and Till River valleys and the largest potential source is the Milfield Plain which is currently quarried. The bedrock also provides the sandstone that defines the vernacular architecture.

  The varied and widespread examples of glacial features that occur throughout this NCA, with quarries and designated geological sites, provide opportunities for interpretation, understanding and research into the geodiversity and landscape processes of the area.

Statements of Environmental Opportunity

SEO 1: Manage the agricultural landscape to secure viable and sustainable farming, strengthening historic landscape character and protecting heritage assets, protecting soils and water quality in the rivers and Fell Sandstone aquifer, supporting the farmland birds and wintering wildfowl that are dependent on this area, and enhancing biodiversity through improved connectivity of semi-natural habitats, creating ecological networks that are resilient to environmental change.

For example, by:

- Promoting best practice in soils, nutrient and pesticides management to improve soil quality, increase carbon storage, reduce sedimentation and diffuse pollution of watercourses. This will include livestock management in riparian zones to minimise poaching and soil compaction, reducing the impact of nutrients from arable cultivation through measures such as improving watercourse crossings, pesticide sprayer loading and wash down sites, and introducing sediment ponds and traps. Ensuring good water quality is particularly important in the River Till Site of Special Scientific Interest (SSSI), and River Tweed Special Area of Conservation (SAC), the River Coquet and Coquet Valley Woodlands SSSI and the Fell Sandstone. Good soil management should also have a positive impact on recharge of the aquifer.
- Improving sustainable use of water, promoting the creation of winter storage reservoirs, and encouraging land management practices that increase infiltration to limit increases in demand for water, such as grassland strips and tree planting along watercourses and re-creation of flood plain grazing marsh.
- Managing and restoring hedgerows, particularly in the vales, to reduce cross-land flows of water during peak floods and create a network across the agricultural landscape which enhances sense of place and creates wildlife corridors, benefiting pollination and pest regulation services.
- Encouraging agricultural practices that support the nationally important farmland bird assemblage found in this area and provide habitats for insects, such as diverse field margins, using wild bird and nectar flower seed mixes, cereal headlands and over-wintered stubbles. This will benefit pollination and pest regulation services.
- Restoring flood plain grazing marsh as part of the flood risk management strategy, providing a valuable habitat which will particularly benefit the wintering wildfowl that roost in the large fields of the Milfield Plain and replacing depleted nutrient-rich alluvial deposits which should improve soil quality.
- Incorporating short rotation coppice into the landscape, particularly along river corridors to connect woodland fragments, stabilise banks, reduce soil erosion and help regulate water flow without damaging semi-natural habitats or sites with high potential for shallow-buried heritage assets or areas of historic field patterns, and with due consideration of the impact on landscape character. Appropriate buffers are likely to be needed adjacent to watercourses (particularly the SSSI/SAC rivers) to reduce the risk of sediment, nutrient and herbicide run-off, particularly during planting and harvesting in winter, and in order to avoid the introduction of non-native species.
- Promoting land management practices that minimise the disturbance and damage to archaeological sites from agricultural practices, particularly around the Milfield Plain which is recognised as a nationally important archaeological landscape.

SEO 2: Manage and enhance the network of streams and rivers, improving water quality, restoring natural river morphology, promoting natural flood management and assisted natural recovery, and extending semi-natural habitat to increase flood storage capacity, protect nationally and internationally important species, create more resilient ecological networks, and strengthen landscape character while ensuring rivers maintain the international recognition they have attracted as important game fisheries.

For example, by:

- Ensuring that populations of the European Protected Species and the UK Biodiversity Action Plan species found in the rivers and streams, such as otter, lamprey, Atlantic salmon, water crowfoot and river jelly lichen, are maintained and increased by improving water quality, controlling non-native invasive species and enhancing riparian habitats.
- Improving water quality through encouraging land management practices that reduce diffuse pollution, such as informed infield nutrient application, using crops which require lower applications of fertilisers and pesticides, improving farm infrastructure and waste management, using buffer strips to protect watercourses, and minimising damage to soil structure through the careful timing of activities, using low pressure machinery, managing stock movements and controlling riparian grazing.
- Reconnecting rivers with their natural flood plains where possible, to manage flood risk as detailed in the Catchment Flood Management Plans, improving soil quality by replacing depleted alluvial deposits, and creating important wetland habitats for wildfowl.
- Removing redundant manmade structures that interfere with the dynamic river system, such as weirs, old bridge footings and rock armour, and encouraging the reinstatement of features such as ox-bow lakes. A more natural morphology should stabilise the system, enabling the rivers to absorb more of the water's energy, thereby mitigating the effects of peak flows, and ensuring the continued presence of important riparian habitats.
- Encouraging well-vegetated banks to reduce soil erosion and provide green corridors.
- Working collaboratively to control invasive non-native species such as Himalayan balsam, giant hogweed, Japanese knotweed and signal crayfish.
- Seeking opportunities to reduce pollution from mine water and industrial discharges to improve the water quality of the watercourses and Fell Sandstone aquifer, restoring quarries to ensure they enhance local landscape character and biodiversity interest while incorporating flood water storage where appropriate.
- Restoring and creating woodland along riverbanks to connect existing fragments, stabilise banks, increase water infiltration and strengthen landscape character. Where appropriate, short rotation coppice could be planted, increasing the area's biomass provision and providing some of the advantages of semi-natural woodland. Ensuring that fish populations in the rivers Till, Tweed and Coquet continue to attract local people and tourists to these internationally recognised game fisheries without detriment to the designated features and habitats.

SEO 3: Protect, enhance and extend the mosaic of semi-natural habitats, including wet woodland, upland heath, fens, blanket bog and grazing marsh as a way of contributing to ecological networks that are more robust to environmental change, as well as supporting the nationally important farmland bird assemblage found in this NCA, increasing the water and carbon storage capacity of soils, reinforcing landscape character and perceptions of tranquillity, and improving amenity for local communities.

For example, by:

- Improving the quality of existing high biodiversity value habitats including designated sites such as Ford Moss SAC, Campfield Kettle Hole SSSI and Barelees Pond SSSI, buffering and expanding them where possible and connecting them to other semi-natural habitats to increase ecological coherence and resilience to environmental change, and to maximise carbon sequestration and water retention.
- Restoring and creating high biodiversity value habitat to enhance habitat networks, link existing sites and increase the heterogeneity of the area. In particular, the naturalising of river morphology will provide opportunities for the restoration of habitats such as wet grassland and wet woodland; and the restoration of sand and gravel quarries will present opportunities for extensive habitat creation and management, both between quarry sites and creating connections into the wider landscape.
- Managing existing woodlands to improve age structure and diversity, taking opportunities to diversify coniferous plantations with broadleaved planting, and re-planting woodlands on former woodland sites or adjacent to existing semi-natural ancient woodland sites, particularly along rivers and streams. This will enhance ecological connectivity and function, improve carbon sequestration, enhance biodiversity, and potentially provide sources of wood fuel, as well as contributing to the perception of tranquillity and providing new access opportunities where appropriate. In areas buffering red squirrel populations, the clear-felling of large conifer blocks and planting of large-seeded deciduous species should be avoided.
- Promoting agri-environment schemes and other mechanisms to encourage the restoration and expansion of networks of hedgerows, arable margins, road verges and unimproved grassland to support farmland birds, pollinators and pest regulators, improve the permeability of the agricultural landscape for wildlife, reduce cross-land water flows and reinforce landscape character.
- Identifying opportunities to enhance the existing rights of way network and encourage increased access to the natural environment. Semi-natural habitats and the species they support offer opportunities for education and recreation, contributing to a sense of place and perceptions of tranquillity.

SEO 4: Protect and sustainably manage the wealth of geodiversity and heritage assets, such as the nationally important glacial and archaeological landscape of the Milfield Plain; recognising the value they provide in contributing to our understanding of the landscape and its history, local distinctiveness and sense of place, and promoting knowledge and understanding of these important resources.

For example, by:

- Raising awareness of the important role that glacial processes have played in shaping the landscape by improving access to and interpretation of sites and developing opportunities for earth science research to extend the understanding of the geomorphological processes.
- Ensuring that future development and extraction do not remove possible key sites and sections with the potential to lead to greater understanding of ice sheet behaviour in the region, such as the Milfield Fan. Taking opportunities arising from sand, gravel and stone extraction to record temporary sections and retain permanent geological sections through the restoration process, where appropriate.
- Utilising opportunities to unearth research and preserve a wealth of archaeological artefacts revealed through mineral extraction, such as in the Milfield Plain, and ensuring that these valuable assets are protected for future generations.
- Conserving archaeological earthworks and sub-surface archaeology, while recognising the potential for undiscovered remains, through the employment of land management practices that minimise disturbance and damage from cultivation such as controlling scrub, minimising the use of heavy vehicles, taking archaeological features out of cultivation and encouraging arable reversion where possible.
- Improving access to and interpretation of the wealth of archaeology, above-ground features and battlefields in the area, promoting the use of these resources for education, research and tourism, and encouraging local communities to connect with and explore their heritage.
- Ensuring that new developments respect historic settlement patterns and features, including traditional farmsteads and buildings, and are in keeping with the local vernacular, addressing the decline of historic buildings by repairing and restoring them using traditional materials and styles.
- Strengthening historic field patterns through hedgerow restoration and management, contributing to the network of wildlife corridors and other ecosystem services.
- Removing redundant modern vertical structures to reinforce open views, landscape character and perceptions of tranquillity.
- Conserving and managing historic parklands, including establishing new generations of trees in a way that is sensitive to their historic character, appropriately managing ancient and veteran trees and retaining deadwood fauna and flora, and where possible improving public access to increase understanding and amenity.

Supporting document 1: Key facts and data

Total area: 51,591 ha

1. Landscape and nature conservation designations

Three per cent of the NCA, 1,480 ha, falls within the Northumberland National Park.

More information about the protected landscape can be found at:
www.northumberlandnationalpark.org.uk/

Source: Natural England (2011)

1.1 Designated nature conservation sites

The NCA includes the following statutory nature conservation designations:

Tier	Designation	Name	Area (ha)	Percentage of NCA
International	n/a	n/a	0	0
European	Special Protection Area (SPA)	n/a	0	0
	Special Area of Conservation (SAC)	River Tweed SAC; Ford Moss SAC; Harbottle Moors SAC.	300	<1
National	National Nature Reserve (NNR)	n/a	0	0
National	Site of Special Scientific Interest (SSSI)	A total of 8 sites wholly or partly within the NCA	1,010	2

Source: Natural England (2011)

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

In total 1,036 ha of the NCA are nationally designated. All the SAC area is within the SSSI area.

There are 15 local sites in the Cheviot Fringe NCA covering 231 ha which is less than 1 per cent of the NCA.

Source: Natural England (2011)

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

1.2 Condition of designated sites

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

SSSI condition category	Area (ha)	Percentage of SSSI in category condition
Unfavourable declining	81	8
Favourable	219	21
Unfavourable no change	188	18
Unfavourable recovering	549	59

Source: Natural England (March 2011)

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

2. Landform, geology and soils

2.1 Elevation

Elevation ranges from 2 m above sea level to a maximum of 323 m at Whether Hill. The average elevation of the landscape is 99 m.

Source: Natural England (2010)

2.2 Landform and process

The outlying foothills of the Cheviots in the west drop down to form an undulating to flat lowland farmland landscape. It has been heavily influenced by glaciation and deposition, with frequent drumlin fields and kettle moraines, which have subsequently been further modified by the many meandering rivers forming broad valleys.

Source: Cheviot Fringe Countryside Character Area Description

2.3 Bedrock geology

The solid geology which underlies the area is made up of limestones, mudstones and sandstones from the Cementstone Group of the Lower Carboniferous. Pre-glacial erosion has reduced most of the area to a low elevation. Outlying foothills of the Cheviots are found just within the western boundary of the NCA. They are formed from the Andesitic lava which underlies the majority of the Cheviot Hills, and drop away sharply at the interface with the softer sedimentary rocks of the surrounding lowland. A breakdown of solid geology as a proportion of total land area is as follows: 56 per cent sandstone, siltstone and dolomitic limestone; 14 per cent andesite; 10 per cent sandstone; 10 per cent limestone, sandstone, siltstone and mudstone; 5 per cent sandstone, siltstone and mudstone; 3 per cent conglomerate; and 2 per cent limestone.

Source: Cheviot Fringe Countryside Character Area Description, Natural England (2010)

2.4 Superficial deposits

The landscape of the area owes much to the deposition of rock debris from the ice sheets that crossed the area during the last glacial period. These have left a widespread mantle of glacial deposits, some of which have been moulded into drumlins. Deposited sand and gravel carried by the meltwaters have formed distinctive hummocky ground with hollows known as kettle holes. Other distinctive features include ridges, eskers and kames of sand and gravel. Glacial meltwater cut channels into the underlying rock in places, and elsewhere formed temporary lakes in which gravel, sands and clays were deposited.

Source: Cheviot Fringe Countryside Character Area Description

2.5 Designated geological sites

Tier	Designation	Number
National	Geological Site of Special Scientific Interest (SSSI)	2
National	Mixed interest SSSI	0
Local	Local Geological Sites	0

Source: Natural England (2011)

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

2.6 Soils and Agricultural Land Classification

Most soils in the NCA are loamy, slightly acidic and freely draining. There are 8 main soilscape types: slowly permeable seasonally wet slightly acid but base-rich loamy and clayey soils, covering 32 per cent of the NCA; freely draining slightly acid loamy soils, 23 per cent; slowly permeable seasonally wet acid loamy and clayey soils, 20 per cent; slightly acid loamy and clayey soils with impeded drainage, 7 per cent; freely draining acid loamy soils over rock, 7 per cent; freely

draining flood plain soils, 6 per cent; freely draining slightly acid sandy soils, 3 per cent; and freely draining very acid sandy and loamy soils, 1 per cent.

Source: National Soil Resources Institute Soilscape Maps, 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	6,719	13
Grade 3	31,264	61
Grade 4	10,195	20
Grade 5	3,267	6
Non-agricultural	71	<1
Urban	0	0

Source: Natural England (2010)

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

3. Key waterbodies and catchments

3.1 Major rivers/canals

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

Name	Length in NCA (km)
River Till	34
River Breamish	16
River Tweed	14
River Aln	12
River Coquet	12
River Glen	10
Wooler Water	9
Bowmont Water	7
River Alwin	1

Source: Natural England (2010)

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

These rivers flow eastwards down from the Cheviot Hills, and then meander across the Cheviot Fringe. The Coquet and Aln continue to flow through the Sandstone Hills to the east while the Breamish and Till swing northwards to join the Tweed.

Source: Natural England (2010)

3.2 Water quality

The total area of Nitrate Vulnerable Zone is 7,098 ha, or 14 per cent of NCA.

Source: Natural England (2010)

3.3 Water Framework Directive

Maps are available from the Environment Agency showing current and projected future status of water bodies
http://maps.environment-agency.gov.uk/wiyby/wiybyController?ep=maptopics&lang=_e

4. Trees and woodlands

4.1 Total woodland cover

The NCA contains 3,900 ha of woodlands over 2 ha, 7.5 per cent of the total area, of which 330 ha is ancient woodland.

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

4.2 Distribution and size of woodland and trees in the landscape

The NCA has 7.5 per cent woodland cover, of which 3 per cent is coniferous. Rivers and streams are often tree lined and ancient riverine woodland cover is particularly apparent along the northern stretches of the River Till and along the Aln to the south and east of Powburn. In places there is a very strong pattern of conifer shelterbelts associated with large estates, and small coniferous and mixed plantations are prominent features of the valleys. Fragments of broadleaved woodland are found on steep banks alongside the rivers Tweed, Till and Coquet. The River Tweed has a mix of deciduous woodland and estate landscape. Around this area, there is a rectangular pattern of small coniferous woodland blocks and shelterbelts.

Source: Cheviot Fringe Countryside Character Area Description, Natural England (2010)

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	1,566	3
Coniferous	1,672	3
Mixed	273	<1
Other	479	<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	165	<1
Ancient re-planted woodland (PAWS)	165	<1

Source: Natural England (2004)

5. Boundary features and patterns

5.1 Boundary features

The southern area of the NCA is characterised by hedgerows with many hedgerow trees. To the north hedgerows become less frequent and the arable areas are largely treeless. The uptake of hedgerow options under Environmental Stewardship is particularly strong in the NCA, with 551 km under management options.

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

5.2 Field patterns

Fields are large on the Milfield Plain, where arable cultivation dominates on the intensively farmed alluvial terraces of the Till valley. Elsewhere field patterns are regular and of medium size.

Source: Cheviot Fringe 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

In 2009 one third of the farms were grazing livestock holdings, 32 per cent, 28 per cent were cereal holdings, 10 per cent were general cropping, and 15 per cent were mixed. Between 2000 and 2009 the number of cereal holdings fell by 10 per cent, whereas grazing livestock holdings rose by 20 per cent.

Source: Agricultural Census, Defra (2010)

6.2 Farm size

In 2009 farms over 100 ha accounted for 64 per cent of all holdings and 97 per cent of the area of farmed land. The number of smaller farms increased between 2000 and 2009 and the number of large farms fell, but the area covered by large farms (>100 ha) increased by almost 20 per cent.

Source: Agricultural Census, Defra (2010)

6.3 Farm ownership

In 2009 approximately half the area is owner-occupied and half is tenanted.

2009: Total farm area = 69,962 ha; owned land = 36,852 ha
2000: Total farm area = 59,347 ha; owned land = 35,404 ha

Source: Agricultural Census, Defra (2010)

6.4 Land use

The main land use is grazed and uncropped land which accounted for 40,730 ha or 52 per cent of total farmed area, in 2009. Cereals follow at 18,278 ha, or 26 per cent, while oilseeds, cash roots, stock feed and other arable crops account for 5,525 ha, or 9 per cent. Between 2000 and 2009 the most notable changes in land use were an increase in the area used for oilseeds – 2,127 ha increased to 3,260 ha – and an increase in the area put down to grass and uncropped land – 33,506 ha increased to 40,730 ha.

Source: Agricultural Census, Defra (2010)

6.5 Livestock numbers

In 2009 sheep were the most numerous livestock in the Cheviot Fringe, a total of 207,000 animals, with 22,600 cattle and 1,700 pigs. Numbers of all livestock fell slightly between 2000 and 2009.

Source: Agricultural Census, Defra (2010)

6.6 Farm labour

The figures suggest the majority of holdings are run by principal farmers, supported by full time workers; there are only small numbers of salaried managers, part-time workers and casual / gang workers.

Source: Agricultural Census, Defra (2010)

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

7. Key habitats and species

7.1 Habitat distribution/coverage

Semi-natural habitats are limited to small woodlands and riparian habitats, including grazing marsh, with recent habitat creations of grazing marsh in the north of the area.

The rolling landscape around the Ford and Etal Estate is notable for its relict ice age kettle holes which have formed into a complex of fens and raised bogs such as Ford and Holburn Moss.

Where the NCA abuts the Cheviots and the Sandstone Hills, outliers of upland heath and blanket bog occur, while an area of lowland heath occurs near Whittington.

Wet woodlands are particularly associated with the River Till and upland oak and ash woodlands with the River Coquet.

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; 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)	1,159	2
Upland heathland	252	<1
Fens	152	<1
Blanket bog	61	<1
Lowland raised bog	61	<1
Lowland heathland	39	<1
Coastal flood plain and grazing marsh	65	<1

Source: Natural England (2011)

Recent habitat creation has resulted in the creation of approximately 65 ha of flood plain grazing marsh (based on NE and EA information)

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 present settlement pattern of small nucleated villages, dispersed farmsteads and farm hamlet settlements was established from Anglo-Saxon times. Many settlements occupy strategic locations, such as river fording points, as at Whittingham and on the break of slope above the flood plain, as can be seen at Milfield, Wooler and Ford.

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

8.2 Main settlements

The main settlement within the Cheviot fringe is Wooler. The total estimated population for this NCA (derived from ONS 2001 census data) is: 7,251.

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

8.3 Local vernacular and building materials

The vernacular style is single storey, constructed in rubble, originally thatched, with some examples remaining in Etal, but most roofs have now been replaced with blue grey slates. On the Milfield Plain sandstone and orange clay tiles dominate. Medieval fortified tower houses and 'bastles', sometimes incorporated into later country houses and farmsteads, are a key characteristic of the area.

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

9. Key historic sites and features

9.1 Origin of historic features

The Milfield Plain is exceptionally rich in buried archaeological remains including extensive Neolithic ritual landscapes, for example Maelmin, and Anglo-Saxon estate centres. Located close to the border with Scotland, many historic features are defensive in nature. These include hill forts originating from the Iron Age, situated on the break of slope between the lowlands and the adjacent uplands of the Cheviot Hills; a chain of defensive structures such as Norham Castle extend along the border. A number of frontier structures from WWII remain, notably at the village of Wooler encircled by pillboxes in 1940/41. The A697, originally a Roman Road, was an important military route in the three centuries of border conflict. Many battles took place along it including the battle of Flodden Field in 1513 where James IV of Scotland was killed.

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

9.2 Designated historic assets

This NCA has the following historic designations:

- 2 Registered Parks and Gardens covering 171 ha.
- 2 Registered Battlefields covering 471 ha.
- 108 Scheduled Monuments.
- 573 Listed Buildings.

Source: Natural England (2010)

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

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

10. Recreation and access

10.1 Public access

- Three per cent of the NCA, 1,263 ha, is classified as being publically accessible.
- There are 432 km of public rights of way at a density of 1 km per km2.
- There are no national trails within the NCA.
- Ford and Etal, and Flodden battlefields are important main tourist attractions in the area.

Sources: Natural England (2010)

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

Access designation	Area (ha)	Percentage of NCA
National Trust (Accessible all year)	0	0
Common Land	28	<1
Country Parks	0	0
CROW Access Land (Section 4 and 16)	1,244	2
CROW Section 15	25	2
Village Greens	3	<1
Doorstep Greens	0	0
Forestry Commission Walkers Welcome Grants	0	0
Local Nature Reserves (LNR)	0	0
Millennium Greens	0	0
Accessible National Nature Reserves (NNR)	0	0
Agri-environment Scheme Access	12	<1
Woods for People	93	<1

Sources: Natural England (2011)

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

11. Experiential qualities

11.1 Tranquillity

Based on the CPRE map of tranquillity (2006) this is a fairly tranquil area, with the lowest scores for tranquillity to be found at Wooler and along the A697 and A698. The most tranquil areas are to the north-east of the NCA, along the west towards the Cheviots and in the south.

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

Tranquillity	Score
Highest value within NCA	55
Lowest value within NCA	-43
Mean value within NCA	6

Sources: CPRE (2006)

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

11.2 Intrusion

The 2007 Intrusion Map (CPRE) shows the extent to which rural landscapes are 'intruded on' from urban development, noise (primarily traffic noise), and other sources of visual and auditory intrusion. This shows that in the NCA the route of the high voltage transmission line, which runs north south, and the main roads are the main source of intrusion in the landscape. A breakdown of intrusion values for this NCA is detailed in the table overleaf.

Intrusion category	1960s (%)	1990s (%)	2007 (%)	Percentage change (1960s-2007)
Disturbed	7	10	8	1
Undisturbed	89	88	92	3
Urban	n//a	n/a	n/a	n/a

Sources: CPRE (2007)

The notable trend from the 1960s to 2007 is a very small increase in the percentage of undisturbed land in this NCA.

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

12 Data sources

- British Geological Survey (2006)
- Natural Area Profiles, Natural England (published by English Nature 1993-1998)
- Countryside Character Descriptions, Natural England (regional volumes published by Countryside Commission/Countryside Agency 1998/1999)
- Joint Character Area GIS boundaries, Natural England (data created 2001)
- National Parks and AONBs GIS boundaries, Natural England (2006)
- Heritage Coast Boundaries, Natural England (2006)
- Agricultural Census June Survey, Defra (2000,2009)
- National Inventory of Woodland & Trees, Forestry Commission (2003)
- Countryside Quality Counts Draft Historic Profiles, English Heritage (2004)*
- Ancient Woodland Inventory, Natural England (2003)
- BAP Priority Habitats GIS data, Natural England (March 2011)
- Special Areas of Conservation data, Natural England (data accessed in March 2011)
- Special Protection Areas data, Natural England (data accessed in March 2011)
- Ramsar sites data, Natural England (data accessed in March 2011)
- Sites of Special Scientific Interest, Natural England (data accessed in March 2011)
- Detailed River Network, Environment Agency (2008)
- Source protection zones, Environment Agency (2005)
- Registered Common Land GIS data, Natural England (2004)
- Open Country GIS data, Natural England (2004)
- Public Rights of Way Density, Defra (2011)
- National Trails, Natural England (2006)
- National Tranquillity Mapping data, CPRE (2007)
- Intrusion map data, CPRE (2007)
- Registered Battlefields, English Heritage (2005)
- Record of Scheduled Monuments, English Heritage (2006)
- Registered Parks and Gardens, English Heritage (2006)
- World Heritage Sites, English Heritage (2006)
- Incorporates Historic Landscape Characterisation and work for preliminary Historic Farmstead Character Statements (English Heritage/Countryside Agency 2006)Detailed River Network, Environment Agency (2008)

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

Supporting document 2: Landscape change

Recent changes and trends

Trees and woodlands

- The NCA has 7.5 per cent woodland cover of which 3 per cent is coniferous (1,672 ha) and 3 per cent is broadleaved (1,566 ha). Between 1999 and 2003 uptake of the Woodland Grant Scheme for managing existing woodlands was limited. Between 2005 and 2012 Higher Level Stewardship agreements have been set up which include management options to maintain 115 ha of woodland. Generally, however, the lack of woodland management has resulted in over-mature woodlands that lack the appropriate age structure and diversity for long term survival.

- Some restocking to diversify coniferous woodlands and some new planting has taken place, particularly in Tweed valley lowlands; this was done through uptake of the Woodland Grant Scheme between 1999 and 2003, and the creation of 13 ha of woodland has been included in Higher Level Stewardship agreements since 2005.

Boundary features

- Between 1999 and 2003 uptake of Countryside Stewardship agreements to address boundary features was small. However, the uptake of hedgerow options under Environmental Stewardship (to March 2011) has been greater resulting in over 550 km of hedgerow under management for maintenance or restoration. This activity has helped to preserve and reinforce the characteristic field patterns of the vales and this important biodiversity resource.

Agriculture

- Although arable holdings continue to be the most numerous (38 per cent of holdings in 2009) the main land use is grazed and un-cropped land which accounted for 52 per cent of the total farmed area in 2009. Between 2000 and 2009 the most notable changes in land use were an increase in the area used for oilseeds (2,127 ha increased to 3,260 ha) and an increase in the area put down to grass and un-cropped land (33,506 ha has increased to 40,730 ha).

- The number of smaller farms increased between 2000 and 2009 and the number of large farms fell, but the area covered by large farms (>100 ha) increased by almost 20 per cent to cover 97 per cent of the farmed area.

- During the 20th century increased agricultural production led to loss and neglect of hedgerows and soil loss through wind erosion. Since 2005 and 2006 there has been widespread participation in the Catchment Sensitive Farming initiative and uptake of Environmental Stewardship agreements with particular emphasis on hedgerow management and resource protection, as well as options to enhance and diversify the cultivated environment such as buffer strips, wild bird seed mix plots, floristically enhanced margins and over-wintered stubble.

Settlement and development

- There has been relatively little development pressure in the NCA with most developments being smaller scale, such as tourist developments (property conversions and small extensions), or agriculture-related development linked to existing facilities/settlements.

Vertical structures, such as these pylons at Roddam, are prominent features in the open landscape.

- Renovation of previously redundant farm cottages and other rural properties for residential and business purposes has been generally in keeping with local character but less sensitive development and modern structures, in both isolated sites and within villages such as Wooler, are weakening the local distinctiveness of the area.

- Modern vertical structures such as electricity pylons, television and mobile phone masts are now prominent in the open landscape.

- Intrusion of noise from Otterburn Military Training Area is perceived as having increased with changes in military training requirements.

Semi-natural habitat

- Between 1999 and 2003 there was significant uptake of Countryside Stewardship agreements for regeneration of grassland/semi-natural vegetation covering 912 ha, and lowland pastures on neutral/acid soils covering 773 ha. This has helped to maintain the upland pastoral character, particularly in the north-east of the Cheviot Fringe. This is now being continued and enhanced through Environmental Stewardship and other schemes / projects such as the River Till Wetland Restoration Project, resulting in the restoration and creation of habitats such as wet grassland, particularly associated with re-establishing natural flood plains.

- Mosaics of high biodiversity value habitats are being created through the restoration of sand and gravel extraction sites on the Milfield Plain.

Historic features

- Historic farm buildings and parkland are important elements in the overall character of the historic landscape. In 1918 about 1 per cent of the NCA was historic parkland but it is estimated that by 1995 29 per cent of this area had been lost. Some of the remaining area is now being managed and restored through agri-environment schemes.

- The Milfield Plain in particular is exceptionally rich in buried archaeological remains including extensive Neolithic ritual landscapes and Anglo-Saxon estate centres. These are threatened by some agricultural practices both directly and indirectly through soil erosion, and by aggregate extraction. However uptake of Environmental Stewardship agreements since 2005 has

been strong and by November 2012 over 2,000 ha within the NCA was being managed to protect the area's rich archaeological resource.

Coast and rivers

- Increased arable cultivation and livestock rearing has contributed to a reduction in riverside woodland and fringing vegetation and subsequent increase in erosion of river banks, particularly on the rivers Tweed, Till and Coquet.
- Introduced or alien plant species have expanded along some river reaches, with colonisation by giant hogweed, Himalayan balsam and Japanese knotweed, although there has been a concerted effort recently through the Tweed Invasives Project to control Himalayan Balsam in particular on the Till.
- Between 1999 and 2003 there was limited uptake of agri-environment schemes to manage and restore riparian habitats. However, since 2005 and 2006 this area has been a priority for the Catchment Sensitive Farming initiative and Environmental Stewardship and there has been widespread uptake of options and initiatives that will help to address issues of diffuse pollution from agricultural land which negatively impact on water quality, particularly in the Tweed Catchment Rivers Sites of Special Scientific Interest and Special Area of Conservation.
- Rivers are being reconnected with their natural flood plains through projects such as the River Till Wetlands Restoration Project and agri-environment schemes, supported through partnerships with the Tweed Forum.
- Salmon, lamprey and otter populations appear to be doing well, although comprehensive surveys are required to confirm this.

Minerals

- There have been extensive sand and gravel workings on the Milfield Plain since the 1960s. Extraction of sand and gravel threatens archaeological remains, and has altered the appearance of the landscape through the removal of existing landscape features, and in some places destabilised watercourses. However sensitive restoration has provided a mosaic of habitats in some cases including Woodbridge and Low Hedgeley.

Drivers of change

Climate change

Climate change projections suggest increased temperatures with drier summers, wetter winters and more heavy rainfall events. This is likely to result in:

- Periods of heavy rain leading to an increased risk and frequency of flooding, and resulting in increased soil erosion and pollution of watercourses downstream.
- Summer droughts leading to increased water demands. This would result in lower flow levels in the rivers and consequently less water available for domestic, business and agricultural usage, and potentially a reduction in water quality through increased concentration of pollutants.
- Summer droughts may also lead to deterioration of habitats such as wet woodland, fens, grazing marsh and heathland.
- Species extinction or migration and loss of small or isolated habitats, and continued decline of biodiversity in fragmented habitats such as woodlands is also a threat. Changing conditions may begin to favour invasive non-native species.

- Increased pressures for renewable energy development and a growing demand for bio-energy crops through timber production may result in changes to cropping types and patterns. This may provide opportunities for new species to be introduced but also increases the risk of the introduction of pests and diseases.

Other key drivers

- The need to improve water and habitat quality in the Tweed Catchment Rivers Site of Special Scientific Interest and Special Area of Conservation coupled with the implementation of the Water Framework Directive and the Wetland Vision initiative, and the need to manage flooding in the area should result in improvements to the ecological status of rivers and water bodies in the area. Ongoing work to support restoration of the River Till flood plain will see the creation of wetlands, ponds and areas of marsh which will improve biodiversity while helping to regulate water flow.

- The Natural Environment White Paper (2011) calls for joined-up efforts across the conservation sector and working at a landscape scale, to establish a coherent and resilient ecological network capable of adapting to environmental change and halting losses in biodiversity. An increased focus on connectivity and resilience of habitats should lead to greater networks of habitats, a more diverse mosaic of vegetation and larger areas of semi-natural habitat.

- The Government's UK Low Carbon Transition Plan (2009), Forestry and Woodlands Policy Statement (2013) and the Regional Forestry Strategy for the North East of England (2005) indicate an increased rate of woodland creation over the next 15–20 years, alongside an increase in demand for timber and wood fuel.

- A requirement for increasing renewable energy generation could result in increased pressure for wind power, hydro power, wood fuel and biomass crops.

- Demand for housing is likely to increase; developments should seek to retain and enhance historic settlement patterns and local distinctiveness.

- There is likely to be a continued demand for sand and gravel. Much of the North East region's sand and gravel resources are found in the Coquet, Breamish, Glen and Till valleys and the largest potential source is the Milfield Plain.[4] It is therefore likely that existing quarries will need to be extended and new quarry sites found. While these may impact negatively on the landscape and environment in the short term, they will also open up opportunities for landscape enhancement, habitat creation and recreation, and provide opportunities for interpretation, understanding and research into the geodiversity and landscape processes of the area.

[4] *Northumberland National Park Geodiversity Audit and Action Plan*, Commissioned Report (2007)

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.

The vale of Whittingham is a patchwork of pasture, meadows and arable fields; the historic field pattern is still strong, delineated by hedgerows punctuated with hedgerow trees.

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: Manage the agricultural landscape to secure viable and sustainable farming, strengthening historic landscape character and protecting heritage assets, protecting soils and water quality in the rivers and Fell Sandstone aquifer, supporting the farmland birds and wintering wildfowl that are dependent on this area, and enhancing biodiversity through improved connectivity of semi-natural habitats, creating ecological networks that are resilient to environmental change.	↗ **	↗ *	↗ *	↔ **	↗ *	↗ **	↑ **	↗ **	↑ **	↑ **	↗ *	↗ *	N/A	↗ *	↗ *	↔ **	↔ *	↗ **	↔ *
SEO 2: Manage and enhance the network of streams and rivers, improving water quality, restoring natural river morphology, promoting natural flood management and assisted natural recovery, and extending semi-natural habitat to increase flood storage capacity, protect nationally and internationally important species, create more resilient ecological networks, and strengthen landscape character while ensuring rivers maintain the international recognition they have attracted as important game fisheries.	↘ *	↗ *	↗ *	↔ **	↗ *	↗ *	↗ **	↑ ***	↗ *	↗ **	↔ *	↔ *	N/A	↗ **	↔ *	↔ *	↗ *	↑ ***	↗ *
SEO 3: Protect, enhance and extend the mosaic of semi-natural habitats, including wet woodland, upland heath, fens, blanket bog and grazing marsh as a way of contributing to ecological networks that are more robust to environmental change, as well as supporting the nationally important farmland bird assemblage found in this NCA, increasing the water and carbon storage capacity of soils, reinforcing landscape character and perceptions of tranquillity, and improving amenity for local communities.	↘ *	↗ *	↗ *	↔ **	↔ *	↗ *	↗ *	↗ **	↗ *	↗ *	↗ *	↗ *	N/A	↗ *	↔ *	↔ **	↗ *	↑ ***	↔ *
SEO 4: Protect and sustainably manage the wealth of geodiversity and heritage assets, such as the nationally important glacial and archaeological landscape of the Milfield Plain; recognising the value they provide in contributing to our understanding of the landscape and its history, local distinctiveness and sense of place, and promoting knowledge and understanding of these important resources.	↔ *	↔ *	↔ **	↔ **	↔ **	↔ **	↔ **	↗ *	↔ *	↗ *	↔ **	↔ **	N/A	↑ ***	↑ ***	↔ *	↗ **	↔ *	↑ ***

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

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

Landscape attributes

Landscape attribute	Justification for selection
A landscape of broad valleys and plains that form a belt of lowland that wraps itself around the Cheviots, separating them from the Northumberland Sandstone Hills to the east.	■ The softer mudstones, sandstones and limestones underlying much of this area have eroded to form a lowland corridor of valleys and plains between the more resistant volcanic rocks of the Cheviots and the coarse sandstone of the Northumberland Sandstone Hills. ■ The contrast between the undulating and open landscape of this area with the surrounding hills, is key to the character of this NCA. ■ The Fell Sandstone outcrops in an arc around the Cheviot Hills, along the eastern edge of the NCA form the aquifer which provides public water supply for much of this part of Northumberland.
Landscape features shaped by glacial deposition and subsequent geomorphological processes.	■ The underlying bedrock, glacial deposition of an extensive layer of boulder clay and alluvial deposition has resulted in the fertile soils that support the agriculture that now dominates in this area. ■ Glacial deposition is responsible for the sinuous ridges, eskers, kames and kettle holes which are distinctive features of the landscape. The area boasts an unusually extensive array of glacial features which could significantly contribute to our understanding of glacial processes. ■ Glacial deposits provide regionally important sand and gravel resources.
Agricultural landscape of mixed farmland with small, hedge-lined fields with hedgerow trees in the south and flatter, more open arable farmland in the north.	■ There is a long history of this area being farmed with evidence dating back to the Neolithic period. ■ Large arable fields in the north and mixed farmland with smaller, hedge-lined fields in the south provide the open views and a diverse range of colours, textures and patterns in the landscape. ■ This area is nationally important for its assemblage of farmland birds and the low-lying fields in the north are important roosts and feeding grounds for wildfowl, especially geese, overwintering on the coast.
Large estates with grand houses set in parkland and with small, coniferous woodland blocks and shelterbelts forming a strong rectilinear pattern.	■ Mixed coniferous belts and blocks associated with large estates such as Ewart, Park, Fenton House and Ford and Etal Estates are distinctive features of the landscape and help to support red squirrels which are found in this area. ■ The parklands which are scattered throughout this area, some of which were originally medieval deer parks which constitute important historic and landscape features.

Landscape attribute	Justification for selection
Many meandering rivers and streams.	■ The three main river systems, which arise in the Cheviots, provide important links with the surrounding areas and are key landscape features. ■ All three river systems but especially the Coquet are excellent examples of a dynamic montane river system, characterised by active meandering, large depositional features and connected and active flood plain. ■ The rivers have an important role in providing water for domestic and agricultural use in the area. ■ The River Tweed is internationally important for its habitat and species and as such is designated as a Special Area of Conservation. The River Twill is also important for its habitats and species and is designated a Site of Special Scientific Interest. ■ Important woodland and grassland habitats are found along the many rivers and streams, providing essential green corridors. ■ The Rivers Coquet, Till and Tweed support one of the most important game fisheries in England with large migrations of salmon and sea trout. The three British species of lamprey, protected under the EC Habitats Directive, migrate and spawn in these rivers.
Small, traditional villages strategically sited at river bridging points and on the break of slope of the surrounding uplands and the flatter vale floor, with isolated farmsteads and farm hamlets.	■ The settlement pattern of small nucleated villages, dispersed farmsteads and farm hamlets has been established from Anglo-Saxon times. ■ The dispersed farmsteads of this area are testament to the extensive landscape transformation that occurred during the late-18th and 19th century as a result of agricultural improvement, and are highly significant in a national context, along with those extending to the North Sea and into Scotland. ■ The use of local building materials has created local distinctiveness and contributes to a sense of place: cottages built from stone rubble from glacial deposits and larger houses from dressed sandstone, with blue-grey roof slates and, on the Milfield Plain, buildings constructed in sandstone of a pinkish hue and roofed in local orange clay tiles. ■ This is a rural area with low population density which remains little disturbed by modern development and scores moderately highly for tranquillity.
A wealth of heritage assets, the most prominent of which exist as a result of their proximity to the English/Scottish border.	■ The Milfield Plain is exceptionally rich in buried archaeological remains and is regarded as one of the most important archaeological sites in the British Isles, revealing extensive artefacts from the Mesolithic to early-medieval period. ■ Fortified castles, 'bastle houses' and 'tower houses' are distinctive landscape features and important relicts from the centuries of border conflict. ■ The battlefields of Flodden Field and Homildon Hill are both registered within the Register of Historic Battlefields by English Heritage for their special historic interest, and are important tourist destinations. ■ Buildings constructed from local materials contribute to a sense of place.

Landscape opportunities

- Protect and conserve the extensive geodiversity and heritage assets of the area while raising public awareness and understanding of their role in the development of the landscape over time.
- Preserve the open, tranquil landscape, retaining the historic settlement pattern of small nucleated villages reinforcing local distinctiveness and a sense of place by using traditional building materials in new developments.
- Manage the agricultural landscape to expand the networks of hedgerows, arable margins and unimproved grassland which support invertebrates and farmland birds, strengthening landscape character by preserving traditional field patterns and creating important habitat connectivity through the agricultural landscape.
- Protect, restore and enhance the rivers and streams, improving water quality through encouraging good soil and nutrient management throughout the catchment, and reinstating more natural morphology to restore riparian habitats and regulate water flow.
- Manage and significantly enhance broadleaved woodland cover, particularly along rivers and streams, creating an ecological network more resilient to climate change, helping to regulate water flow and strengthening landscape character.
- Protect, enhance and buffer existing semi-natural habitats and seek opportunities such as the restoration of mineral extraction sites to create new habitat of high biodiversity value, contributing to ecological networks that should be more robust to environmental change and improving the heterogeneity of the area.
- Plan to increase access and recreation across the NCA, particularly associated with increasing public understanding and enjoyment of the historic, biodiversity and geodiversity assets of the area.

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 service offered by opportunities
Food provision	Underlying bedrock Fertile soils Water	Approximately 93 per cent of the NCA is cultivated. 61 per cent of this is Grade 3 agricultural land, and 13 per cent is Grade 2. 52 per cent of the land is grazed; sheep are the most numerous livestock, followed by cattle. 26 per cent of land is used for cereals, while oilseeds, cash roots, stock feed and other arable crops account for 9 per cent. There is water available for irrigation of crops; the majority currently comes from the River Till.	Regional	The underlying bedrock and glacial and alluvial deposits are responsible for the fertile soils that currently support production of cereals and other crops supporting the rearing of livestock. Future ability to increase food production will be shaped by soil quality, and by availability of inputs, including water. Poor soil and nutrient management is associated with diffuse pollution and sedimentation which is currently a problem in the River Tweed SAC and Till SSSI catchment, this currently undermines other ecosystem services. While water is currently abundant it will become increasingly important to identify opportunities to optimise water usage and storage in the face of climate change. Many historic features occur within the farmed environment and increases in food provision could damage these and key natural features. Increases in demand for food could also pose a threat to semi-natural habitats through further loss and fragmentation.	Seek opportunities to manage food production sustainably, and where appropriate, seek to increase sustainable production. Work with the farming community to ensure good soil and nutrient management, protection of historic and other environmental features, and support farmers and land managers in the provision of other ecosystem services. There may be opportunities to adapt to change in demand for food production through climatic change enabling the use of alternative crops or cropping patterns. Seek opportunities to increase water availability through the creation of winter storage reservoirs. Ensure that future agri-environment schemes are used to best effect to preserve and enhance wildlife-rich habitats.	**Food provision** **Regulating water quality** **Water availability** **Regulating soil quality** **Regulating soil erosion** **Pollination** **Pest regulation** **Sense of place/ inspiration** **Biodiversity**

Service	Assets/ attributes: main contributors to service	State	Main beneficiary	Analysis	Opportunities	Principal service offered by opportunities
Timber provision	Woodland cover Soils	Woodland covers 7.5 per cent of the NCA; with small coniferous blocks found in the south of the NCA and broadleaved woodland largely confined to river banks.	Local	The open character and limited woodland cover will restrict suitable opportunities for expanding commercial timber production. However, small scale planting for timber products, if appropriately sited, has the potential to provide environmental benefits such as restoring, expanding and linking woodland habitat and stabilising soils, while providing social and economic benefits. Red squirrels are found in this area with a number of reserves in the adjacent NCAs so clear-felling of large conifer blocks and planting of large-seeded deciduous species should be avoided in areas buffering squirrel populations.	There are opportunities to manage and enhance existing woodland by improving age structure and diversity for long term survival, providing local sources of wood fuel. Expand native woodland cover through small-scale planting in locations appropriate to local landscape and biodiversity, particularly along river corridors. This could contribute to local provision of wood fuel while strengthening habitat networks, stabilising soil, reducing soil erosion and potentially assisting with water quality along watercourses. Planting new woodland on slopes elsewhere in the area would maximise benefits in flood control and prevention erosion. Woodland management or creation should consider the implications for red squirrels; clear-felling of large conifer blocks and planting of large-seeded deciduous species should be avoided in areas buffering squirrel populations.	**Timber Provision** **Biomass energy** **Climate regulation** **Regulating water quality** **Regulating water flow** **Regulating soil erosion** **Sense of place/ inspiration** **Biodiversity** **Recreation**

Service	Assets/ attributes: main contributors to service	State	Main beneficiary	Analysis	Opportunities	Principal service offered by opportunities
Water availability	Rivers including Coquet, Aln, Till, Glen and Tweed Part of the Fell Sandstone aquifer High rainfall in the Cheviots flowing down into the Cheviot Fringe	The eastern edge of the NCA overlies the Fell Sandstone aquifer which has 'water available' from which abstractions are mainly for public water supply with some industrial and commercial use. The River Till with its tributaries represents the major catchment in the NCA, much of which is part of the River Tweed Special Area of Conservation. The Environment Agency do not currently licence abstraction on the English Tweed as it is an exempted river. Summer abstraction from the River Till is consented up to the sustainable level and no additional water is currently available during the summer months. Abstractions are consented by Natural England. The River Coquet in the south of the NCA is part of the Northumberland Rivers Catchment Abstraction Management Strategy (CAMS). Within this area the predominant land use is agriculture but the predominant abstraction of water is for public water supply at 80 per cent, followed by industrial and commercial at 11 per cent. The Upper Coquet has 'no water available'.[5] The River Aln has 'water available'. The majority (80 per cent) of water abstracted is for crop irrigation.[6]	Regional	Water for agriculture, and in particular the irrigation of root crops comes predominantly from the River Till. Public water supply is provided predominantly by the Fell Sandstone Aquifer and the River Coquet. High levels of unsustainable abstraction create low flow levels that negatively impact on biodiversity and water quality based on the Water Framework Directive assessment. The Environment Agency's strategy for the Fell Sandstone Aquifer is to move to 'no water available' status.[7] This, combined with restrictions on abstraction from the River Till SSSI and River Tweed SAC due to their designations and the fact that the River Coquet has 'no water available' makes it imperative that water is used sustainably and that land management practices are employed which will increase water infiltration, such as grassland strips along watercourses, wet woodland and re-creation of flood plain grazing marsh. **Continued over...**	Work with the farming community and businesses to improve sustainable use of water and sympathetic land management practices, including crop selection and water harvesting such as winter storage reservoirs, and water conservation measures in new development. Increase areas of semi-natural habitats to increase infiltration such as grassland strips along watercourses, wet woodland and re-creation of flood plain grazing marsh. Encourage good soil management to promote good soil structure and optimise infiltration of rain water into the aquifer.	**Water availability** **Food provision** **Regulating water quality** **Regulating water flow** **Regulating soil erosion** **Biodiversity**

[5, 6] *The Northumberland Rivers Catchment Abstraction Management Strategy*, Environment Agency (September 2003) (accessed April 2013; URL: http://cdn.environment-agency.gov.uk/geneo903bkug-e-e.pdf)

[7] *The Till Catchment Abstraction Management Strategy*, Environment Agency (March 2008) (accessed April 2013; URL: http://cdn.environment-agency.gov.uk/geneo308bnsu-e-e.pdf)

Service	Assets/ attributes: main contributors to service	State	Main beneficiary	Analysis	Opportunities	Principal service offered by opportunities
Water availability continued				**...continued from previous.** Groundwater quality within the Fell Sandstone aquifer is generally reported to be good but there are issues with saline intrusion, diffuse and localised agricultural and industrial pollution in the north eastern extent of the aquifer and additional pressures related to public water supply abstraction. Management of agricultural land in the area could influence recharge of the aquifer. Measures to promote good soil structure and reduce speed of surface run-off could increase rain infiltration rates, thereby optimising groundwater recharge. These measures are also likely to improve water retention in soils, increasing drought resilience and potentially helping to reduce the risk of flooding.		
Genetic diversity	N/A	N/A	N/A	N/A	N/A	**N/A**

Service	Assets/ attributes: main contributors to service	State	Main beneficiary	Analysis	Opportunities	Principal service offered by opportunities
Biomass energy	Woodland cover Soils Water	Woodland cover (7.5 per cent) provides only limited potential for biomass through woodland management or as a by-product of commercial timber production.	Local	Low woodland cover means there is limited potential for the provision of biomass, either through bringing unmanaged woodland under management or as a by-product of commercial timber production. The potential for miscanthus yield is only low to medium, and would not be in keeping with the landscape character. The potential for short rotation coppice (SRC) yield is medium to high. Planting along river corridors would provide opportunities to link existing woodland fragments and stabilise banks, reducing soil erosion helping to regulate water flow, but appropriate buffers are likely to be needed adjacent to watercourses (particularly the SSSI/SAC rivers) to reduce the risk of sediment, nutrient and herbicide run-off, particularly during planting and harvesting in winter, and prevent the introduction of non-native species. For information on the potential landscape impacts of biomass plantings within the NCA, refer to the Natural England website (http://www.naturalengland.org.uk/ourwork/farming/funding/ecs/sitings/areas/003.aspx).	Work with the farming community to identify suitable opportunities to increase the net yield of SRC, seeking to locate these where they may be accommodated within local landscape character and realise multiple objectives for the environment, particularly along river corridors but with appropriate buffers.	**Biomass energy** **Regulating water flow** **Climate regulation**

Service	Assets/ attributes: main contributors to service	State	Main beneficiary	Analysis	Opportunities	Principal service offered by opportunities
Climate regulation	Limestone bedrock Soils (supporting semi-natural habitats) Semi-natural habitats, particularly woodland cover	Some carbon is locked in the limestones of the Ballagan Formation and other limestones that underlie areas of this NCA. The NCA has limited climate regulation potential with only 7.5 per cent woodland cover and about 1 per cent cover of other semi-natural habitats. There are some very small areas of blanket bog, heathland, fen and wet woodland which are important for carbon storage but as they cover such small areas they do not contribute significantly to this service in this area.	Local	Organic carbon levels in the freely draining and intensively farmed soils of the NCA are relatively low (0-5 per cent) reflecting the dominance of mineral soils with low organic matter content. Releases of greenhouse gasses from land management activities (especially nitrous oxide from soils) are likely to be relatively high. Larger stores of carbon will exist in soils under heathland, fen, semi-natural grassland and woodland. The woodland will provide some carbon storage, particularly if brought under management, but areas of these habitats are relatively small. Preventing damage to the bedrock should ensure carbon remains locked up in the underlying limestones of the area.	Increase the amount of carbon stored in agricultural soils through appropriate management, for example through low grazing levels, soil aeration, and minimum tillage agriculture. Promote good soil management and sympathetic land management practices to prevent damage to the limestone bedrocks. Seek opportunities to restore and expand woodland and semi-natural habitats such as flood plain grazing marsh and bring them under sympathetic management to increase carbon storage. Seek opportunities to restore areas of blanket bog and heathland fen along the borders with the Cheviots and Northumberland Sandstone Hills NCAs through sustainable land management practices and programmes of work to restore the hydrology and ecology of the habitats. This will strengthen the habitats and the climate regulating potential, as well as strengthen links with the adjacent NCA.	**Climate regulation** **Timber provision** **Regulating water quality** **Regulating water flow** **Regulating soil erosion** **Regulating soil quality** **Biodiversity**

Service	Assets/ attributes: main contributors to service	State	Main beneficiary	Analysis	Opportunities	Principal service offered by opportunities
Regulating water quality	Network of rivers and streams Part of the Fell Sandstone Aquifer Geology Soils Semi-natural habitats Land management practices	When last assessed, ecological status of river water was moderate in the River Glen, in the River Till from the Glen to the Tweed and also in Wooler Water from Harthope Burn to the Till. Ecological and chemical quality was otherwise good for the River Till and tributaries within the NCA, although they have now failed the Special Area of Conservation condition assessment due to higher phosphate levels. Ecological quality of the stretches of the Aln and Coquet that lie within the NCA was mainly moderate although chemical status was not assessed. Groundwater quality within the Fell Sandstone aquifer is poor[8] and elevated levels of nitrate, sulphate, potassium and volatile compounds have been detected in the north of the unit. [8] WFD classification for Till Fell Sandstone Aquifer, Scottish Environment Protection Agency (2011) (accessed April 2013; URL: http://www.sepa.org.uk/water/monitoring_and_classification/classification/classification_results.aspx)	Regional	The Till/Tweed, Aln and Coquet rivers all fall within a Priority Catchment designated under Defra's Catchment Sensitive Farming initiative. There are some issues of diffuse pollution from agricultural land which are being addressed by catchment sensitive farming and agri-environment schemes. The water quality of the Rivers Tweed/ Till and tributaries and Coquet is essential to the survival of the salmon, sea trout, otter, lampreys, water vole, water crowfoot, river jelly lichen and rich invertebrate fauna which are found there. Salmon, lampreys and otter are currently present in good numbers. Elevated levels of nitrate, sulphate, potassium and volatile compounds detected in the north of the Fell Sandstone groundwater unit are thought to be due to diffuse pollution from agriculture, localised industrial contamination and surface water contamination from mine water discharges.	Work with the farming community to promote best practice in soils, nutrient and pesticides management such as using low pressure machinery, improving farm infrastructure and waste management, carefully managing stock movements and controlling riparian grazing, informed infield nutrient application, and encouraging use of crops which require lower applications of fertiliser and pesticide. This should reduce diffuse pollution and increase water infiltration, thereby improving water quality of watercourses and the aquifer. Seek opportunities to create and expand semi-natural riparian habitats such as wet grassland and introduce buffer strips along watercourses. Manage existing woodland and seek opportunities to plant more trees along watercourses to help stabilise bank sides, reduce erosion and filter pollutants, while benefitting riparian and riverine wildlife. Seek opportunities to reduce pollution from industrial and mine water discharges to benefit watercourses and the Fell Sandstone aquifer.	**Regulating water quality** **Regulating water flow** **Regulating soil quality** **Regulating soil erosion** **Food provision** **Biodiversity**

Service	Assets/ attributes: main contributors to service	State	Main beneficiary	Analysis	Opportunities	Principal service offered by opportunities
Regulating water flow	Geology Soils Semi-natural habitats (particularly woodland and flood plain grassland)	The River Till and its tributaries and the River Coquet all have their steep headwaters draining upland heather and peat moors in the Cheviot Hills to the west. This means they respond quickly to rainfall leading to a rapid onset of flooding. Despite a long history of river flooding, flood risk to people and property from the rivers in this NCA is relatively low due to its rural nature. Flood risk is concentrated in the settlement of Wooler (on the Till), Norham (on the Tweed) and to a lesser extent villages such as Powburn (on the Breamish), and Akeld and Kirknewton (on the Glen). The main settlement at risk of flooding from the River Coquet is Rothbury, which lies downstream in the Northumberland Sandstone Hills NCA. The headwaters of the River Aln lie within this NCA and although flooding has been reported on this river since 1770 it has not resulted in damage to property. The greatest cost of flooding in this rural area is from loss of crops and stock when agricultural land is flooded.	Regional	Interventions in the Northumberland National Park (Cheviots NCA) designed to retain flood waters in the upper catchments and restore and enhance water dependant habitats such as blanket bog will be important in regulating flow in this NCA, as will maintaining any small areas of blanket bog in this NCA in good condition. The Environment Agency's preferred approach to managing this flood risk includes restoring the natural flood plain on the Lower Till,[9] promotion of sustainable land management practices that reduce the amount and rate of runoff and erosion, and investigation of measures such as floodwater storage in gravel pits upstream of Rothbury and the use of afforestation in upland parts of the catchment.[10] Flood defences on the Till have been breached at Fenton and a number of other locations to restore flood plain grazing marsh and manage flood risk by reinstating a more natural system. **Continued over...**	Seek opportunities to restore a more naturally functioning flood plain and river morphology, enabling rivers to naturally absorb more of the water's energy, thereby mitigating the effects of peak flows. Reconnecting rivers with their natural flood plains increases flood water storage and creates important wetland habitats. Removing redundant structures such as weirs and old bridge footings will reinstate a more natural morphology and have ecological benefits. Promote restoration of mineral extraction sites to stabilise rivers and achieve landscape and biodiversity improvements along with increased flood water storage. Ensure future extraction of sand and gravel does not impact on river morphology or water quality. **Continued over...**	**Regulating water flow** **Regulating water quality** **Regulating soil quality** **Regulating soil erosion** **Climate regulation** **Food provision** **Timber provision** **Biodiversity** **Sense of place / inspiration**

[9] *Till and Breamish Catchment Flood Management Plan, Summary Report*, Environment Agency (December 2009) (accessed April 2013; URL: http://www.environment-agency.gov.uk/research/planning/114022.aspx)

[10] *Northumberland National Park Geodiversity Audit and Action Plan*, Commissioned Report (2007)

Service	Assets/ attributes: main contributors to service	State	Main beneficiary	Analysis	Opportunities	Principal service offered by opportunities
Regulating water flow continued				**...continued from previous.** Historic sand and gravel extraction along the River Till and River Coquet has exacerbated flooding downstream in places such as Wooler. It is important that current and future gravel extraction continues to be from the adjacent flood plain rather than from the rivers. Restoration of historic workings provides opportunities to create semi-natural habitat and reduce future flood risk. The River Till Restoration Strategy is a long-term plan aimed at reinstating a more natural system. Some works have already been undertaken such as reconnecting the river with its flood plain through the River Till Wetlands Restoration Project, and a number of projects are planned to address issues such as the removal of redundant man-made structures which are impacting on the morphology of the system.	**...continued from previous.** Promote tree planting and creation of wet woodland habitats in appropriate locations, and restore and enhance hedgerows, to reduce cross-land flows of water during floods, improve soil permeability and increase the holding capacity within the wider catchment for flood water before reaching main watercourses.	

Service	Assets/ attributes: main contributors to service	State	Main beneficiary	Analysis	Opportunities	Principal service offered by opportunities
Regulating soil quality	Geology Soil types Semi-natural habitats Land management practices	Most soils in the NCA are loamy and slightly acidic. There are 8 main soilscape types, the most significant of which are slowly permeable seasonally wet slightly acidic but base-rich loamy and clayey soils (32 per cent), freely draining slightly acid loamy soils (23 per cent) and slowly permeable seasonally wet acid loamy and clayey soils (20 per cent).	Regional	The slowly permeable seasonally wet slightly acid but base-rich loamy and clayey soils may suffer compaction and/ or capping as they are easily damaged when wet, which in turn may lead to increasingly poor water infiltration and diffuse pollution as a result of surface water runoff. The freely draining slightly acid loamy soils allow water infiltration. They can be valuable for aquifer recharge requiring the maintenance of good structural conditions to aid water infiltration and requiring the matching of nutrients to needs to prevent pollution of the underlying aquifer. The main soil types described have potential for improved soil quality through management of organic matter. Careful timing of activities is required to reduce the likelihood of soil compaction where drainage is impeded and weak topsoil structure is easily damaged. The areas of semi-natural habitat such as woodland, and areas of uncultivated ground that is under low-intensity management, will help to maintain soil quality within the NCA. **Continued over...**	Working with the farming community to ensure best practice in soil management. This includes minimising damage to soil structure through careful timing of activities, using low pressure machinery and managing stock movements, encouraging the use of green manure crops and winter stubbles in arable rotations to replace nutrients and bind soil, as well as undertaking informed infield nutrient application. This will improve structure and quality of soils as well as benefiting wildlife such as farmland birds. Ensure that management of the pastures on the moorland fringes of the Cheviots and Northumberland Sandstone Hills encourages the build up of organic matter through extensive grazing regimes, which will reduce the level of 'poaching' by livestock which occurs when soil is cut up by cattle moving or tramping on wet soils, removing vegetative cover, leaving the soil open to the elements and prone to being washed away via surface water run-off. **Continued over...**	**Regulating soil quality** **Food provision** **Water availability** **Climate regulation** **Regulating water flow** **Regulating water quality** **Regulating soil erosion** **Biodiversity**

Service	Assets/ attributes: main contributors to service	State	Main beneficiary	Analysis	Opportunities	Principal service offered by opportunities
Regulating soil quality continued				**...continued from previous.** The small areas of blanket bog and heath in the NCA need to be protected from drying and erosion which can be caused by climate change and some land management practices. The soils of the Milfield Plain and similar areas protected by flood banks are no longer "draped" in the fine nutrient-rich alluvial deposits. Increased and managed flooding could help to improve the soils in these areas.	**...continued from previous.** Opportunities for managed flooding of areas previously protected by flood banks as part of the flood risk management strategy should help to replace depleted nutrient-rich alluvial deposits thereby improving the soils in these areas.	
Regulating soil erosion	Freely draining and clayey soils Land management practices Semi-natural habitats and hedgerows.	The freely draining slightly acid loamy soils (23 per cent), freely draining slightly acid sandy soils (3 per cent), and freely draining very acid sandy and loamy soils (1 per cent) are easily eroded on steeper slopes where cultivated or bare soil is exposed, especially if organic matter levels are low after continuous arable cultivation or where soils are compacted. This is particularly a problem in the mid to lower stretches of the River Till around the Milfield Plain. Livestock accessing stream side's increases sediment input to the water and wind erosion of the sandy soils occurs where soils are cultivated or left bare, especially in spring and late autumn. The slightly acid loamy and clayey soils with impeded drainage (7 per cent of NCA) are easily compacted by machinery or livestock if accessed when wet and are prone to capping or slaking, increasing the risks of soil erosion by surface water run-off, especially on steeper slopes.	Regional	The whole of the NCA falls within the Tweed, Aln, Coquet and Coastal Streams Priority Catchment designated under Defra's Catchment Sensitive Farming initiative and there is particular emphasis on addressing impacts on the River Till Site of Special Scientific interest, and River Tweed Special Area of Conservation. The priorities for this catchment are reducing run-off of soil from agricultural fields, particularly associated with reducing the impact of livestock on riparian zones, and reducing the impact of nutrients from arable cultivation. These measures should also provide enhanced carbon storage, improved water quality and help regulate water flow.	Working with the farming community, promote good soil management through Catchment Sensitive Farming and other initiatives, including livestock management in riparian zones to minimise poaching and soil compaction. Opportunities should be sought to decrease the frequency and intensity of cultivation, increase in-field margins and grassland habitats, particularly buffering watercourses, and use green manure crops and winter stubble. Tree planting in the form of small shelterbelts, hedgerow restoration and woodland and short-rotation coppice along riverbanks (with appropriate buffers) will help to stabilise soils and reduce wind erosion.	**Regulating soil erosion** **Regulating soil quality** **Food provision** **Climate regulation** **Regulating water flow** **Regulating water quality** **Biodiversity**

Service	Assets/ attributes: main contributors to service	State	Main beneficiary	Analysis	Opportunities	Principal service offered by opportunities
Pollination	Limited areas of semi-natural habitats including woodlands and riparian habitats Network of hedgerows and arable margins	This NCA has relatively little high quality habitat to support pollinating insects; grasslands, arable margins, hedgerows, tree-lined watercourses and areas of flood plain grazing marsh provide a fragmented network of nectar sources and habitats for pollinating insects through the agricultural landscape.	Local	The presence of pollinators plays an important role in producing high crop yields; in this NCA this is particularly the case for crops such as oilseed rape. Increasing the area and quality habitat to ensure the presence of nectar and pollen producing flowers in season, including (for bumble bees) perennial species, suitable nesting habitat (for wild bees). Adequate connectivity of habitats within the landscape will increase food security and contribute to climate adaptation in both food production and biodiversity.	Seek opportunities within the agricultural landscape, through agri-environment schemes and other initiatives, to promote uncultivated and nectar-rich margins, conservation headlands and species rich grasslands. Restore species-rich hedgerows, road verges and other semi-natural habitats such as flood plain grazing marsh and woodlands, within a coherent network to benefit pollinators.	**Pollination** **Food provision** **Regulating water quality** **Regulating soil erosion** **Regulating water flow** **Biodiversity**
Pest regulation	Limited areas of semi-natural habitats and hedgerows.	Small areas of semi-natural habitat are interspersed with productive agricultural land.	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. Improving pest-regulation services should reduce the need for pesticides, thereby affording benefits for water quality, soil quality and wider biodiversity.	Seek opportunities to enhance the network of semi-natural habitats and the network of hedgerows and margins throughout the agricultural landscape so they provide habitat for predator species within close proximity to main food production areas. Improving the species and structural diversity of these habitats will increase the diversity of pest-regulating species supported.	**Pest regulation** **Food provision** **Regulating water quality** **Regulating soil quality** **Regulating soil erosion** **Pollination** **Biodiversity**

Service	Assets/ attributes: main contributors to service	State	Main beneficiary	Analysis	Opportunities	Principal service offered by opportunities
Sense of place/ inspiration	Broad valleys bounded by rising hills Distinctive glacial features Fertile soils Rivers Semi-natural habitats and hedgerows Village settlements Vernacular buildings using traditional materials and local building styles Proximity to the English-Scottish border	A sense of place is provided by the broad valleys and plains of this landscape that fringe the Cheviots, characterised by the numerous signs of glaciations and the interplay between the large agricultural areas, numerous rivers and watercourses. Feelings of inspiration and escapism are likely to be associated with this open and uncluttered landscape with views to the Cheviots. 3 per cent of the NCA falls within the Northumberland National Park.	Regional	This landscape has been shaped by glaciation and deposition and is recognised as possessing an unusually varied and fine array of glacial features. The hills on either side form a backdrop to the fertile valleys and plains of this NCA. The strong parliamentary enclosure pattern, most evident within the vales, with a strong patchwork of mixed farmland, hedgerows and hedgerow trees, contrasts with the more open arable farmland to the north where the enclosure pattern is slightly more fragmented. Many, often tree-lined, meandering rivers and streams flowing between raised terraces and flat, gravel benches, provide a further distinct sense of place contrasting with the intensively managed farmland. The identity of this area is that of a border community; the landscape is scattered with reminders of centuries of border conflict in the form of fortified castles, bastles and tower houses. **Continued over...**	Seek opportunities to raise awareness of the importance of glacial history to this landscape, improving access to and interpretation of sites where appropriate. Seek opportunities to connect local people with the history of the area, particularly relating to its border location by improving access to, and interpretation of heritage assets. There are opportunities to increase sense of place by protecting the open and rural feel of the NCA through retention of the field patterns and improved management and restoration of the hedgerow network. Natural flood plain management and creation of wetland habitats will strengthen the impact of the waterways on the NCA sense of place, as will restoring woodland along river corridors. **Continued over..**	**Sense of place/ inspiration** **Food provision** **Sense of history** **Tranquillity** **Recreation** **Biodiversity** **Geodiversity**

Service	Assets/ attributes: main contributors to service	State	Main beneficiary	Analysis	Opportunities	Principal service offered by opportunities
Sense of place/ Inspiration continued				**...continued from previous.** The sense of place is further reinforced by the strategic location of small traditional villages at river bridging points and on the break of slope at the edge of the valley floor. Isolated farmsteads, constructed from local materials: single-storied cottages built from stone rubble won from the overlying glacial till deposits, as well as larger houses constructed in dressed sandstone, blue-grey slates or stone slabs for roofs and, on the Milfield Plain, buildings constructed in sandstone of a pinkish hue and roofed in local orange clay tiles are all typical of the area. Increasing access to these landscape features will increase understanding and appreciation of their importance.	**...continued from previous.** New developments and redevelopment activity should be sympathetic to the historic settlement patterns, using materials in keeping with the vernacular architecture.	

Service	Assets/ attributes: main contributors to service	State	Main beneficiary	Analysis	Opportunities	Principal service offered by opportunities
Sense of history	Evidence of past glaciations A wealth of archaeological evidence of Neolithic, Bronze Age, Iron Age and Anglo-Saxon settlements Many reminders of centuries of border conflicts	The visible legacy of the last ice age, such as the kames, eskers and kettle holes provide a useful educational resource to explain the landscape history of the area. A strong sense of history is captured in the surviving evidence of early Neolithic farming and an exceptionally rich collection of archaeological remains from the Mesolithic through to early-medieval times. Yeavering, near Kirknewton, is thought to have been a seat of royal power in Anglo-Saxon times and the Milfield basin is regarded as one of the most important archaeological landscapes in the British Isles. Fine examples of cup and ring marks which are thought to be of Neolithic origin can be found on the eastern edge of the Cheviot Fringe south-east of Ford. The aspect of history most evident to the general public is that of centuries of border conflict; there are widespread reminders of a contested landscape lying on the English/Scottish border, with fortified castles such as Norham Castle, Wark Castle and Etal Castle, 'bastle houses' and 'tower houses' such as Twizel Towerhouse, and structures such as Twizel Bridge. There are two Registered Battlefields and the A697 follows the Roman route from Morpeth to Coldstream. **Continued over...**	National	The unique and varied legacy of glacial features is contributing to greater understanding of ice sheet behaviour in the region through scientific research. The varied historic features within the NCA, both upstanding and buried, are an important part of its character. Protecting this link with the past and enhancing our understanding of this will further strengthen the character of the area. There are a number of ongoing research projects in association with the University of Newcastle which are helping to raise the profile of this area as an important archaeological landscape. There are opportunities to connect local people with their history through communicating the findings of this research and encouraging access and interpretation of artefacts and sites. Projects such as the Flodden 500 project to commemorate the 500th anniversary of the Battle of Flodden will create learning, participation and volunteering opportunities for people to get involved in all aspects of their local heritage.	Seek opportunities to communicate the importance of the glacial history of this area to the public through improved access to and interpretation of sites. Minimise disturbance and damage to archaeological sites resulting from cultivation and mineral extraction. Encourage arable reversion where appropriate. Encourage restoration of Listed Buildings, Scheduled Monuments, traditional farmsteads, Registered Parkland and other historic parklands, and encourage the use of local building materials in vernacular buildings to maintain the distinctive historical style of the area. Increase public awareness of the historic importance of the area and provide interpretation of the archaeological and historical sites, highlighting the wider landscape context, to aid understanding.	**Sense of history** **Sense of place / inspiration** **Recreation**

Service	Assets/ attributes: main contributors to service	State	Main beneficiary	Analysis	Opportunities	Principal service offered by opportunities
Sense of history continued		**...continued from previous.** There are a number of large estates with country houses set in parkland, some of which have medieval origins and 2 of which are Registered Parklands (Tillmouth Park and Chillingham Estate, the majority of which lies within the Northumberland Sandstone Hills NCA), and the historic village of Etal with its thatched roofs which is part of the Ford and Etal Estates, and a popular tourist destination. The dispersed farmsteads of this area are testament to the extensive landscape transformation that occurred associated with late 18th and 19th century agricultural improvement, and are highly significant in a national context, along with those extending to the North Sea and into Scotland. The area around Fenton was farmed by the Culley brothers, who were important agricultural innovators, instrumental in changing farming techniques in northern England and southern Scotland and known for breeding the Border Leicester. The remains of their water meadows have now been found at Fenton. There are 573 Listed Buildings, 108 Scheduled Monuments and 2 Registered Parks and Gardens.				

Service	Assets/ attributes: main contributors to service	State	Main beneficiary	Analysis	Opportunities	Principal service offered by opportunities
Tranquillity	Landform Low population density Few settlements	Tranquillity represents a significant feature of the NCA with 92 per cent of the area identified as undisturbed.	Regional	This is a sparsely populated, rural landscape with small, nucleated villages linked by minor roads; only one major road (A697) links to adjacent NCAs. The many tree-lined meandering river and stream courses are particularly important in conveying a sense of tranquillity as are the small traditional villages and parkland associated with the larger country houses. The main sources of intrusion are the main roads, the high voltage transmission line and noise from the Otterburn military training area. The adjacent Northumberland National Park, (3 per cent of which occurs within this NCA), is to be awarded International Dark Skies Reserve status. This will mean any future developments in this NCA will need to consider and limit light intrusion.	Ensure new development conserves the sense of tranquillity and openness important to the rural character of the NCA and the Northumberland National Park. Seek opportunities for restoration and creation of semi-natural habitats, particularly along rivers to enhance the sense of tranquillity provided by these key features.	**Tranquillity** **Sense of history** **Sense of place / inspiration** **Recreation** **Biodiversity**

Service	Assets/ attributes: main contributors to service	State	Main beneficiary	Analysis	Opportunities	Principal service offered by opportunities
Recreation	Rights of way network St Cuthbert's Way long distance route National cycle route Limited open access land Game fisheries	The NCA offers a limited network of rights of way totalling 432 km at a low density of just over 0.8 km per km^2 as well as a small amount of open access land covering 1,154 ha (2 per cent) of the NCA. The St Cuthbert's long distance walking route from Melrose to Lindisfarne passes through Wooler, as does the national cycle trail that runs north-south through the NCA. The River Tweed is a world famous salmon river, the River Till is noted mainly for its sea trout fishery and the River Coquet is fished for brown trout.	Regional	This area provides a range of opportunities for public access and tourism. The Battlefields and historic village of Etal are important tourist attractions, but there is potential to further develop tourism opportunities within the immediate border area. Wooler acts as a gateway to the Northumberland National Park which has had a particularly large increase in walkers and rock climbers in recent years, and as a hub for tourists on route to Scotland. There is a national cycle route which runs north-south through the NCA and passes through Wooler. There is potential to improve this cycle route and add value to the national cycle route network by utilising dismantled railway lines. Game fishing is very important for tourism in this area but needs to be kept within sustainable levels due to the designations of the River Till Site of Special Scientific Interest and River Tweed Special Area of Conservation. The River Coquet is also a SSSI hosting Atlantic salmon which is a protected species.	Support sustainable recreational and educational access to enable understanding and appreciation of the area, in particular its historic and geodiversity assets. Seek opportunities to enhance provision of information about the wildlife, heritage and geology of the area and identify opportunities to create new circular routes or links to existing rights of way, and to develop the network of cycle routes.	**Recreation** **Sense of history** **Sense of place / inspiration**

Service	Assets/ attributes: main contributors to service	State	Main beneficiary	Analysis	Opportunities	Principal service offered by opportunities
Biodiversity	Sites designated for their nature conservation interest Natural corridors such as river corridors, hedgerows and field margins Protected species such as otter, lamprey, Atlantic salmon, red squirrel, water crowfoot Farmland bird assemblage Wintering wildfowl	There is a limited extent of UK Biodiversity Action Plan priority habitats within the NCA which include upland heath, wet woodland, fens and blanket bog. Tree-lined river courses, hedgerows and field margins, and corners managed for wildlife through agri-environment schemes play an important role as natural corridors in this agricultural landscape. The NCA contains 3 Special Areas of Conservation including the River Tweed, Ford Moss and part of Harbottle Moors; (only the very edge of this lies within this NCA). The majority of designated area in this NCA is riverine; including the Tweed SAC, Till Riverbanks SSSI and River Coquet & Coquet Valley Woodlands SSSI. These are designated for their flowing waters and associated woodland habitats and for the nationally and internationally important populations of water crowfoot, Atlantic salmon, lamprey, otter, and invertebrate assemblages that they support. Much of the remaining semi-natural woodland is found along the rivers and streams. Ford Moss Special Aare of Conservation, Campfield Kettle Hole SSSI and Barelees Pond SSSI are notified for their mire habitats. **Continued over...**	National	The main issues influencing the condition of the River Tweed Special Area of Conservation and other rivers are diffuse pollution, largely from agriculture, and control of invasive non-native species. There are small isolated pockets of no riparian semi-natural habitats such as fens, mires, upland heath and juniper scrub scattered within this agricultural landscape. Many of these areas are designated for their nature conservation interest, but this fragmentation means that the SSSI lack the resilience of being part of a more robust ecological network. The farmed environment includes many hedgerows, shelter belts and field margins which, together with the river corridors provide important connections through the managed landscape. Improving the biological resource of this area is likely to involve buffering existing semi-natural habitats through their restoration and creation of new ones, sensitive restoration of mineral extraction sites, reinstating natural river morphology (particularly restoring flood plain grassland), woodland planting to connect fragmented woodland along river corridors, improving connectivity within the farmed environment (hedgerows, field margins), and reducing diffuse pollution. **Continued over...**	Continue to work with the farming community to encourage land management practices that reduce diffuse pollution and sources of eroded sediment input to watercourses. Seek opportunities to restore more natural river morphology and restore flood plain grassland habitats that will benefit wintering wildfowl and improve regulating services such as water flow. Seek opportunities to increase connectivity within the landscape through woodland planting along rivers and streams, hedgerow restoration, and management of field margins and ditches for wildlife. Encourage measures to support farmland birds, pollinators and pest regulators such as sowing wild bird seed and nectar flower mixes, cereal headlands and over-wintered stubbles, and carry out enhancement of the hedgerow network. **Continued over...**	**Biodiversity** **Climate regulation** **Regulating water quality** **Regulating water flow** **Regulating soil erosion** **Pollination** **Pest regulation** **Sense of place/ inspiration** **Recreation**

Service	Assets/ attributes: main contributors to service	State	Main beneficiary	Analysis	Opportunities	Principal service offered by opportunities
Biodiversity continued		**...continued from previous.** The area is nationally important for its assemblage of arable birds and the low-lying fields around the Milfield Plain are important roosts and feeding grounds for wildfowl, especially geese, overwintering on the coast. Red squirrels are found in this area with reserves in the adjacent NCAs. Restoration of mineral extraction sites has already provided significant biodiversity gain through the creation of wetland and grassland mosaics at sites such as Woodbridge and Low Hedgeley.		**...continued from previous.** Woodland management and creation should take account of red squirrel populations; clear-felling of large conifer blocks and planting of large-seeded deciduous species should be avoided in areas buffering squirrel populations. These measures will benefit the protected species farmland birds, wintering wildfowl, pollinators and pest regulators occurring in the NCA, while helping to increase/ improve regulating services such as water quality and soil erosion, and contribute to sustaining a sense of place.	**...continued from previous.** Ensure mineral extraction sites are sensitively restored to provide a diversity of habitats. Sand and gravel quarries tend to be found in concentrated areas within the landscape which presents opportunities for extensive habitat creation and management across and between quarry sites, and the creation of habitat connections into the wider landscape. Improve the long term condition of designated sites by ensuring that underlying contributors to site condition are being managed appropriately, and that these are also considered in light of anticipated environmental change. This opportunity should be sought both within the existing designated sites and in buffering areas to build more robust ecological networks. Where appropriate, seek opportunities to manage woodland for red squirrels, particularly to buffer reserves. Seek opportunities to improve access to and usage of the biodiversity resource for education programs, linking communities with their natural environment.	

Service	Assets/ attributes: main contributors to service	State	Main beneficiary	Analysis	Opportunities	Principal service offered by opportunities
Geodiversity	Underlying bedrock Glacial features and deposits Sites designated for their geological or geo-morphological interest	The underlying bedrock has dictated the overall form of this landscape: the softer mudstones, sandstones and limestones underlying much of this area have eroded to form a lowland corridor of valleys and plains between the more resistant volcanic rocks of the Cheviots and the coarse sandstone of the Northumberland Sandstone Hills. The underlying bedrock, glacial and alluvial deposition is responsible for the fertile soils that support the agriculture that is the predominant form of land management in this area. Glacial deposits provide locally important sand and gravel resources. Glacial deposition is also responsible for the extensive glacial lake and fan deposits, sinuous ridges, eskers, kames and kettle holes which are distinctive features of the landscape. Fine examples of kettle holes can be found to the west of Wooperton, and at Ford Moss Special Area of Conservation; they have formed an internationally important complex of fens and raised bogs. Two SSSI are designated wholly for their geological interest, although the majority of the Humbleton Hill and The Trows SSSI is located in the adjacent Cheviots NCA. **Continued over...**	National	Designated geological sites, abandoned and active quarries, and the varied and widespread examples of glacial and geomorphological features occurring throughout this NCA provide opportunities for interpretation, understanding and research into the geodiversity and landscape processes of the area, contributing to a sense of place and history. A number of possible sites have already been identified for interpretation.[11] The fluvio-glacial deposits of the area are largely robust, and current farming and resource extraction practices have had little effect upon their overall distribution and stability. However future development and extraction could remove possible key sites and sections with the potential to lead to greater understanding of ice sheet behaviour in the region[12]. The Milfield Fan is the largest potential source of sand and gravel in the area and there are consequently plans to extend and locate new quarries. It is important that future extraction does not completely remove this feature. **Continued over...**	Seek opportunities to raise awareness of the importance of glacial history to this landscape, improving access to and interpretation of sites where appropriate. Encourage and develop opportunities for earth science research and to extend the understanding of geodiversity in the area. Capitalise on opportunities arising from sand, gravel and stone extraction to record temporary sections and retain permanent geological sections through the restoration process. Take opportunities through the restoration of quarries to enhance ecological networks by creating areas of semi-natural habitats, improve local landscape character, and provide recreational resources. Seek opportunities to re-naturalise river systems, allowing rivers to follow their natural courses and increasing understanding of processes within the landscape.	**Geodiversity** **Regulating water flow** **Regulating water quality** **Regulating soil erosion** **Sense of place/ inspiration** **Sense of history** **Biodiversity** **Recreation**

[11, 12] *Northumberland National Park Geodiversity Audit and Action Plan*, Commissioned Report (2007)

Service	Assets/ attributes: main contributors to service	State	Main beneficiary	Analysis	Opportunities	Principal service offered by opportunities
Geodiversity continued		**...continued from previous.** The interplay between geology and hydrology is responsible for the characteristic meandering paths of the many rivers across this landscape.		**...continued from previous.** Extraction of sand, gravel and stone may create exposures of interest which could further contribute to knowledge and understanding of the geodiversity of the area. Dynamic river systems are a key feature of this landscape, and improving understanding of the processes involved should promote the restoration of more natural river morphologies that would bring benefits for other ecosystem services such as water flow regulation and biodiversity.		

Photo credits

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