



Introduction

As part of Natural England's responsibilities as set out in the Natural Environment White Paper¹, Biodiversity 2020² and the European Landscape Convention³, we are revising profiles for England's 159 National Character Areas (NCAs). These are areas that share similar landscape characteristics, and which follow natural lines in the landscape rather than administrative boundaries, making them a good decision-making framework for the natural environment.

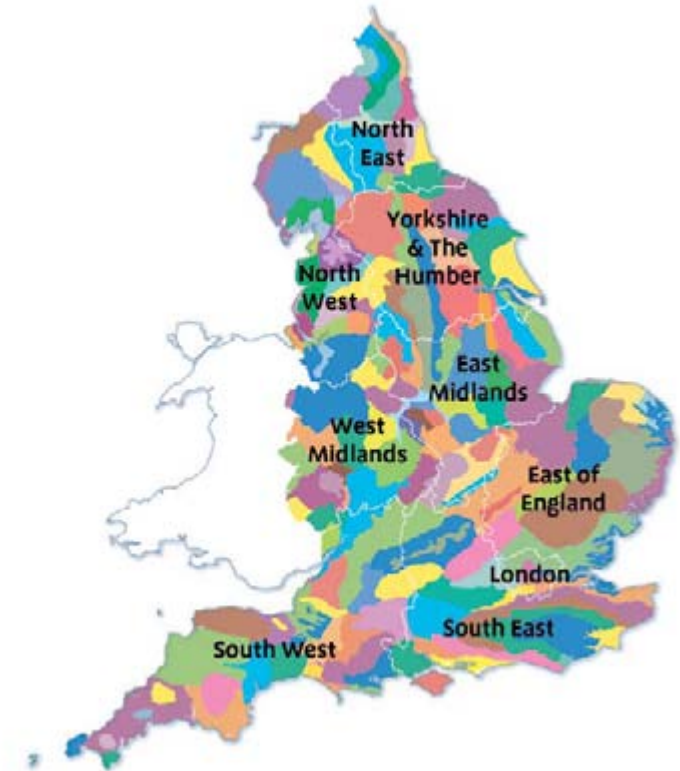
NCA profiles are guidance documents which can help communities to inform their decision-making about the places that they live in and care for. The information they contain will support the planning of conservation initiatives at a landscape scale, inform the delivery of Nature Improvement Areas and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

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

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

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

National Character Areas map



¹ The Natural Choice: Securing the Value of Nature, Defra (2011; URL: www.official-documents.gov.uk/document/cm80/8082/8082.pdf)

² Biodiversity 2020: A Strategy for England's Wildlife and Ecosystem Services, Defra (2011; URL: www.defra.gov.uk/publications/files/pb13583-biodiversity-strategy-2020-111111.pdf)

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

Summary

Tyne and Wear Lowlands National Character Area (NCA) is an area of gently undulating or rolling land, incised by the valleys of the major rivers and their tributaries. It is densely populated and heavily influenced by urban settlement, industry and infrastructure. Between settlements there are wide stretches of agricultural land.

The undulating land and broad valleys of the Tyne and Wear Lowlands are underlain almost entirely by Coal Measures rocks of Upper Carboniferous age. Mineral extraction has played a considerable role in the area and the legacy of coal mining remains evident in the landscape, although much restoration has occurred in recent years. Spoil heaps have been restored to pastures, mixed/coniferous plantations, amenity ponds and lakes (former open cast mines) and accessible green spaces such as country parks, and new networks of footpaths and cycle routes have been created along former wagonways.

Newcastle upon Tyne and the surrounding settlements cover a large area in the north of the NCA. Newcastle lies on the site of the Pons Aelius, a Roman fort on Hadrian's Wall, at a strategic crossing point of the River Tyne. Hadrian's Wall, which extends north-west from this NCA, is a World Heritage Site and the Hadrian's Wall Path National Trail provides recreational opportunities for visitors and local people. During the Industrial Revolution, engineering, mining, ship-building and chemical industries grew along with the populations of Newcastle upon Tyne, Gateshead and Tynemouth.

The major settlements in the NCA are distinctive. On the southern bank of the Tyne, Newcastle upon Tyne and Gateshead are linked by a series of dramatic

bridges, including the Tyne, High Level and Gateshead Millennium bridges. The historic centre of Durham is located on a prime defensive site, high up on a bluff in the middle of a tight, incised meander on the River Wear. The castle, cathedral and historic centre combine to form an historic landscape which has been designated a World Heritage Site.

As the settlements expanded, semi-natural habitats became fragmented. Sparse, lowland mixed deciduous woodland is the largest semi-natural habitat, sometimes strongly contributing to sense of place, such as the steep-sided, wooded river valley of the Wear in Durham. Although limited in extent, the Site of Special Scientific Interest (SSSI) known as Walldridge Fell is the largest and most diverse lowland heathland in the north-east of England.

In the east of the NCA, there is a small coastal area bordering the Tyne as it flows out into the sea. Sandy beaches backed by sea cliffs are found at Tynemouth and there are fragmented intertidal habitats along the heavily defended Tyne estuary. This habitat supports many wading birds, and is important for otters and migratory salmon. Part of the coastline in North Tyneside is a designated Ramsar site, an SSSI and a Special Protection Area

Click map to enlarge; click again to reduce.

as it supports nationally important numbers of wintering shore birds and the Tynemouth to Seaton Sluice SSSI is a fine example of Coal Measures strata in Great Britain. Hard rock headlands and foreshore outcrops occur in between defended beach frontages and Tyneside is a major port for commercial fishing and a sea ferry terminal. The coast is also popular with visitors for beach use, watersports and walking.

The rivers Tyne and Wear contribute a strong sense of landscape character to the area. These major catchments supply public water for large settlements such as Newcastle upon Tyne and Gateshead and the headwaters emerge in the North Pennines NCA. Water quality is affected by pollution from former mining activity and diffuse pollution from agriculture. Flood risk occurs during heavy rainfall, emerging from rapid water flow over moorland in upland areas such as in the North Pennines NCA.



Wooded river valleys are a key characteristic of Tyne and Wear Lowlands.

Statements of Environmental Opportunity

SEO 1: Reverse the fragmentation of semi-natural habitats due to the industrial and urban expansion of Tyneside by extending, creating and linking habitats in rural areas, developing or regenerating urban green spaces/urban fringe and protecting brownfield sites with high biodiversity interest.

SEO 2: Enhance and manage the Tyne and Wear river network and Tyneside coastal area to improve water quality and reduce flood risk, and to mitigate the effects of climate change.

SEO 3: Conserve and enhance the network of green infrastructure – broadleaved woodlands characteristic of the Tyne and Wear river valleys, country estates in and around urban settlements and restored coal mining sites – to increase biodiversity, improve water and soil quality, provide tranquillity and recreation and enhance landscape character.

SEO 4: Use an understanding of the unique historic landscape and heritage features of the Tyne and Wear Lowlands NCA to provide opportunities for interpretation, education, wellbeing, recreation and tourism, and to inform good design in new development that respects the setting of heritage assets.



Creation of wetland habitats on brownfield land at Newburn Riverside.

Description

Physical and functional links to other National Character Areas

Centred on the lower valleys of the Tyne and Wear, these lowlands are bounded to the south and east by the prominent escarpment of the Durham Magnesian Limestone Plateau National Character Area (NCA). To the west, the land rises through the Durham Coalfield Pennine Fringe NCA to the uplands of the North Pennines NCA. To the north, the extensive conurbation lying in the broad valley of the Tyne merges into the South East Northumberland Coastal Plain NCA. In the north-east of the area there is a short section of coastal boundary bordering the Tyne as it flows into the sea.

The River Wear with its tributaries rises in the North Pennines NCA and drains higher land in the west before meandering north-eastwards and draining into the North Sea through the Durham Magnesian Limestone Plateau NCA. The River Tyne rises in the uplands of the Border Moors and Forests NCA, and flows from west to east through the wide Tyne valley in the north of the Tyne and Wear Lowlands NCA. It then enters the North Sea at Tynemouth. These rivers are a source of potable water for domestic and industrial use in the conurbations of Tyneside and Wearside. A water transfer system ensures that supplies are maintained and the ecological condition of the rivers is protected by capturing and diverting water from the uplands of the North Pennines and the Border Moors and Forests NCAs. High rainfall in these uplands can cause rapid run-off and downstream flooding in the Tyne and Wear Lowlands NCA which is best addressed through management in upstream areas.



View from the Durham Magnesian Limestone Plateau NCA looking towards Durham.

Poor water quality caused by disused mines and spoil heaps remains an issue, shared with the North Pennines and Durham Coalfield Pennine Fringe NCAs, which also have a coal mining heritage, and with the North Pennines NCA which has lead and copper mining industries.

In the coastal area, the Tyne estuary is a key migration route for salmon on their journey from the sea to spawning grounds in the North Pennines. Some of the coastline in North Tyneside shares the Northumbria Coast Ramsar and Special Protection Area (SPA) designations with the South East Northumberland Coastal Plain NCA. Both NCAs support seabirds such as wintering populations of purple sandpiper and turnstone and breeding populations of little tern. In South Tyneside, the tidal area of the River Tyne supports wintering waterbirds and breeding shelduck, with intertidal habitats occurring along the foreshore, extending south into the Durham Magnesian Limestone Plateau NCA.

Major communication routes crossing the area include the A1, the main north-south road, and the East Coast Main Line railway. Other road and rail links cross the uplands to link the east coast conurbations with the west by following the Tyne valley through the Tyne Gap.

Hadrian's Wall Path National Trail is an unbroken 135-km trail stretching coast-to-coast from Wallsend in the east to Bowness-on-Solway in the west, some of which passes through Newcastle upon Tyne, providing links from the city to the wider countryside.



River Wear, one of the major river catchments in the NCA.

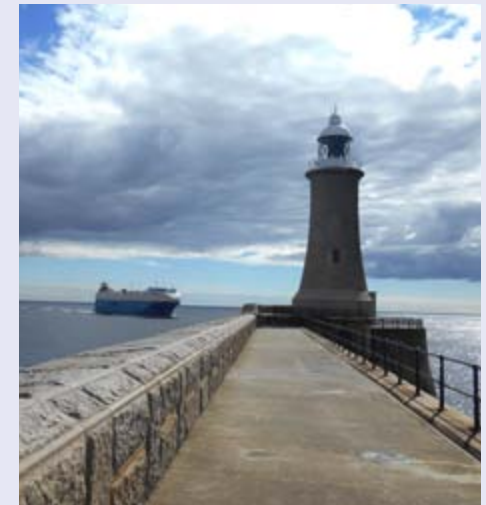
Key characteristics

- Undulating landform incised by the river valleys of the Tyne and the Wear and their tributaries.
- Widespread urban and industrial development with a dense network of major road and rail links and the spreading conurbations of Tyneside in the north. Dispersed towns and villages further south.
- Historic riverside cities of Newcastle upon Tyne and Durham, strategically located at bridging points of the rivers Tyne and Wear.
- Between settlements, wide stretches of agricultural land with large, regular, arable fields bordered by hedgerows with few hedgerow trees, often with large farmsteads and urban fringe pasture land with pony and cattle grazing.
- Strong legacy of mining, much restored to agriculture, forestry, industry, housing and amenity uses such as country parks, linking urban areas with countryside and coast by transforming wagonways to cycle routes and footpaths.
- Industrial prosperity reflected in the large number of 18th- and 19th-century country houses, set within parkland in the vicinity of major settlements.
- Mixed woodland estates and plantations on restored spoil heaps provide woodland cover in some areas, although sparse elsewhere.
- Oak or oak/birch broadleaved woodland, a characteristic feature on steep sides of narrow river valleys, with some river flood plains holding pockets of fen, reedbed and species-rich grasslands.
- Important relic of lowland heath survives at Waldridge Fell, one of few remaining areas of common land.
- Small area of coastline between Whitley Bay and South Shields consisting of sand, rocky foreshore habitats and maritime cliffs, with historic landmarks such as St Mary's lighthouse and Tynemouth Priory.

- Heavily modified, Tynemouth estuary supports regionally important numbers of wintering waterbirds and breeding shelduck and North Shields is a busy port terminus for sea ferries to Norway and Denmark.
- Part of North Tyneside coast supports seabirds: purple sandpiper, ruddy turnstone and breeding little tern.
- Long history of settlement, mining and industry evidenced through historic buildings and settlement patterns which form a core part of today's landscape.
- Important tourist attractions include Durham, Newcastle upon Tyne, Whitley Bay and two World Heritage Sites – Hadrian's Wall and Durham Castle and Cathedral.



Owned by the National Trust, Gibside country estate near Gateshead is set within parkland.



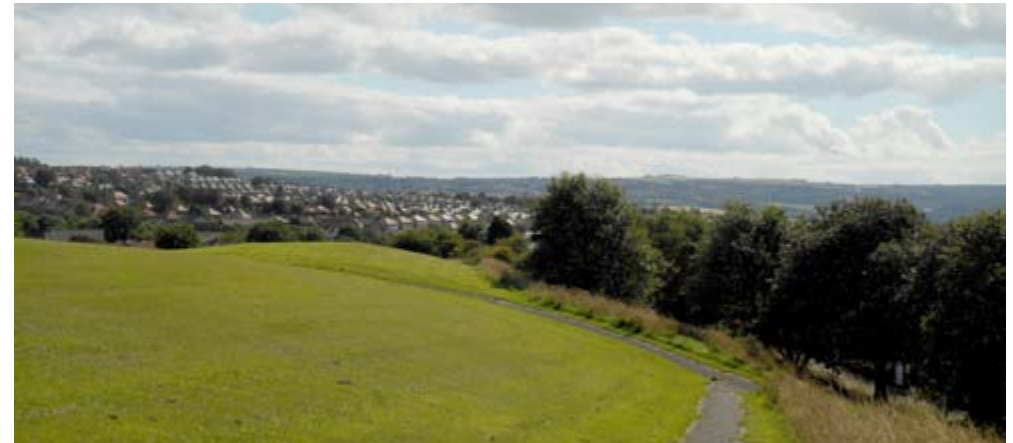
North Pier at Tynemouth with view of the lighthouse and incoming ferry.

Tyne and Wear Lowlands today

The gently undulating and rolling land is incised by the valleys of the rivers Tyne and Wear and their tributaries: the rivers Derwent and Browney. Densely populated and heavily influenced by urban settlement, industry and infrastructure, the impact of widespread mineral extraction (mainly coal) has changed the landform and land use. As the coal industry declined in the late 20th century, spoil heaps, open cast and deep mining sites have been reclaimed and incorporated into a landscape of varied uses, mainly agriculture, forestry, industry, housing and amenity uses such as country parks, ponds and lakes.

Woodland cover is irregular and farmland is divided by small, gappy hedges with few hedgerow trees. These open areas are interrupted by shelterbelts of conifers or small plantations on restored sites, or by blocks of mixed and deciduous woodland. On large country estates, good-sized, mature specimen broadleaves are a characteristic feature. The extensive urban areas and open arable land contrast with incised, wooded river valleys of semi-natural, broadleaved oak, ash and alder. These are often on steep sides of narrow denes or bluffs overlooking small flood plains. The former⁴ Great North Community Forest aimed to increase woodland cover by 30 per cent by regenerating derelict land and there is potential to explore new community forest schemes.

Agriculture is a mix of gently rolling terraces of open arable and mixed farmland with low hedges and few trees or woodlands. This has resulted from land clearance and piecemeal enclosure of rough ground and farmland from the medieval period, and comprehensive reorganisation of farmland in the 18th and 19th centuries. By the mid-19th century, scattered farmsteads provide testament to the mechanisation of agriculture in this area with wheel houses for horse engines being a particular feature. On land restored from spoil heaps or open cast mining, pastures for sheep grazing are divided by fences or strips of mixed or coniferous



Restored spoil heap on former coalfield provides urban communities with access to green space.

plantation. These landscapes lack maturity and urban fringe land uses such as pony grazing are found around settlements.

Flowing north to east, the NCA is split down the middle by a central flood plain of the incised, meandering River Wear and its tributary, the River Browney, while the northern area is dissected by a prominent physical and cultural feature, the River Tyne and its tributary, the Derwent. The Tyne and Wear form two major catchments and the headwaters of these rivers lie to the west, in the North Pennines NCA. Here, they drain remote moorland flowing through narrow, steep valleys, over soils often saturated by heavy rainfall. This can lead to downstream flood risks to major settlements within the Tyne and Wear Lowlands NCA.

The northern and largely urban part of the NCA comprises the spreading conurbations of the lower Tyne which have expanded along with a network of main roads, railways and power lines. The urban settlements have their distinctive

⁴ Following the closure of the Great North Community Forest project, there are currently no active community forest schemes in this NCA.

qualities. Newcastle upon Tyne lies on the crossing point of the Great North Road over the Tyne and a series of bridges at several levels cross over the river, connecting with Gateshead on the south bank. Built on the site of Pons Aelius, a Roman fort on Hadrian's Wall, and at a strategic crossing point of the River Tyne, Newcastle upon Tyne was generally confined within the city walls. In the 19th century, it expanded rapidly due to the growth of engineering, ship-building and chemical industries. Together with Gateshead, the conurbation developed as a major riverside trading centre handling goods from the surrounding coalfield areas. Its wealth was reflected in the many prominent public buildings in the town centres, built in local sandstone. Of particular note are the buildings in the centre of Newcastle upon Tyne, designed in the neo-classical style by John Dobson.

Newcastle upon Tyne has other striking features, notably a substantial area of common land at its heart, the historic Town Moor, and a number of Victorian bridges built across the Tyne. Further south, the historic centre of Durham is located on a prime defensive site, high up on a bluff in the middle of a tight meander on the River Wear. The castle and cathedral, built during the 11th century, stand above the tight-knit houses and streets of the old town. This townscape, combined with its dramatic setting above the steep wooded slopes, forms an historic landscape which has been designated a World Heritage Site. Industrial prosperity is also revealed through the large number of country houses, dating from the 18th and 19th centuries, set in parkland, in the countryside around main settlements. As 30 per cent of the NCA is greenbelt, there are opportunities to create more green spaces and improve links to existing ones, particularly in urban areas. Further south, the area is more rural and settlements are smaller and widely dispersed.

Owing to the continued expansion of settlements over decades, structures and building styles are mixed. Typical of the mining villages are the terraces of grey or red brick workers' housing with grey slate roofs. Later styles included estates of



Horse grazing is a typical land use in the urban fringe.

post-war public housing and the planned new town settlement of Washington.

In this post-industrial landscape, most semi-natural habitats are fragmented, covering only 4 per cent of the NCA. Waldrige Fell, the largest, most diverse lowland heathland in the north-east of England, is found near Chester-le-Street. Designated a Site of Special Scientific Interest (SSSI), it supports a variety of habitat communities (mires, scrub, bracken and a mix of acid grassland and heather-dominated vegetation) and includes an area of common land.

The Tyne estuary, relatively long, narrow and modified, has limited estuarine habitats with mudflats and salt marsh in the tidal area around North Tyneside. It also supports regionally important numbers of wintering waterbirds and breeding shelduck and is an important migratory route for salmon and sea trout. Despite urbanisation and fragmented habitats, the entire length of the estuary forms an important wildlife

corridor and otters and kingfisher regularly use it and its connecting tributaries. Manmade structures also play a role in providing habitat for kittiwakes which nest under the Tyne Bridge and breed on quayside buildings such as the BALTIC Centre for Contemporary Art and the purpose-built kittiwake tower in Gateshead.

The coastline consists of soft sandstones, although dolomitic limestone crops out in small areas at Tynemouth and Whitley Bay to form sea cliffs. Part of North Tyneside is designated a Ramsar site and an SPA (it is part of the Northumbria Coast SPA) as well as Northumberland Shore SSSI, mainly for the important numbers of wintering shore birds, whereas North Tyneside's intertidal habitats provide winter feeding and roosting habitats. Tynemouth to Seaton Sluice SSSI is geologically important as one of the best exposures of Coal Measures strata in Great Britain. Fishing remains one of the main commercial activities here, contributing to the local economy, with North Shields being a main fishing port and the terminus of sea ferries to Norway and Denmark.

Recreation and tourism play an important part in the NCA with many visitors to its distinctive towns, cities and coast attracted by its varied culture and history, which includes the legacy of the Industrial Revolution (mainly coal mining and ship-building) and the ecclesiastical heritage of Durham with its World Heritage Site (Durham Castle and Cathedral). Durham's 11th-century motte-and-bailey castle is an early example of Norman architecture commissioned by William the Conqueror to defend the peninsula and is now University College established in the 1830s. Durham Cathedral is a prominent feature in the landscape and was designed and built under William of St Carilef, the first prince-bishop appointed by William the Conqueror in 1080. Newcastle upon Tyne boasts part of Hadrian's Wall and Jarrow has St Paul's Monastery where the Venerable Bede (an English monk and author of the Ecclesiastical History of the English People) lived for a time. The creative arts have flourished in this NCA. Historic Durham inspired painters such as J.M.W. Turner and



Kittiwakes on the Tyne Bridge.

John Sell Cotman; more recently, Antony Gormley's contemporary, iconic sculpture, the 'Angel of the North', is seen by travellers to and from the area as it overlooks major road networks into Tyneside and the East Coast Main Line.

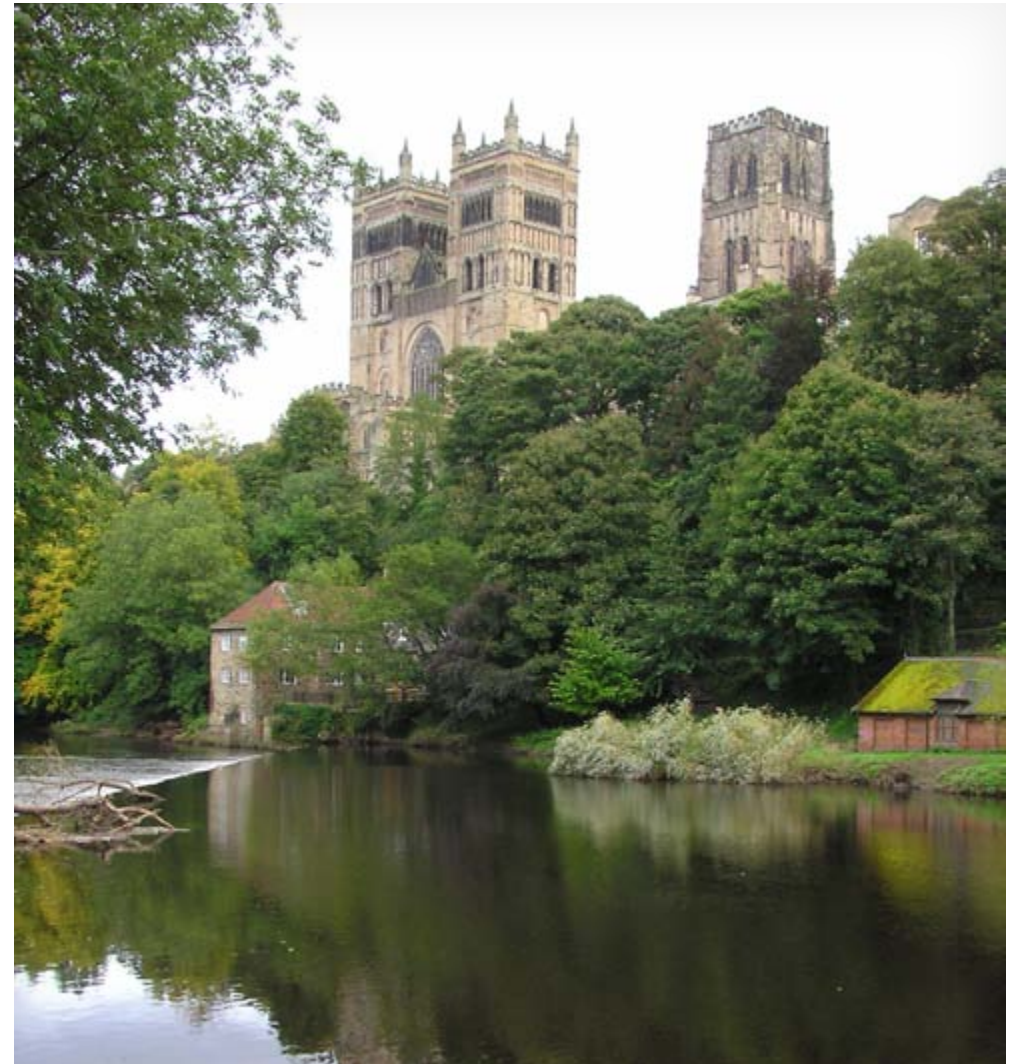
Four per cent of the NCA is classified publicly accessible, having numerous country parks, Local Nature Reserves and other green spaces which link urban areas with the countryside and coast. Old railway lines and wagonways have been converted to cycle routes and footpaths, and common land, coastline, historic settlements and country estates offer a wide range of recreation opportunities. Part of the 135-km coast-to-coast National Trail (Hadrian's Wall) includes walks along the River Tyne and the centre of Newcastle. A 23-km National Cycle Route runs from Newcastle upon Tyne along the riverside to the coast at Whitley Bay, and Town Moor common land in Newcastle covers 400 ha, where Freemen of the city still have the right to graze cattle.

The landscape through time

The undulating land and broad valleys of the Tyne and Wear Lowlands NCA are largely underlain by Coal Measures rocks of Upper Carboniferous age, consisting of a succession of shales and sandstones with numerous coal seams. Permian rocks overlie the Coal Measures cropping out in small areas at Tynemouth and Whitley Bay. These sea cliffs consist mainly of soft sandstones and dolomitic limestone and underlying rocks are overlain by a mantle of boulder clay or till deposited from ice sheets which covered the area during the last glacial period.

Glaciation altered drainage patterns by blocking the original northwards route of the River Wear and diverting it eastwards, where it cut a new channel through the Magnesian Limestone Plateau entering the North Sea at Sunderland. Increased flow of streams during de-glaciation caused down-cutting of existing river courses which can be seen in the classic incised meander gorge of the River Wear at Durham. It forms a naturally defensive site where Durham Castle still stands. Other incised valleys include the denes or steep-sided valleys in which tributaries of the River Tyne flow.

The history of settlement includes bronze-age clearances of the heavily wooded landscape. The Roman settlement established at Newcastle was of strategic importance, being the crossing point of the Tyne by the main north-south route, and this influenced the location of other settlements. Most medieval settlement was re-written after the Harrying of the North in the late 11th century. However, original medieval settlement patterns were preserved within the Palatine of Durham (extensive territory originally under the control of the Bishop of Durham), seen today in the regular rows of house plots (tofts) and garths (enclosed ground). The ecclesiastical monuments of Monkwearmouth, Jarrow and Durham Cathedral are testaments to the power and influence of the Church during the medieval period.



Views of Durham Cathedral, symbolic of the power and influence of the church during the medieval period.

Arable production has taken place since the medieval period, with linear farmsteads dating from the late 17th century. By the late 18th century, enclosure of arable fields was complete, followed by the remaining commons and open pastures. Fields were large and regular, reflecting the ease with which the open fields of the medieval townships could be re-ordered when production was re-organised around larger, centralised farming units. While farmland often retains the traces of earlier boundaries, later re-organisation was accompanied by the wholesale rebuilding of farmsteads around courtyards for fattening cattle, and buildings for mechanised corn threshing and processing fodder.

The underlying Coal Measures have been a valuable economic asset to the area, and coal has been exploited since Roman times. This initially took place in coastal and river areas but as steam power and technology developed, the working and draining of deep mines became possible. This transformed the settled landscape, especially during the 19th century when many new pit-head villages were established along with industrial infrastructure and urban expansion. Most building stock dates from the mid-18th century with sandstone being the traditional building material. Large numbers of country houses were built within their own designed parkland in the 18th and 19th centuries, reflecting industrial prosperity and numerous Victorian mining and industrial terraces of brick and slate can be found in Jarrow and County Durham.

Newcastle upon Tyne originated as a small Roman settlement close to the eastern end of Hadrian's Wall and the crossing point of the River Tyne. In the 11th century, Robert Curthose (son of William the Conqueror) built a motte-and-bailey castle which gave 'new castle' its name. The most prominent remaining structures on the site are the Castle Keep and the Black Gate, which were built later in the 12th and 13th centuries. During the 19th century, Newcastle and Gateshead expanded, as major trading, engineering and ship-building



Dramatic bridges were built to link Newcastle and Gateshead across the Tyne.

industries emerged along with innovators and engineers such as William Armstrong, Joseph Swan and Robert Stephenson. Icons of this era are the dramatic bridges which were built to link Newcastle and Gateshead across the Tyne including High Level Bridge (1849), being the first combined road and rail bridge in the world. Some of Newcastle's finest Victorian buildings lay within Grainger Town, today a high-quality shopping outlet and conservation area containing 29 Grade I and 49 Grade II listed buildings.

Throughout the 20th century, major industries were in decline, due to global competition. In 1936, the famous protest march against unemployment and

poverty in the north-east of England set out from Jarrow and over 200 people walked 300 miles to Westminster to lobby Parliament.

Today, this area is an active industrial and commercial centre for port-related, ship repair and offshore industries, manufacturing, out-of-town retailing and tourism. In Newcastle upon Tyne and Gateshead, former shipping premises have been replaced with office developments and the Gateshead Millennium Bridge provides links to the older Newcastle quayside. In Gateshead, the BALTIC Centre for Contemporary Art and the Sage Gateshead music centre, designed by Norman Foster, symbolise the regeneration of the quaysides into thriving, cosmopolitan public spaces. The Metrocentre, Europe's largest shopping and leisure centre lies close by, attracting visitors from the UK and beyond, with many Scandinavians visiting the area via the nearby port of Tynemouth. In the urban conurbation of Newcastle and Gateshead, particularly in the north and west, there is continued pressure on the greenbelt for land to develop housing, business and new roads.

Farming and fishery industries have helped to feed large populations around the industrial and port centres, along the rivers Tyne and Wear and in the rest of the UK. The North Sea remains an important fishing ground and the marine environment provides spawning, nursery and feeding areas for many species of fish. Along the coast are built heritage conservation areas containing Grade II listed buildings, such as the North Shields Fish Quay Conservation Area, Tynemouth North Pier and Lighthouse and Tynemouth Priory and Castle.



North Pier in Tynemouth looking towards Tynemouth Priory.

Ecosystem services

The Tyne and Wear Lowlands 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 Tyne and Wear Lowlands NCA is contained in the 'Analysis' section of this document.

Provisioning services (food, fibre and water supply)

■ **Food provision:** As the NCA contains extensive urban areas, the total farmed area is low at only 32 per cent. The majority of agricultural land is Grade 3 except for small areas of Grade 2 soil along the flood plain of the River Wear. In 2009, arable and horticultural land accounted for 56 per cent of the farmed area, while livestock (sheep, pigs and cattle) was 19 per cent. The majority of farm holdings are small (50 ha) and only 21 per cent are over 100 ha. Commercial fishing occurs in Tyneside, the main species being cod, haddock, whiting, plaice, lemon sole and monkfish, and North Shields is the largest prawn port in England.

■ **Water availability:** The urban and industrial nature of the NCA means that there is high demand for water for domestic, industrial and agricultural use. Although there are no major aquifers underlying the NCA, the water reservoirs of the Border Moors and Forests and the North Pennines NCAs provide a potable source of water through a transfer system. Water is transported down from these reservoirs into the Tyne and Wear Lowlands NCA.

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

■ **Climate regulation:** The main soils have a mixture of medium or low carbon content, except for some limited heathland and wetland habitats. Improving/

maintaining soil quality and structure will aid carbon storage in the soils as well as increase resilience to the effects of climate change. Covering 4,295 ha or 9 per cent of the NCA, woodland habitats provide carbon storage and there is the potential to increase this in appropriate locations.

■ **Regulating soil erosion:** The most common soil types are not prone to erosion but are easily compacted or capped in wet conditions, leading to reduced water infiltration and diffuse pollution due to surface water run-off. Where arable and livestock production occurs, by following good farming practices and adopting Environmental Stewardship, soil erosion may be reduced.

■ **Regulating soil quality:** As mentioned above, the most common soil types are prone to compaction or capping in wet conditions which can damage soil structure. Land management measures to increase organic matter, such as creating semi-natural habitats, will prevent damage to soils and increase carbon levels.

■ **Regulating water quality:** There are no major aquifers or priority catchments in the NCA. In 2003 under the Water Framework Directive, the ecological status of the rivers was found to be 'good' but the chemical status of the River Tyne was failing to achieve 'good' and the chemical status of groundwater for all rivers was 'poor'. The ecological status of estuarine and coastal waters was 'moderate' but with some pollutants.

Recent evidence suggests diffuse water pollution from agriculture is affecting the River Wear. Other contaminants include mine water discharging from closed mines and sediment run-off from downstream flooding. Continued water treatment facilities and adoption of sustainable land management practices (particularly on upland moorland areas) will improve water quality in the lowlands.

In urban areas, rapid run-off caused by impermeable surfaces pressurises underground surface water and sewerage infrastructure, but this could be reduced by implementing sustainable urban drainage schemes.

- **Regulating water flow:** The headwaters of the rivers Tyne and Wear emerge in the North Pennines NCA. During heavy rainfall, rapid water flows over the moorland cause downstream flooding of the settlements through which the rivers flow. This mainly affects Newcastle upon Tyne and Gateshead on the River Tyne and Durham and Chester-le-Street on the River Wear. Urban drainage issues also occur in high-density residential and industrial areas where impermeable surfaces are responsible for rapid run-off and flash flooding during periods of heavy rainfall. The dense broadleaved woodland in the riversides helps to slow water flow and the potential to increase these assets should be explored.

Regional water transfers utilising reservoirs in the Border Moors and Forests and North Pennines NCAs provide a potable source of water for the conurbations of Tyneside and Wearside, but transfer of water between these NCAs can also help to control water flow during times of potential flooding.

In the long term, on the coast, the impacts of climate change may cause more tidal flooding and storm surges which are likely to exacerbate coastal squeeze and erosion.

- **Regulating coastal flooding and erosion:** The small coastal area varies from sandy beaches backed by sea cliffs in Tynemouth, to the estuarine environment, quay walls and fragmented intertidal flats in North Tyneside. Hard rock headlands and foreshore outcrops occur between defended beach frontages. Erosion rates are relatively low but may increase with climate change.

The long, narrow Tyne estuary includes the busy port of Tyneside which supports an active fishing industry and is deep enough for the navigation of sea vessels. The Shoreline Management Plan (SMP) acknowledges the need to build greater width into existing defences which may have an impact upon coastal habitats causing increased coastal erosion, coastal squeeze, loss of intertidal habitats and geological features. SMPs covering North and South Tyneside recommend a policy of 'hold the line', with limited scope for 'no active intervention' and 'managed realignment'.



The Tyne Estuary is long, narrow and heavily defended.

Cultural services (inspiration, education and wellbeing)

- **Sense of place/inspiration:** A varied landscape, the urban areas of the NCA have a strong character and sense of place and the open, arable and mixed farmland is interrupted by shelterbelts or blocks of woodland and pastures for pony grazing. Largely urban in the north, the NCA has a very long settlement history and a strong industrial heritage to which the development of coal mining and other industries has contributed. Large settlements include Newcastle upon Tyne and Gateshead with the distinctive bridge crossings between them. The historic city of Durham has notable medieval ecclesiastical origins and is located on a distinctive high rock bluff above densely wooded, steep river banks which provided the inspiration for the famous artist J.M.W. Turner.

Due to the legacy of coal mining, the physical landform changed. Following restoration, former spoil heaps have become pastures, mixed/coniferous plantations or country parks, and amenity ponds and lakes have been created from former open cast mines. Built heritage includes 18th-century sandstone buildings and Victorian mining and industrial terraces of brick and slate. The large number of 18th- and 19th-century country houses set within parkland is partly due to industrial prosperity and starkly contrasts with the terraced housing found in mining villages.

An area popular with tourists, the Tynemouth coastline is scattered with caravan sites and there are recreation opportunities at Whitley Bay and South Shields. The coastline comprises rocky headlands, sea cliffs and foreshore outcrops with a few sandy beaches. The port of Tyneside is characterised by its fishing quay and as the busy terminus for sea ferries.

- **Sense of history:** The NCA is one of the most distinctive areas in England for its extensive industrial and commercial history, coupled with landscape and

heritage features, and is rich in evidence of the development of settlements and society from the Roman period and earlier.

A strong sense of history is apparent at the World Heritage Sites of Durham Castle and Cathedral and Hadrian's Wall. There are influences from the Bronze Age and the Roman (including Hadrian's Wall) and medieval periods, and evidence of ecclesiastical rule within the Palatinate of Durham with its preserved settlement patterns.

In Newcastle upon Tyne, the 19th- and early 20th- century Tyne bridges are examples of high quality engineering associated with the engineers and innovators of the era.

Development of the coal industry from its Roman and medieval origins to the 20th century transformed the settled landscape, evidence of which can be seen in the 19th-century pit-head villages, industrial infrastructure and urbanisation in the north of the NCA.

Along the coast are many conservation areas with built heritage and Grade II listed buildings, including the Fish Quay, North Pier and Lighthouse, Prior's Haven, Tynemouth Priory and the Grand Hotel, Tynemouth.

- **Recreation:** There are many opportunities for tourism and recreation. Four per cent of the NCA is publicly accessible (655 km of public rights of way and part of the Hadrian's Wall Path National Trail) and a 23-km national cycle route runs from Newcastle to Whitley Bay on the coast. The 15 registered parks and gardens reflect the large number of 18th- and 19th-century country houses, often located close to large settlements. Post-industrial restoration has created accessible green spaces such as numerous Local Wildlife Sites, Local Nature Reserves, country parks (former

spoil heaps) and amenity ponds and lakes (former open cast mines). Networks of new footpaths and cycle routes along old railways/wagonways provide links between town and country. Newcastle upon Tyne and Durham are important tourist attractions and the coast is popular with visitors for recreation.

- **Biodiversity:** Internationally designated nature conservation sites cover less than 1 per cent of the NCA and SSSI cover only 200 ha, reflecting fragmentation of semi-natural habitats due to urban and industrial expansion. Although broadleaved, mixed wet woodland is sparse, it is the largest extent of semi-natural habitat. Other small areas of semi-natural habitats include the largest and most diverse lowland heathland in the north-east of England, Waldridge Fell SSSI, and intertidal habitats along the River Tyne and its estuary which supports wading birds and is a key migration route for salmon. Small areas of coastline in North Tyneside have several designations (Ramsar, SSSI and SPA).

Opportunities for creating, restoring and maintaining habitats include sustainable land management interventions, new woodland planting and the development of new, and enhancement of existing, green spaces in urban areas.

The urban conurbations have unique biodiversity interest. Some derelict industrial, railway and mining sites have been naturally colonised, often forming part of the Local Wildlife Site network and meeting priority habitat criteria for open mosaic habitats on previously developed land. Manmade structures provide nesting and breeding sites for kittiwake such as the Tyne Bridge and the BALTIC Centre for Contemporary Art in Gateshead.

Networks of urban gardens, parks, allotments and manmade structures provide resources for a number of pollinators and birds, including nesting and roosting by seabirds and urban associated priority species such as house sparrow and starling.

- **Geodiversity:** There are research, education and interpretation opportunities in the NCA, including establishing geological links to the history and culture associated with industrial heritage such as the Tynemouth to Seaton Sluice geological SSSI, one of the best exposures of Coal Measures strata in Great Britain and, inland, the exposed geology of disused quarries. More recent geology includes the shaping of the landscape associated with the last ice age through the visible glacial tills along the coast, incised meander and gorges of the River Wear and the Denes.



Waldridge Fell SSSI, survives as the most diverse lowland heathland in the north-east of England.

Statements of Environmental Opportunity

SEO 1: Reverse the fragmentation of semi-natural habitats due to the industrial and urban expansion of Tyneside by extending, creating and linking habitats in rural areas, developing or regenerating urban green spaces/urban fringe and protecting brownfield sites with high biodiversity interest.

For example by:

- Restoring and creating a network of species-rich grasslands, woodlands and hedgerows in rural areas on and around agricultural land, including use of Environmental Stewardship.
- Maintaining the rare habitat of lowland heathland at Waldrige Fell through appropriate management interventions (scrub clearance, grazing, controlled burning or mechanical management).
- Creating buffers zones and habitat networks while improving soil and crop management by encouraging farmers and landowners to increase green cover crops such as grasslands on cultivated or bare soil and field margins, and adopting light grazing regimes on soils that are vulnerable to compaction.
- Encouraging the development of wildlife gardens, green roofs, street trees and other natural greenspace in urban areas to enhance habitat networks and benefit pollinators.
- Working in partnership with local authorities and the Highways Agency to create wild flower meadows in parks, verges and on roundabouts.
- Ensuring that planning policies adopt environmentally-friendly developments, incorporating green spaces and Local Wildlife Sites into urban areas, providing links to footpaths and cycle routes both locally and to the wider countryside and coast, and making a positive contribution to local character.
- Raising public awareness of the value of wildlife and habitats in urban environments and encouraging engagement with them.
- Protecting biodiverse brownfield land for its biodiversity interest, avoiding greening of these sites but, where appropriate, enhancing other ex-industrial derelict land by creating native broadleaved woodland or semi-natural grassland on former spoil heaps, and creating wetlands on former open cast extraction areas. Linking habitats by footpaths, cycle routes and bridleways wherever possible, particularly in urban fringe areas.
- Within larger urban settlements such as Newcastle upon Tyne, creating links to riverside habitats along the River Tyne, while providing recreation for local people.
- Minimising disturbance to breeding seabirds and wintering waders along the coast and estuary by encouraging the zoning of activities/ sensitive usage of the area.
- Planning for integrated coastal management, allowing natural coastal processes to occur, where feasible, to protect the impact of coastal erosion on coastal and estuarine habitats and the geology of the rocky headlands and sea cliffs.

SEO 2: Enhance and manage the Tyne and Wear river network and Tyneside coastal area to improve water quality and reduce flood risk, and to mitigate the effects of climate change.

For example by:

- Improving water quality in rivers flowing from urban and industrial sites by incorporating rain gardens, swales and green roofs into new and existing developments to attenuate water and provide wildlife habitats, and by pumping polluted water out of industrial sites such as disused coal mines.
- Reducing flood risk and enhancing biodiversity and landscape by creating multi-functional flood storage wetlands and restoring water meadows on lowland flood plains of rivers such as the Lower Derwent and Team.
- Improving water quality and water flow by increasing urban greenspace and woodland cover to intercept and infiltrate rainfall and impede run-off into the drainage systems and rivers.
- Maintaining the regional water transfer network with upland NCAs that have water reservoirs to control water flow, manage flood risk and ensure water availability.
- Seeking opportunities to work in partnership with the North Pennines NCA to encourage adoption of sustainable, upland land management practices to reduce downstream flooding. For example, by grip blocking on heather moorland and woodland planting to help control water flow.
- Expanding areas of semi-natural habitats such as woodland and permanent grassland to improve infiltration rates.
- Encouraging land management interventions that increase the carbon content of soils through increased organic matter so that they withstand periods of increased heavy rain, reducing sediment run-off, controlling water flow and increasing carbon storage. For example, by establishing areas of uncultivated land/permanent and semi-natural grassland and using green cover crops on agricultural land.
- Encouraging the adoption of light grazing regimes to reduce the release of greenhouse gases (methane) and soil compaction (by poaching), producing a good soil structure that reduces the erosion which causes sediment run-off into watercourses.
- Increasing the extent of and actively managing existing woodlands on valley slopes to improve infiltration of water, reduce soil erosion and pollutants that may leach into surface waters, and to increase carbon storage potential.
- Working with landowners and farmers to promote good nutrient management planning and adherence to government guidelines on nitrate vulnerable zone (NVZ) regulations to help manage levels of fertiliser inputs on productive arable land.
- Allowing natural development of undefended sections of coastal frontage, wherever possible, to reduce the impact of coastal erosion and coastal squeeze on intertidal habitats and rocky cliffs and foreshore outcrops.
- Supporting policies that protect the natural, cultural and built heritage of the coastal area.

SEO 3: Conserve and enhance the network of green infrastructure – broadleaved woodlands characteristic of the Tyne and Wear river valleys, country estates in and around urban settlements and restored coal mining sites – to increase biodiversity, improve water and soil quality, provide tranquillity and recreation and enhance landscape character.

For example by:

- Conserving the characteristic, semi-natural, broadleaved oak, ash and alder woodland on steep-sided, narrow denes and bluffs overlooking small flood plains, such as those found in County Durham, for their biodiversity value, recreation opportunities, tranquillity and contribution to landscape character.
- Creating and extending new woodlands along valley slopes, on country estates and parklands and re-connecting semi-natural woodlands in urban areas by encouraging new Community Forest schemes to increase tranquillity and areas for recreation.
- Planning the location, species composition and design of new woodlands (including native species), to enhance biodiversity and ensure their design is sympathetic to the surrounding landscape character.
- Planning for the management and restoration of habitats that can provide valuable wildlife corridors by linking woodlands to hedgerows and species-rich grassland.
- Encouraging the development of accessible natural greenspace in urban areas, such as wildlife gardens, green roofs, street trees, wild flowers on verges and roundabouts, and meadows in parkland and common land such as Town Moor in Newcastle, to enhance habitat networks and provide areas for recreation and tranquillity.
- Ensuring that planning policies adopt environmentally-friendly developments incorporating green spaces and Local Wildlife Sites into urban areas, providing links to footpaths and cycle routes and making a positive contribution to local character, while raising public awareness of the value of wildlife and habitats in urban environments.



Semi-natural, broadleaved woodland on steep-sided denes provides areas of recreation and increase tranquillity.

SEO 4: Use an understanding of the unique historic landscape and heritage features of the Tyne and Wear Lowlands NCA to provide opportunities for interpretation, education, wellbeing, recreation and tourism, and to inform good design in new development that respects the setting of heritage assets.

For example by:

- Seeking opportunities to encourage urban populations to engage with, learn about and enjoy the natural environment, utilising wildlife sites and Local Nature Reserves, restored industrial areas, creation of new woodlands (by developing Community Forest schemes), riverside walks, coastline, country parks, country estates, rural areas and common land such as Town Moor in Newcastle.
- Providing opportunities in the urban areas through the numerous Walking for Health schemes that operate throughout the NCA, allowing people access to their local greenspace through connecting routes in and around towns and cities such as Newcastle upon Tyne, Durham, Tynemouth and Spennymoor to improve health, wellbeing, tranquillity and experience of the natural and historic environment.
- Developing interpretation about wildlife, habitats and geodiversity for local communities and visitors along key locations on the River Tyne and along the coast, including exploring the potential for a coastal heritage trail; and interpreting the geology of the Tynemouth to Seaton Sluice SSSI that has been the basis of the coal mining industry, and the shaping of the landscape associated with the last ice age through visible glacial tills along the coast.
- Seeking opportunities to identify and manage Local Geological Sites and supporting research, education and interpretation by establishing geological links to the history and culture associated with industrial heritage and the shaping of the landscape through geology, including Tynemouth to Seaton Sluice geological SSSI, glacial tills along the coast, the exposed geology of disused quarries and the incised meander and gorges of the River Wear and the Denes.
- Exploring opportunities for circular routes off the Hadrian's Wall Path National Trail to promote wider access to, and appreciation of, the heritage of Newcastle upon Tyne and the tranquillity of the surrounding countryside for local communities and visitors.
- Conserving, managing and interpreting the history, culture and legacy of the coal mining and ship-building industries in and around Durham, Newcastle upon Tyne, Gateshead and Tynemouth on former coal mining sites, the quaysides and port to benefit local communities and visitors.
- Managing the existing network of public rights of way and cycle routes, improving access by ensuring that paths are maintained, well signposted and cater for all levels of ability and interest, while linking urban access routes to the wider countryside and the coast.
- Managing and conserving the area's heritage assets as an integral part of its distinctive landscape and improving their condition through appropriate measures, seeking to reduce conflicting or unsympathetic management regimes.
- Protecting and maintaining buildings of historic importance, including Newcastle's Roman and Victorian heritage, the medieval character and World Heritage Site in Durham and the heritage conservation areas of Tynemouth, encouraging use of traditional building materials for appropriate developments and contributing to the strong sense of historic character of the NCA.
- Supporting the World Heritage Site committee's management plan to deliver priorities concerning the sites' 'outstanding universal value'.

Continued over...

SEO₄ continued:

For example by:

- Conserving and protecting remaining features of the coal mining industry, such as the winding towers and other artefacts.
- Managing future developments to incorporate green infrastructure, providing access to green spaces of relative tranquillity within towns, cities and the surrounding countryside and ensuring that new designs complement the many heritage assets within the towns, cities and coastal areas of the Tyne and Wear Lowlands NCA.
- Ensuring that there is a sustainable approach to land use planning with integration of coastal management policies into regeneration plans to protect the cultural, natural and built heritage of the coastal area.



Town Moor is a large area of common land in the middle of Newcastle.

Supporting document 1: Key facts and data

Total area: 46,418 ha

1. Landscape and nature conservation designations

There are no national landscape designations in this NCA.

Source: Natural England (2011)

1.1 Designated nature conservation sites

The NCA includes the following statutory nature conservation designations:

| Tier | Designation | Name | Area (ha) | % of NCA |
|---------------|--|---|-----------|----------|
| International | Ramsar | Northumbria Coast | 5 | <1 |
| European | Special Protection Area (SPA) | Northumbria Coast SPA | 5 | <1 |
| | Special Area of Conservation (SAC) | n/a | 0 | 0 |
| National | National Nature Reserve (NNR) | n/a | 0 | 0 |
| National | Site of Special Scientific Interest (SSSI) | A total of 13 sites wholly or partly within the NCA | 206 | <1 |

Source: Natural England (2011)

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

The NCA has a proportion of its area under international and national nature conservation designations – note that the European sites (Ramsar and SPA) refer to the same site and both are underpinned by a larger SSSI (Northumberland Shore), therefore these areas overlap.

There are 171 local sites in the Tyne and Wear Lowlands covering 1,947 ha, which is 4 per cent of the NCA.

Source: Natural England (2011)

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

1.1.1 Condition of designated sites

| SSSI condition category | Area (ha) | % of SSSI land in category condition |
|-------------------------|-----------|--------------------------------------|
| Unfavourable declining | 0 | 0 |
| Favourable | 74 | 37 |
| Unfavourable no change | 0 | 0 |
| Unfavourable recovering | 128 | 63 |

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 below sea level to a height of 177 m. The highest land occurs in the west of the NCA, on the borders of the neighbouring NCA

(Durham Coalfield Pennine Fringe) and the western escarpment of the Durham Magnesian Limestone Plateau NCA to the east. The average elevation of the landscape is 64 m above sea level

Source: Natural England (2010)

2.2 Landform and process

This NCA is an undulating landform of gently rolling hills incised by the broad river valleys of the Tyne and Wear and their tributaries

The area is underlain by Coal Measures rocks of Upper Carboniferous age, which consist of a succession of shales and sandstones and numerous coal seams, very few of which are naturally exposed.

Permian rocks overlay the Coal Measures and in places (Tynemouth and Whitley Bay) form sea cliffs of soft sandstones and dolomitic limestone.

A mantle of glacial debris, largely boulder clay (till), covers the NCA. During the last glacial period, local temporary lakes were formed in which deposits of fine silts and clay accumulated. Laminated clays of this sort have been extensively worked for brick making (Birtley area).

Post-glacial wind-blown sands occur on the low lying coast south of the River Tyne at South Shields. Developed soils are now predominately heavy clay loams and areas of silty alluvial soils and free draining sands.

Glaciation also altered drainage patterns by blocking the original route of the River Wear northwards, causing it to divert eastwards, cutting a new channel through the adjacent Magnesian Limestone Plateau, to flow into the North Sea at Sunderland.

Source: Tyne & Wear Lowland Countryside Character Area Description

2.3 Bedrock geology

Landscape in this NCA is mainly formed of Coal Measure rocks of the Carboniferous age overlain by Permian rocks and glacial deposits. A breakdown of solid geology as a proportion of total land area (where more than 1 per cent) is as follows: 59 per cent mudstone, siltstone and sandstone (27,177 ha); 40 per cent sandstone (18,562 ha); 1 per cent Dolomite rock (Synonymous with Dolostone) (450 ha).

Source: Natural England (2010)

2.4 Superficial deposits

The main extensive superficial deposits are Diamicton, sedimentary boulder clay or till, deposited from the ice sheets during the last glacial period. Boulder clays cover much of the area especially the lower valley slopes. Watercourses are often incised through the till in small ravines or denes. Valley bottoms have deposits of alluvial sands and gravels.

Source: Tyne & Wear Lowland Countryside Character Area Description

2.5 Designated geological sites

| Designation | Number of sites |
|---|-----------------|
| Geological Site of Special Scientific Interest (SSSI) | 0 |
| Mixed interest SSSI | 7 |

There are no Local Geological Sites within 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>

2.6 Soils and Agricultural Land Classification

There are 6 main soils types in this NCA; slowly permeable seasonally wet slightly acid but base-rich loamy and clayey soils, covering 58 per cent of the NCA; slowly permeable seasonally wet acid loamy and clayey soils (23 per cent); freely draining slightly acid sandy soils (8 per cent); freely draining flood plain soils (4 per cent); freely draining

slightly acid loamy soils (3 per cent); restored soils mostly from quarry and opencast spoil (3 per cent). Just less than half of the land is classified Grade 3 with some small strips of Grade 2 along the Wear Valley, and most of the remainder is urban.

Source: National Soil Resource Institute Soilscape Map

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) | % of NCA |
|----------------------------------|-----------|----------|
| Grade 1 | 0 | 0 |
| Grade 2 | 946 | 2 |
| Grade 3 | 22,483 | 48 |
| Grade 4 | 179 | 0 |
| Grade 5 | 0 | 0 |
| Non-agricultural | 388 | 1 |
| Urban | 22,136 | 48 |

Source: Natural England (2010)

Maps showing locations of Statutory sites can be found at:

<http://magic.defra.gov.uk/website/magic/> – select 'Landscape' (shows ALC classification and 27 types of soils)

3. Key water bodies and catchments

3.1 Major rivers/canals

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

| Name | Length (km) |
|---------------|-------------|
| River Browney | 10 |
| River Derwent | 4 |
| River Tyne | 32 |
| River Wear | 48 |

Source: Natural England (2010)

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

The NCA is split down the middle by a central flood plain of the meandering River Wear and its tributary the River Browney flowing north to east from a south-westerly approach to the NCA. The River Tyne and its tributaries dissect the northerly section of the NCA and is a prominent physical and cultural feature of the landscape as it meets the North Sea at Tynemouth.

3.2 Water quality

The total area of Nitrate Vulnerable Zone is 14,360 ha, or 31 per cent of the NCA.

Source: Natural England (2010)

3.3 Water Framework Directive

Maps are available from the Environment Agency showing current and projected future status of water bodies

http://maps.environment-agency.gov.uk/wiyby/wiybyController?ep=maptopics&lang=_e

4. Trees and woodlands

4.1 Total woodland cover

The NCA contains 4,295 ha of woodland (9 per cent of the total area), of which 964 ha (2 per cent) is ancient woodland. The Great North Community Forest, one of twelve Community Forests established to demonstrate the contribution of environmental improvement to economic and social regeneration, covers 9,194 ha of this NCA, which is 20 per cent of the total area.

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

4.2 Distribution and size of woodland and trees in the landscape

Woodland cover is generally sparse but the valley sides and bluffs are well-wooded, sometimes with ancient oak woods. Parkland and wooded estates surrounding castles and country houses lie along the river corridors. Gently rolling terraces of open arable and mixed farmland with low hedgerows and few trees or woods occupy much of the area.

On land restored from spoil heaps or opencast mining, pastures for sheep grazing are divided by fences or strips of mixed or coniferous plantation; these landscapes lack maturity.

Source: Tyne & Wear Lowland Countryside Character Area Description

4.3 Woodland types

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

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

| Woodland type | Area (ha) | % of NCA |
|---------------|-----------|----------|
| Broadleaved | 3,201 | 7 |
| Coniferous | 445 | 1 |
| Mixed | 255 | 1 |
| Other | 394 | 1 |

Source: Forestry Commission (2011)

Area and proportion of Ancient Woodland and Planted Ancient Woodland within the NCA.

| Woodland type | Area (ha) | % of NCA |
|------------------------------------|-----------|----------|
| Ancient semi-natural woodland | 581 | 1 |
| Ancient re-planted woodland (PAWS) | 382 | 1 |

Source: Natural England (2004)

5. Boundary features and patterns

5.1 Boundary features

Boundary features in this NCA are typically hedgerows, mainly managed to a low height, with few hedgerow trees. Woodland naturally shaped and in blocks also acts as boundaries throughout the NCA. On land restored from spoil heaps or opencast mining, pastures for sheep grazing are divided by fences or strips of mixed or coniferous plantations. The estimated boundary length for the NCA is 1,873 km. The total length of agri-environment (Countryside Stewardship) agreement managed boundaries between the years 1999 and 2003 is equivalent to about 4 per cent of this total. Linear features under these agreements include: hedgerow management 8 km; hedgerow planting and restoration 24 km; restored boundary protection 26 km; and fencing 21 km.

Source: Tyne & Wear Lowland Countryside Character Area description; Countryside Quality Counts (2003)

5.2 Field patterns

Between settlements there are wide stretches of agricultural land with large, regular fields. Small paddocks and pastures for pony grazing, sheds and other miscellaneous land uses typical of urban fringe areas are frequently found close to settlements. Country house estates with managed parkland are a noticeable feature throughout the more rural parts of this NCA

Source: Tyne & Wear Lowland Countryside Character Area description; Countryside Quality Counts (2003)

6. Agriculture

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

6.1 Farm type

The total farmed area is 14,768 hectares, comprised of a total of 216 holdings. The principal type of farming in the NCA is dominated by cereals, 'other' land

use and livestock production. Cereal production represented 33 per cent of all holdings in 2009, a small increase of 2 per cent from year 2000 figures and 'other' land use represented 31 per cent, an increase of 5 per cent since 2000. Livestock farming represents 19 per cent of all 2009 holding figures; a 3 per cent increase from the year 2000. Between 2000 and 2009 there was a small increase in the number of farms from 203 to 216.

Source: Agricultural Census, Defra (2010)

6.2 Farm size

Sixty-two per cent of farms are below 50 ha in size, and these account for 14 per cent of the farmed area. Twenty-one per cent of holdings are over 100 ha in size, accounting for 67 per cent of the farmed area. These figures have remained generally stable since 2000.

Source: Agricultural Census, Defra (2010)

6.3 Farm ownership

2009: Total farm area = 14,768 ha; owned land = 9,488 ha

2000: Total farm area = 14,311 ha; owned land = 8,633 ha.

In 2009 64 per cent of farmland was owner occupied compared to 60 per cent in 2000. There has been a 10 per cent increase in land ownership between 2000 and 2009.

Source: Agricultural Census, Defra (2010);

6.4 Land use

The dominant land use based on 2009 figures throughout the NCA is arable with cereals accounting for 42 per cent (6,194 ha), oilseeds accounting for 9 per cent (1,401 ha) and other arable crops 1 per cent (195 ha) of the farmed area. Grass and uncropped land account for 5,934 ha which is 40 per cent of all the farmed land. There has been no significant change since 2000.

Source: Agricultural Census, Defra (2010)

6.5 Livestock numbers

Since 2000 there has been a decline by 15 per cent in cattle numbers and by 4 per cent in sheep numbers. In 2009 there were 7,200 cattle (8,500 in 2000), 13,800 sheep (14,400 in 2000) and 2,200 pigs (1,200 in 2000). Pig numbers in 2009 have gone from 1,200 to 2,200, an increase of 85 per cent since 2000.

Source: Agricultural Census, Defra (2010)

6.6 Farm labour

Defra's Agricultural Census figures suggest that in 2009 the majority of farms were run by the land holders themselves (278 principal farmers). This represented an increase of 5 per cent from the 2000 year figure. Trends from 2000 to 2009 show an increase in the number of salaried managers (13 per cent increase), and a decrease in full time workers (-4 per cent). The number of part time workers fell considerably from 68 workers in 2000 to 37 workers in 2009, a fall of 45 per cent. Casual/gang workers have also fallen in number by 21 per cent (36 workers in 2000 to 28 in 2009).

Source: Agricultural Census, Defra (2010)

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

7. Key habitats and species

7.1 Habitat distribution/coverage

Key terrestrial habitat types are limited and rare in this NCA primarily due to the historical industrial mining activities and the extensive urban and industrial areas. However, the rural landscape within the NCA contains several well-wooded parklands and estate landscapes with broadleaved or mixed plantations and mature specimen trees. The main rivers valleys and their tributaries are frequently well-wooded with semi-natural oak or oak-birch woodlands. The remaining open rural landscape between settlements is relatively low in woodland cover.

Some river flood plains hold pockets of fen, reedbed and species-rich grasslands.

An important relic of lowland heath survives at Waldridge Fell on one of the few remaining areas of common land.

The restorations of opencast or deep mining sites have historically left substantial areas of land which often lack natural habitats, without natural features and immature. Some areas have been developed into arable or pasture agriculture and others, particularly within urban areas, into country parks for recreational use .

Source: Northumbria Coal Measures 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) | % of NCA |
|--|-----------|----------|
| Broadleaved mixed and yew woodland (broad habitat) | 1,560 | 3 |
| Lowland heathland | 410 | 1 |
| Fens | 117 | <1 |
| Lowland meadows | 33 | <1 |
| Lowland dry acid grassland | 29 | <1 |

| Priority habitat | Area (ha) | % of NCA |
|------------------------------------|-----------|----------|
| Purple moor grass and rush pasture | 24 | <1 |
| Reedbeds | 22 | <1 |
| Mudflats | 9 | <1 |
| Maritime cliff and slope | 8 | <1 |
| Coastal sand dunes | 2 | <1 |
| Lowland calcareous grassland | 1 | <1 |

Source: Natural England (2011)

- Maps showing locations of Priority Habitats are available at: <http://magic.defra.gov.uk/website/magic/> – select ‘Habitat Inventories’

7.3 Key species and assemblages of species

- Maps showing locations of Priority Habitats are available at: <http://magic.defra.gov.uk/website/magic/> – select ‘Habitat Inventories’
- Maps showing locations of S41 species are available at: <http://data.nbn.org.uk/>

8. Settlement and development patterns

8.1 Settlement pattern

Settlements include the spreading conurbation of Tyneside, the planned structures of new towns, notably Washington, and more dispersed large towns and villages further south. The area is dominated by widespread urban and industrial development and a dense network of major road and rail links. Coal mining has resulted in locally-prominent opencast extraction areas, spoil heaps and recently restored sites. There are scattered ‘green’ villages with buildings of local sandstone and roofs of red clay pantile or slate, as well as numerous mining and industrial terraces of Victorian brick and slate, and later estate housing.

Source: Tyne & Wear Lowlands Countryside Character Area description; Countryside Quality Counts (2003)

8.2 Main settlements

The NCA's larger settlements are congregated in a conurbation to the north of the NCA, focused around the River Tyne including; Newcastle-upon-Tyne, Gateshead, South Shields and Blaydon. Outside of these conurbations are; Washington (New Town), Chester-le-Street, Penshaw, Durham, Framwellgate, Brandon and Spennymoor. The total estimated population for this NCA (derived from ONS 2001 census data) is: 902,026.

Source: Tyne & Wear Lowlands Countryside Character Area description; Countryside Quality Counts (2003)

8.3 Local vernacular and building materials

Building styles and materials vary across the NCA dependant on the availability of local stone type, both available within the NCA and from neighbouring NCAs. Prominent building stones are hard grits and shales, Magnesian limestone and various coloured sandstones.

Source: Tyne & Wear Lowlands Countryside Character Area description; Countryside Quality Counts (2003)

9. Key historic sites and features

9.1 Origin of historic features

The long history of settlement here began with bronze-age clearances and became highly structured in the Roman period, although there are few obvious traces in the landscape.

Medieval settlement included scattered planned villages, some centred on greens, developed within the Palatinate of Durham, which provide the origins of much of the present settlement patterns. Regular rows of facing house plots, tofts or garths are common.

The ecclesiastical monuments of Monkwearmouth, Jarrow and Durham remind of the power and influence of the church during the medieval period. The ecclesiastical rule of Durham provided a conservative influence on settlement

change, limiting the early engrossment of farm holdings here.

The development of the coal industry from its Roman and medieval origins transformed the settled landscape after the 16th century and particularly during the 19th century as new pithead villages were established, large scale industrial infrastructure developed and the urban centres expanded.

Most of the building stock dates from the mid 18th century, sandstone being the traditional building material, with numerous mining and industrial terraces of brick and slate from later Victorian times.

Industrial prosperity is reflected in the large number of 18th and 19th century country houses, set within parkland in the vicinity of major settlements.

Newcastle-upon-Tyne, located on the site of Pons Aelli, the eastern terminal of Hadrian's Wall, expanded from within its town walls in the 19th century and together with Gateshead developed as a major trading, engineering and shipbuilding centre for the region.

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

9.2 Designated historic assets

This NCA has the following historic designations:

- 15 Registered Parks and Gardens covering 1,247 ha (3 per cent of NCA)
- 2 Registered Battlefields covering 381 ha
- 82 Scheduled Monuments
- 1,975 Listed Buildings

The NCA includes 3 World Heritage Sites:

- Hadrian's Wall Buffer Zone 610 ha (1 per cent of the NCA)
- Hadrian's Wall 46 ha (<1 per cent of the NCA)
- Durham Castle and Cathedral 9 ha (<1 per cent of the NCA)

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

- Four per cent of the NCA 1,803 ha is classified as being publically accessible.
- There are 655 km of public rights of way at a density of 1.4 km per km².
- There is 1 National Trail (Hadrian's Wall) which extends approximately 25 km within the NCA.

Sources: Natural England (2010)

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

| Access designation | Area (ha) | % of NCA |
|--|-----------|----------|
| National Trust (Accessible all year) | 24 | 1 |
| Common Land | 518 | 11 |
| Country Parks | 464 | 10 |
| CROW Access Land (Section 4 and 16) | 563 | 12 |
| CROW Section 15 | 491 | 10 |
| Village Greens | 65 | 1 |
| Doorstep Greens | 6 | <1 |
| Forestry Commission Walkers Welcome Grants | 198 | 4 |
| Local Nature Reserves (LNR) | 355 | 8 |
| Millennium Greens | 6 | <1 |
| Accessible National Nature Reserves (NNR) | 0 | 0 |
| Agri-environment Scheme Access | 9 | <1 |
| Woods for People | 585 | 12 |

Sources: Natural England (2011)

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

11. Experiential qualities

11.1 Tranquillity

Based on the CPRE map of tranquillity (2006) the majority of this NCA is described as having a low tranquillity threshold. The extent of threshold covering urban areas along the Tyne corridor from the sea to the eastern NCA boundary is among the densest coverage in the north of England.

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

| Tranquillity | Tranquillity Score |
|--------------------------|--------------------|
| Highest value within NCA | 149 |
| Lowest value within NCA | -141 |
| Mean value within NCA | 8 |

Sources: CPRE (2006)

More information is available at the following address:

<http://www.cpre.org.uk/what-we-do/countryside/tranquil-places/in-depth/item/1688-how-we-mapped-tranquillity>

11.2 Intrusion

The 2007 Intrusion Map (CPRE) shows the extent to which rural landscapes are 'intruded on' from urban development, noise (primarily traffic noise), and other sources of visual and auditory intrusion. This shows there are high levels of intrusion throughout the NCA. It is noted that since the 1960s there has been a significant expansion of disturbed areas both along the A1 corridor and around the Newcastle-upon-Tyne conurbation. In 1960, approximately 1,995 ha were classified as undisturbed, compared to 244 ha in 2007. Two small pockets of undisturbed areas can be found to the north-east and west of Spennymoor, allied to land adjacent to the River Wear. A breakdown of intrusion values for this NCA is detailed in the table over.

| Intrusion category | 1960s (%) | 1990s (%) | 2007 (%) | Percentage change (1960s-2007) |
|--------------------|-----------|-----------|----------|--------------------------------|
| Disturbed | 57 | 57 | 56 | -1 |
| Undisturbed | 4 | 3 | 1 | -3 |
| Urban | 39 | 41 | 44 | 5 |

Sources: CPRE (2007)

Notable trends from the 1960s to 2007 are that levels of disturbed areas have decreased marginally by 1 per cent. Undisturbed land has also decreased by 3 per cent allied to a 5 per cent increase in urban areas.

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)
- 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

- Data from Countryside Quality Counts for the period 1999 to 2003 shows a reduction in the uptake of Woodland Grant Scheme agreements for management of established woodlands. However, there may be scope for new urban fringe planting (to extend and reinforce woodland patterns), that could be taken up through the introduction of new Community Forest schemes.
- Woodland Grant Scheme agreements on ancient woodland sites have fallen since 1999 from 18 per cent to 13 per cent in 2003. Some of these sites are in poor condition having been modified by the planting of exotics, felled or replanted with conifers.
- Some parkland landscapes survive only as relics; others are in decline through lack of positive management or have been developed as golf courses. Lack of management of broadleaved woodland and parkland trees has resulted in over mature stock without young trees to replace them and could be addressed through agri-environment schemes.

Boundary features

- Data from Countryside Quality Counts for the period 1999 to 2003 shows that Countryside Stewardship agreements covered fencing, hedge management, hedge planting and restoration and restored boundary protection totalling 78 km (4 per cent of the estimated boundary length of the NCA).

- Data from Natural England (March 2011), shows that there has been a large increase from 4 per cent to 19.5 per cent of the estimated boundary length of the NCA being managed under Environmental Stewardship agreements. These cover ditches, hedgerows, stone walls, stone-faced hedgerows and woodland protection.

Agriculture

- Increased arable cropping in previously pastoral areas has led to loss of old pasture, meadows, hedgerows, hedgerow trees, ridge and furrow and other archaeological features.
- Hedgerow decline and some grassland loss continue as agricultural land is lost to other uses.
- Urban edge farming is generally influenced by increasing numbers of horse and pony infrastructure such as post-and-wire fences and stables. There are some concerns with the impacts of anti-social behaviour such vandalism of hedges, fences and gates leading to the abandonment of livestock grazing in the smaller urban edge fields.

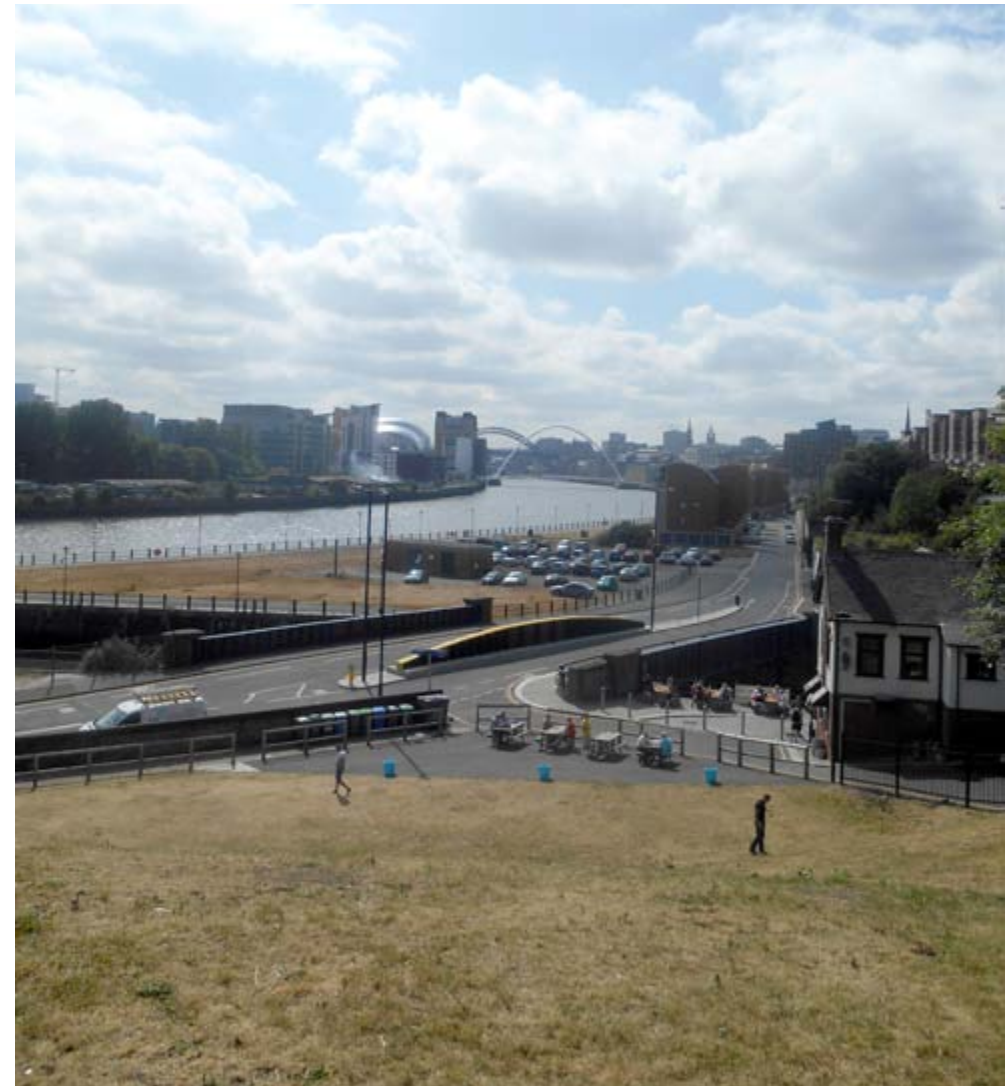
Settlement and development

- Pressure for new development has extended the urban fringe into open countryside, with light industry, retail and housing development often poorly integrated into the surrounding landscape.

- The decline of the deep coal mining industry left locally-prominent pitheads and spoil heaps, most of which have been restored over recent years. These, along with recently restored, open cast mining sites left a legacy of immature and somewhat featureless landscapes.
- There is ongoing business park development on some post-industrial sites such as Baltic Quays, Newburn Riverside, Gateshead City Centre and Ouseburn, in the urban conurbation of Newcastle and Gateshead, there is pressure for development for housing on the greenbelt, and for business and regeneration in the city centre, particularly along the River Tyne.
- A new road is proposed connecting the A1 north of city centre via the airport with the A 69, to join the western bypass.
- Manufacturing and out of town retailing occurs in and along the urban conurbations and in Newcastle and Gateshead, former shipping premises have been replaced with office developments. Regeneration of the quaysides has created a cosmopolitan public space for local people and visitors with iconic buildings such as the BALTIC Centre for Contemporary Art and The Sage Gateshead music centre. The Gateshead Millennium Bridge provides links to the older Newcastle Quayside.

Semi-natural habitat

- Most loss of semi-natural habitats will have occurred during the 19th and early 20th centuries mainly due to large-scale industrialisation, however fringe pockets of some semi natural habitats may be becoming neglected through abandonment due to high maintenance costs.



The quayside in Newcastle has been regenerated utilising derelict buildings from its industrial past.

- Loss of semi-natural habitat continues to occur due to new developments.
- Some semi-natural habitats have increased, mainly; the Tyne mudflats due to decreased dredging, new wetlands where there is mining subsidence and sand dunes due to marram grass planting.
- Derelict brownfield sites are becoming increasingly valuable habitats for invertebrates including the dingy skipper butterfly, but these could be lost as re-developments occur in the future.
- Recent data (2011) shows that part of the River Wear has diffuse pollution issues due to agriculture.
- The ecological status of estuarine and coastal waters was moderate but with some pollutants.
- Over recent years, the quality of the River Tyne has improved and it is now home to kingfishers and otters as well as being a migratory route for salmon.

Historic features

- In 1918 about 4 per cent of the NCA was historic parkland. By 1995 it was estimated that 62 per cent had been lost. In 2003, according to Countryside Quality Counts data, approximately 55 per cent of the remaining parkland was covered by a Historic Parkland Grant and 10 per cent was included in agri-environmental schemes. Approximately 54 per cent of historic farm buildings remained unconverted and 86 per cent were structurally intact.

Coast and rivers

- Biological water quality in 1995 was predominantly excellent and maintained, and the ecological status of rivers was generally moderate, with some tributaries good or poor. The Tyne and Wear estuaries into which they drain were moderate. However, since the Water Framework Directive was established in 2003, data⁵ shows the ecological status of the rivers as good but chemical status of the River Tyne as failing to achieve good status, while the River Wear did not require assessment. The chemical status of groundwater for all rivers was poor (although there are no major aquifers and the NCA does not contain any priority catchments designated under the ECSFD⁶).

Minerals

- During the last 15–20 years, numerous small quarries have been restored, particularly around Gateshead and larger reclamation schemes at Ryton Woodside OCCS, Ravensworth Grange OCCS, Birtley Claypit, Wardley Claypit and St Bede's Landfill site, Birtley.
- Landfilling, with reclamation to agriculture, amenity and wildlife conservation has been a notable feature in the landscape over the past few decades; especially around Gateshead.
- Quarrying, mining and landfilling schemes continue to play a role in shaping the settlement pattern, landscape and land use and this is likely to continue into the future.

⁵ *Northumbria River Basin Management Plan*, Environment Agency (December 2009; URL: www.environment-agency.gov.uk/research/planning/33106.aspx)

⁶ England Catchment Sensitive Farming Delivery Initiative

Drivers of change

Climate change

- The anticipated gradual rise in sea level is likely to have implications for important coastal wildlife and habitats, particularly those vulnerable to 'coastal squeeze' (where they are trapped between an advancing sea and 'fixed' land defences) such as salt marsh and erosion of sand dunes.
- Sea level rise and storm surge events may accelerate the rate of erosion and increased risk of sea inundation, including loss of salt marsh and sand dunes due to coastal squeeze and cliff erosion causing loss of geological features and roosting habitats.
- Where major settlements are at risk from tidal flooding, heavier engineering solutions might be required which may impact on natural coastal processes changing erosion patterns elsewhere on the coast.
- Temperate rise and warmer waters may affect the marine environment including species of fish, cetaceans and birds.
- Changes in rainfall patterns, in particular more frequent and more intense storm events, may cause increased run-off leading to surface and fluvial flooding and increasing the risk of downstream flooding events to urban populations, along with groundwater contamination from former mining operations and diffuse pollution.
- Warmer, drier summers may result in changes in agricultural practices as more cereals and other crops may be grown and areas of permanent grassland may decrease.

- Wetland sites in the NCA may be vulnerable to drought which may lead to increase incidents of algae bloom and in the long term the drying up of such features and subsequent loss of these habitats and landscape features.
- Warmer, drier summers and warmer, wetter winters may provide better conditions for growing biomass crops which are also sources of renewable energy. However, if grown on a large scale, demands on soil and water resources are likely to increase.

Other key drivers

- Industrial pollution of the rivers has reduced in recent years, although some remain polluted. The potential for further pollution from mine water, should the pumping of the deep mines cease, remains a potential threat.
- Improvements in upland land management practices in the North Pennines NCA may help to reduce run-off and this area is also a priority for woodland planting for reducing downstream flood risk.⁷
- There has been a significant expansion of urban fringe areas around major settlements, such as Houghton-le-Spring, and Washington. The retention of the rural character of the countryside between settlements is important, and consideration should be given to the improvement of the urban fringe environment and the creation of new, accessible quality green spaces, particularly in urban areas.
- There are continued pressures for light industry, retail and housing in and around major settlements including motorway junctions, but opportunities to preserve the greenbelt and accessibility to green spaces in these areas should be sought.

⁷ *Yorkshire & North East England Water for Woodland Project, Phase 1: Opportunity Mapping Final Report*, Samantha Broadmeadow and Tom Nisbet, Forest Research (March 2013)

- Some restored mineral extraction sites should integrate better into the surrounding landscape to combine a range of land uses; forestry, amenity, recreation and nature conservation. Pressure for mineral restoration can compromise the survival of many aspects of the industrial archaeology of the area.
- Securing and enhancing more green infrastructure including the urban fringe and good networks in and out of urban areas, will provide opportunities to deliver health benefits by improving accessibility to a high quality natural environment and more options for the popular Walking for Health schemes that operate throughout the NCA.
- Challenges to delivering the North Tyneside SMP include maintaining largely Victorian era defences along North Tyneside and managing the transition between defended and undefended sections of coast.
- In South Tyneside, with increasing pressure on defences, there is the potential threat of low water moving landward causing steepening of beaches, increased pressure on defences and loss of amenity. The Shoreline Management Plan recommends the need to build greater width into defence systems to account for this. There is an opportunity in all areas for coastal defence policy to be integrated better into regeneration plans by good co-ordination between planning authorities and managers of coastal defence.



Anthony Gormley's iconic sculpture, Angel of the North can be seen far and wide on the approach into Tyneside.

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 Tyne Bridge where kittiwakes have found a nesting place.

| 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: Reverse the fragmentation of semi-natural habitats due to the industrial and urban expansion of Tyneside by extending, creating and linking habitats in rural areas, developing or regenerating urban green spaces/urban fringe and protecting brownfield sites with high biodiversity interest. | ↗* | ↑** | ↔* | ○* | ↗** | ↗* | ↑*** | ↑*** | ↑*** | ↑*** | ↑*** | ↑*** | ↔** | ↗** | ↗** | ↗** | ↑*** | ↑*** | ↔** |
| SEO 2: Enhance and manage the Tyne and Wear river network and Tyneside coastal area to improve water quality and reduce flood risk, and to mitigate the effects of climate change. | ↑*** | ↑*** | ↑*** | ○* | ↗** | ↑** | ↑*** | ↑** | ↑*** | ↑*** | ↗** | ↗** | ↗** | ↗** | ↔*** | ↗** | ↗** | ↑*** | ↗** |
| SEO 3: Conserve and enhance the network of green infrastructure – broadleaved woodlands characteristic of the Tyne and Wear river valleys, country estates in and around urban settlements and restored coal mining sites – to increase biodiversity, improve water and soil quality, provide tranquillity and recreation and enhance landscape character. | ↔** | ↑*** | ↗*** | ○* | ↗*** | ↑*** | ↑** | ↑** | ↔** | ↗*** | ↗*** | ↗** | ↔*** | ↗***↑ | ↗*** | ↑*** | ↑*** | ↑*** | ↔*** |
| SEO 4: Use an understanding of the unique historic landscape and heritage features of the Tyne and Wear Lowlands NCA to provide opportunities for interpretation, education, wellbeing, recreation and tourism, and to inform good design in new development that respects the setting of heritage assets. | ↔*** | ↔*** | ↔*** | ○* | ↔*** | ↔*** | ↔*** | ↔*** | ↔*** | ↔*** | ↔*** | ↔*** | ↗*** | ↑*** | ↑*** | ↗** | ↑*** | ↗** | ↗** |

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

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

Landscape attributes

| Landscape attribute | Justification for selection |
|--|---|
| <p>Major rivers and their tributaries flowing through valleys with semi-natural woodlands on valley slopes dominated by ash, oak and along the riverside, alder and willows.</p> | <ul style="list-style-type: none"> ■ Undulating land and broad river valleys incised by rivers Tyne and Wear and their tributaries. ■ Well-wooded river valleys contribute strongly to landscape character and locally characteristic tree species contribute to biodiversity. ■ Key geological feature and sense of place created by River Wear in incised meander gorge in County Durham. |
| <p>A landscape of change as open cast extraction/deep mining areas, spoil heaps and derelict brownfield sites are restored for a range of uses. Urban fringe pasture land with pony and cattle grazing and wide stretches of large, regular, arable fields in rural areas.</p> | <ul style="list-style-type: none"> ■ Former coal mining open cast extraction areas and spoil heaps are pasture land divided by fences or strips of mixed or coniferous plantations, Local Wildlife Sites and country parks. ■ Some derelict brownfield sites are of high biodiversity value. ■ Subsided, underground mine-workings form areas of open water forming valuable wetlands. ■ Urban fringe used for small paddocks and pastures for pony grazing, sheds and other miscellaneous uses. ■ Main soils are loamy and clayey with low erosion risk, but susceptible to compaction and capping in wet conditions. ■ Mostly grade 3 agricultural land in rural areas and around urban settlements. In 2009 arable and horticultural land accounted for 56 per cent of the farmed area, while livestock was 19 per cent (mainly pigs, sheep and cattle). |

| Landscape attribute | Justification for selection |
|--|--|
| <p>Fragmented areas of semi-natural habitats, mainly due to extensive industrialisation and urbanisation.</p> | <ul style="list-style-type: none"> ■ Waldrige Fell SSSI lowland heathland habitats and largest and most diverse in north-east England. Sparse woodland cover but river valleys of broadleaved, semi-natural oak or oak-birch woodlands and wooded parklands and estates. Limited extent of species-rich neutral grassland, often managed as pasture for cattle or horses with minimal fertiliser inputs. ■ Tyne estuary located largely within an urban environment supports riverside habitats and recreation for local communities. ■ The rivers Tyne and Wear are important landscape features and wildlife corridors for wading birds, otters and key migration route for salmon. ■ Coastline is part of several designated areas (Northumbria Heritage Coast, Ramsar, SPA, Northumberland Shore SSSI and Tynemouth to Seaton Sluice SSSI). Comprises intertidal mudflats, sand dunes and hard, rocky foreshore. ■ Coastal area supports wide range of birds (little tern, purple sandpiper, ringed and golden plover). ■ Scope for creating green space and linking habitats in and around urban settlements on reclaimed sites, in between agricultural areas and by developing Community Forest schemes. ■ Derelict brownfield sites of high biodiversity value should be protected from development. ■ Continued pressure to build on greenbelt areas in and around urban areas but potential to preserve it and create accessible green spaces for health, wellbeing, wildlife and recreation and support good, sustainable developments that incorporate natural greenspace into the design. |
| <p>Small, varied and heavily modified coastal area from sandy beach and sea cliffs of Tynemouth to estuarine environment characterised by quay walls and intertidal mud flats.</p> | <ul style="list-style-type: none"> ■ Coastline of sand and rocky foreshore habitats and maritime cliffs. Part of several designated conservation areas (Northumbria Heritage Coast, Ramsar, SPA, Northumberland Shore SSSI and Tynemouth to Seaton Sluice SSSI). ■ Tynemouth estuary is long and narrow with heavily defended steep sides along the frontage. ■ Commercial Tyneside port with fishing industry, sea ferry terminal and some mineral and waste disposal requiring access to water-borne transport. ■ Tyne estuary between Fish Quay and Newburn supports regionally important numbers of wintering waterbirds and in summer, breeding shelduck. ■ Seaside tourism associated with Tynemouth, Cullercoats, Whitley Bay and Longsands. |

| Landscape attribute | Justification for selection |
|---|--|
| <p>Extensive evidence of heritage and settlement from Roman occupation to medieval ecclesiastical rule and the industrial revolution (coal, steel, heavy engineering, glass, rope, chemical manufacturing and ship building on the Tyne).</p> | <ul style="list-style-type: none"> ■ Roman settlement of Newcastle of strategic importance as crossing point of the Tyne by the main north-south route (including Hadrian's Wall World Heritage Site). ■ Monastic communities at Jarrow and Durham including Norman Castle and Cathedral. Ecclesiastical rule within Palatinate of Durham preserved settlement patterns and has World Heritage Site status. ■ Coalfield exploitation from Roman times to the 20th century and recent industrial decline with reclaimed spoil heaps and artefacts of mining; wagonways, tramways and coke ovens. ■ 18th-century sandstone buildings with numerous Victorian mining and industrial terraces of brick and slate. ■ Industrial prosperity reflected in large number of 18th- and 19th-century country houses, set within parkland in the vicinity of major settlements. ■ Historic riverside cities of Newcastle upon Tyne and Durham, strategically located at bridging points of the rivers Tyne and Wear. ■ Tyneside port/coastal area with Grade II listed buildings reflecting rich heritage (Fish Quay; North Pier and Lighthouse, Prior's Haven, Tynemouth Priory and the Grand Hotel, Tynemouth) and 19th/20th-century coastal defences. ■ Geological heritage with industrial links includes Tynemouth to Seaton Sluice SSSI along the coast and disused quarries inland. ■ Visible evidence of recent geological history through glacial tills along the coast and inland, the incised meander and gorges of the River Wear as well as the Denes. |
| <p>Nationally important cultural tourist attractions in Newcastle upon Tyne and Durham, mining heritage and access to green spaces in urban areas through country parks and connecting networks of footpaths and cycle routes.</p> | <ul style="list-style-type: none"> ■ Four per cent of the NCA is publically accessible, Hadrian's Wall Path National Trail covers 24 km, Newcastle to Whitley Bay national cycle route covers 23 km, and there are 15 registered parks and gardens. ■ Nationally important World Heritage Sites; the centre of Newcastle upon Tyne and Durham with its Norman Castle and Cathedral. ■ Accessible green spaces; riverside walks, wetlands/woodlands from former industrial sites and wildlife-rich brownfield sites, links to footpaths and cycle routes from old railway and wagonways. ■ Extensive historical and cultural connections to medieval history and the Industrial Revolution. |

Landscape opportunities

- Plan for and create green infrastructure in urban areas to improve quality of life, contact with nature and increased access and recreation for large urban populations while making a positive contribution to local character.
- Protect rural areas and biodiversity-rich brownfield sites from development between urban settlements.
- Conserve the woodlands on steep-sided river valleys, a locally characteristic feature, to strengthen biodiversity and landscape character. Create new and maintain existing woodlands along valley slopes, on country estates and parklands.
- Plan the location and composition of new woodlands (including native species) to enhance biodiversity and existing woodland character and ensure semi-natural woodland habitats are linked to hedgerows and species-rich grassland, while providing recreation and tranquillity.
- Enhance ex-industrial or derelict land by creating native, broadleaved woodland or semi natural grassland on former spoil heaps and wetlands and where possible, link habitats ensuring design, scale, location and tree species fit with the surrounding landscape.
- Manage, enhance and restore semi natural habitats in rural areas such as grasslands, hedgerows and hedgerow trees to increase the network of semi-natural habitats.
- Plan for integrated, coastal management allowing natural, coastal processes to occur where feasible to protect the impact of further hard sea defences on coastal and estuarine habitats and the geology of the rocky headlands and sea cliffs.
- Ensure new developments close to undisturbed areas and greenspace are sensitively designed with minimal light spill.
- Plan interpretation along key locations on the rivers Tyne and Wear and along the coast for its geodiversity, wildlife and heritage value.
- Promote the history and culture associated with the mining heritage and sites of interest for local communities and visitors.

Ecosystem service analysis

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

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

| Service | Assets/ attributes: main contributors to service | State | Main beneficiary | Analysis | Opportunities | Principal services offered by opportunities |
|-----------------------|---|---|------------------|--|--|---|
| Food provision | Fertile soils Water availability Offshore sea bed | <p>The NCA is predominantly urban with totalled farmed area covering 32 per cent of the NCA. Forty eight percent of agricultural land is Grade 3, mainly located south in rural areas and around urban settlements. Small extent of grade 2 land occurs along the flood plain of the River Wear.</p> <p>In 2009 arable and horticultural land accounted for 56 per cent of the farmed area, while livestock was 19 per cent.</p> <p>In Tyneside, fishing remains a commercial activity, main species being; cod, haddock, whiting, plaice, lemon sole and monkfish. North Shields is the biggest prawn port in England.</p> | Regional | <p>Largely urban, the NCA has mixed land use with limited scope for increasing food production.</p> <p>Improved soil quality and structure will assist agricultural productivity, improved water quality, reduced soil erosion and improved resilience to the predicted effects of climate change such as droughts and heavy rainfall will help maintain outputs and bring environmental benefit.</p> <p>Fishing remains one of the main commercial activities in Tynemouth with North Shields being a main fishing port. The North Sea remains an important fishing ground providing spawning, nursery and feeding areas for many species of fish.</p> <p>Overfishing is limiting the size of the fish stocks of the North Sea and efforts are being made to reduce the numbers of juvenile fish caught and limit the by catch. Spawning and nursery areas are vulnerable to activities such as sewage sludge dumping and dredging.</p> | <p>Encourage good agricultural management of land for food production and grazing to ensure its long term viability.</p> <p>Encourage take-up of agri-environment schemes in order to protect soils and improve water quality bringing long term benefits to food production.</p> <p>Promote sustainable fishing practices to protect the inshore fishery and commercial fish stocks within the marine environment.</p> <p>Address water quality and protect estuarine habitats to ensure continued populations of fish and crustaceans.</p> <p>Encourage fishermen to avoid incidental damage from fishing, for example, by-catches or disturbance to sensitive benthic habitats.</p> | <p>Food provision</p> <p>Water availability</p> <p>Biodiversity</p> <p>Climate regulation</p> <p>Regulating soil erosion</p> <p>Regulating soil quality</p> |

| Service | Assets/ attributes: main contributors to service | State | Main beneficiary | Analysis | Opportunities | Principal services offered by opportunities |
|-------------------------|---|---|------------------|--|--|--|
| Timber provision | <p>Semi-natural broadleaved woodland and small conifer plantations</p> <p>Estates and parklands</p> | <p>Small conifer plantations, semi-natural woodlands such as ash and oak occur on the valley slopes, particularly in County Durham along the rivers Wear and Derwent.</p> <p>Country estates and parklands located throughout rural areas often contain mixed woodland and parkland trees.</p> <p>Approximately 40 per cent of woodland cover is on ancient woodland sites.</p> <p>Forestry Commission data from 2012 shows that 19 per cent of existing woodland is found on statutory sensitive sites with other woodland in urban areas and on agricultural land.</p> <p>Lack of management of broadleaved woodland and parkland trees has resulted in over mature stock. without young trees to replace them.</p> | Local | <p>There is potential for increasing timber production as recent data (2012) shows that there is capacity to increase woodland cover on statutory sensitive sites, agricultural land and in urban areas for biodiversity, recreation and contribution to landscape character. This is particularly relevant in and around urban areas. There should also be opportunities to supply timber/ woodfuel.</p> <p>Mixed, broadleaved woodland should be maintained by replacing stock with young trees.</p> | <p>Seek opportunities to create new woodlands for recreation, biodiversity and timber, east of the River Derwent by promoting greater involvement of local communities in the management, planting and care of woodlands and trees in their neighbourhoods by encouraging new community forest schemes.</p> <p>Ensure new timber provision/ woodland planting considers location, native species, and composition to enhance biodiversity and woodland character and encourage planting that extends/ improves links between, isolated woods and restores hedgerows and species-rich grasslands.</p> <p>Plant new woodlands on former industrial/derelict land providing it is not of existing biodiversity value, particularly in urban settlements, ensuring design and tree species fit with the surrounding landscape and allowing capacity for timber provision.</p> <p>Through agri-environment schemes, manage broadleaved woodland and parkland trees to ensure young trees replace over mature stock including protecting woodlands from browsing by livestock or wild animals.</p> | <p>Timber provision</p> <p>Pollination</p> <p>Regulating water flow</p> <p>Regulating water quality</p> <p>Climate regulation</p> <p>Regulating soil erosion</p> <p>Biodiversity</p> <p>Sense of place / inspiration</p> <p>Recreation</p> <p>Tranquillity</p> |

| Service | Assets/ attributes: main contributors to service | State | Main beneficiary | Analysis | Opportunities | Principal services offered by opportunities |
|---------------------------|--|---|------------------|--|--|--|
| Water availability | Rivers Tyne, Wear, Derwent and Browney Rainfall | The NCA does not overlay major aquifers. Where assessed, surface water resources have 'water available' status. The upper third of the NCA lies within the Tyne CAMS ⁸ area containing the lower part of the River Tyne and its confluence with the River Derwent. The remainder of the NCA lies in the Wear CAMS area and contains part of the River Wear and the confluence with the River Browney. In urban areas, gardens and industrial/ office buildings can be modified to improve water availability, particularly from heavy rainfall. | Regional | There is a high demand for potable water in this area for domestic and industrial use making this NCA a net importer of water. High rainfall and impervious rocks of the adjacent Borders Moors and Forests and the North Pennines NCAs are exploited through construction of major reservoirs including Kielder Water and Derwent Reservoir in adjoining, upland NCAs. The water supply is maintained by a transfer system that moves water down from these reservoirs into the Tyne and the Wear Lowlands. Interception, infiltration and harvesting of water should be encouraged in urban areas by incorporating rain gardens, rain harvesting, swales and green roofs into new and existing developments which also provide wildlife habitats. | Work with the Environment Agency to ensure water levels are maintained through water transfer networks. Support sustainable urban developments which include rain harvesting, swales and green roofs. | Water availability Regulating water flow Regulating water quality |
| Genetic diversity | N/A | N/A | N/A | N/A | N/A | N/A |
| Biomass energy | Existing woodland | Woodland covers 9 per cent of the NCA; well-wooded areas are on steep valley sides, estate trees and plantations/mixed woodland on restored spoil heaps. | Local | There is moderate potential for biomass through managing existing/ unmanaged woodlands and on land restored from current and future open cast mining, to create by-products where commercial timber is produced. Soils in southern and western areas are likely to produce high yields for short rotation coppice with medium or low potential elsewhere. The potential miscanthus yield is medium, but high in a few areas along the Tyne estuary. For information on the potential landscape impacts of biomass plantings within the NCA. ⁹ | Ensure appropriate woodlands are managed to produce surplus timber as wood fuel and explore opportunities to increase miscanthus and short rotation coppice in suitable areas to service demand from high urban populations. | Biomass energy Timber provision Climate regulation |

⁸ Catchment Abstraction Management Strategy

⁹ Refer to the tables on the Natural England website at: www.naturalengland.org.uk/ourwork/farming/funding/ecs/sitings/areas/default.aspx

| Service | Assets/ attributes: main contributors to service | State | Main beneficiary | Analysis | Opportunities | Principal services offered by opportunities |
|---------------------------|--|--|------------------|---|--|--|
| Climate regulation | Woodland Lowland heathland Semi-natural grassland Intertidal habitats Marine environment | <p>Main soil types have medium or low carbon content with small areas of high carbon soils associated with the limited heathland and wetland habitats in the NCA.</p> <p>Arable farming is likely to involve high input fertilisers which release greenhouse gases and intensive livestock production produces greenhouse gases through release of methane and damage to soil structure (compaction) caused by poaching.</p> <p>Woodland stores carbon and covers 4,295 ha or 9 per cent of the NCA.</p> <p>In built-up urban areas which are dominant in this NCA, man-made surfaces absorb heat, becoming hotter than the surrounding area and creating heat islands, although urban street trees and green spaces help reduce the impact.</p> <p>Predicted sea level rise may exacerbate coastal erosion and more frequent flooding may impact on rivers.</p> | Regional | <p>Improving/maintaining soil quality and structure increases carbon soil content which is more resilient to droughts and heavy rainfall.</p> <p>Good farming practices and sustainable land management interventions can help reduce the release of greenhouse gases.</p> <p>There is potential to increase woodland in appropriate areas in the NCA (see timber provision).</p> <p>Introducing new green spaces in and around settlements will help reduce urban heat islands.</p> <p>As sea level rises, new defences may be required to protect large settlements and infrastructure but this could cause coastal squeeze impacting on intertidal habitats and loss of geological features.</p> <p>In flood plain areas, increased flooding may lead indirectly to more flood defences which may impact on natural river processes/riverine habitats.</p> | <p>Increase organic matter and improve soil structure by establishing areas of permanent or semi-natural grassland without cultivation to allow build up of soil carbon.</p> <p>Employ minimum tillage, plant green manure /cover crops and apply low intensity grazing regimes to reduce release of methane and reduce poaching.</p> <p>Increase the extent and actively manage, existing woodland by encouraging a diverse structure and native tree species. Instigate coppicing where appropriate.</p> <p>Explore opportunities to deliver plans for afforestation by developing community forest schemes.</p> <p>Continued over...</p> | <p>Climate regulation</p> <p>Timber provision</p> <p>Biodiversity</p> <p>Regulating water flow</p> <p>Regulating soil quality</p> <p>Regulating soil erosion</p> <p>Pollination</p> <p>Sense of place / inspiration</p> <p>Recreation</p> |

| Service | Assets/ attributes: main contributors to service | State | Main beneficiary | Analysis | Opportunities | Principal services offered by opportunities |
|------------------------------|--|-------|------------------|----------|--|---|
| Climate regulation continued | | | | | <p>...continued from previous.</p> <p>Seek opportunities to sustain and increase urban greenspace, including green roofs and street trees, in town centres and high density residential areas. Explore opportunities outlined in the shoreline management plans to manage the transition between defended and undefended sections of coast while protecting property and infrastructure against erosion and sea flooding. Allow natural development of undefended sections of frontage where possible.</p> <p>Create multi-functional flood storage areas and restore water meadows on lowland flood plains, on rivers such as the Derwent and Team, to reduce flood risk and enhance biodiversity and landscape.</p> | |

| Service | Assets/ attributes: main contributors to service | State | Main beneficiary | Analysis | Opportunities | Principal services offered by opportunities |
|---------------------------------|---|--|------------------|---|--|--|
| Regulating water quality | <p>Rivers Tyne, Wear, Derwent, Browney</p> <p>Woodlands</p> <p>Soils</p> <p>Semi-natural grasslands</p> | <p>The Water Framework Directive (2003) data shows the ecological status of the rivers as good but chemical status of the River Tyne as failing to achieve good status, while the River Wear did not require assessment. The chemical status of groundwater for all rivers was poor and ecological status of estuarine and coastal waters was moderate but with some pollutants.</p> <p>Recently (2009), there is growing evidence that diffuse water pollution from agriculture is affecting parts of the River Wear and its tributary.</p> <p>There are no major aquifers.¹⁰</p> <p>Soil and water contamination has occurred from former coal mining operations and from lead and copper mining in the North Pennines affecting the River Tyne downstream.</p> <p>Rapid run-off in the North Pennines NCA due to high rainfall, increases sediment load affecting the water quality and ecology of downstream rivers in the Tyne and Wear Lowlands.</p> <p>Land management activities such as over-grazed permanent pasture and high input fertilisers on arable land can cause surface run-off (diffuse pollution of water bodies).</p> | Regional | <p>The chemical status of water bodies is affected by disused mines but improved treatment facilities are leading to improvements. Migratory fish, including salmon, trout and lampreys, now pass up the rivers to spawn.</p> <p>Integrated management of watercourses and river corridors to restore riparian vegetation and increasing woodland cover on slopes and valley sides will help reduce sediment /nutrient run-off and improve biodiversity and landscape character.</p> <p>Sustainable moorland management upstream in the North Pennines and the Borders, Moors and Forests NCAs, will improve the quality of the water that enters this NCA.</p> <p>With much of the NCA classified as urban, water quality is also affected by run-off from urban areas and urban drainage systems.</p> | <p>Reduce the impact of poor water quality by pumping out polluted water.</p> <p>Restore and maintain permanent grassland, scrub, woodland, wetland habitats along watercourses to reduce sediment/ nutrient run-off. Increase planting of broadleaved woodland on valley slopes to improve infiltration of water, reducing soil erosion and leaching of pollutants into surface and ground waters.</p> <p>Encourage practice of sustainable land management interventions (as outlined under climate regulation).</p> <p>Promote sustainable moorland management in the adjacent upland NCAs such as grip blocking to preserve peat and reduce downstream flooding and encourage woodland planting on valley slopes in upland areas to control water flow and reduce run-off.</p> <p>Reduce surface run-off from permanent pastures by encouraging reduced livestock densities and ensure animal feeding areas are carefully placed to avoid pollution of watercourses.</p> <p>Continued over...</p> | <p>Regulating water quality</p> <p>Regulating water flow</p> <p>Regulating soil erosion</p> <p>Regulating soil quality</p> <p>Biodiversity</p> <p>Sense of place / inspiration</p> |

¹⁰ Northumbria River Basin Management Plan, Environment Agency (December 2009; URL: www.environment-agency.gov.uk/research/planning/33106.aspx)

| Service | Assets/ attributes: main contributors to service | State | Main beneficiary | Analysis | Opportunities | Principal services offered by opportunities |
|--|---|-------|---------------------|----------|---|--|
| Regulating water quality continued | | | | | <p>...continued from previous.</p> <p>Work with land managers and farmers to encourage/promote nutrient management planning, precision farming, Nitrate Vulnerable Zone updates and one-to-one training.</p> <p>There are opportunities to develop sustainable urban drainage systems in new developments to improve infiltration and water quality.</p> | |

| Service | Assets/ attributes: main contributors to service | State | Main beneficiary | Analysis | Opportunities | Principal services offered by opportunities |
|------------------------------|--|---|------------------|---|--|--|
| Regulating water flow | <p>Rivers, Tyne and Wear and their tributaries</p> <p>Woodland</p> <p>Semi-natural habitats</p> <p>Soils</p> | <p>Main river catchments in this NCA are the Tyne and Wear catchments. Settlements with the greatest fluvial flood risk are Newcastle upon Tyne and Gateshead on the River Tyne and Durham and Chester-le-Street on the River Wear.</p> <p>The headwaters of the rivers Tyne and Wear lie in the Border, Moors and Forests and North Pennines upland NCAs. Here, during periods of heavy rainfall, rapid run-off can cause downstream flooding in the lowlands. The North Pennines NCA is identified as a priority area for woodland planting to reduce downstream flood risk.¹¹</p> <p>A regional water transfer network involving major reservoirs of Derwent Water (North Pennines NCA) and Kielder Water (Border Moors and Forests NCA) provides potable water for the conurbations of Tyneside and Wearside.</p> <p>Predicted sea level rise (climate change), may increase tidal flooding and storm surges, affecting the Tyne estuary.</p> <p>High-density residential and industrial areas in town centres have highly sealed and impermeable surfaces causing rapid run-off and flash flooding.</p> | Regional | <p>Increased risk of run-off from upland NCAs in the North Pennines and Borders, Moors and Forests, may affect the lower stretches of the Tyne and Wear and sustainable moorland management, and woodland planting should be encouraged to improve infiltration of rainfall.</p> <p>There are limited opportunities to address control of flood flows within this NCA, due to the rivers flowing through narrow incised valleys and the high level of urbanisation with engineered channels.</p> <p>The regional water transfer network helps to maintain water flows and to an extent, control flood flows.</p> <p>In large, urban settlements, rapid run-off and flash flooding caused by impermeable surfaces, pressurises underground surface water and sewerage infrastructure, but could be reduced through sustainable urban drainage.</p> | <p>Seek opportunities to promote sustainable moorland management in the adjacent upland NCAs such as grip blocking to preserve peat and reduce downstream flooding and woodland planting on valley slopes to control water flow.</p> <p>Maintain the existing regional water transfer network.</p> <p>Seek opportunities to increase urban green space and woodland cover to intercept and infiltrate rainfall and impede run-off into the drainage systems and rivers.</p> <p>Encourage sustainable urban drainage such as rain gardens, swales and green roofs into new and existing developments to attenuate water and provide wildlife habitats.</p> <p>Create multi-functional flood storage areas and restore water meadows on lowland flood plains, on rivers such as the Derwent and Team, to reduce flood risk and enhance biodiversity and landscape.</p> | <p>Regulating water flow</p> <p>Timber provision</p> <p>Regulating water quality</p> <p>Water availability</p> |

¹¹Yorkshire & North East England Water for Woodland Project, Phase 1: Opportunity Mapping Final Report, Samantha Broadmeadow and Tom Nisbet, Forest Research (March 2013)

| Service | Assets/ attributes: main contributors to service | State | Main beneficiary | Analysis | Opportunities | Principal services offered by opportunities |
|--------------------------------|--|--|------------------|--|--|--|
| Regulating soil quality | Soils Semi-natural habitats | Slowly permeable, seasonally wet, slightly acid, but base-rich loamy and clayey soils cover 58 per cent of the area, and slowly permeable, seasonally wet, acid loamy and clayey soils cover 23 per cent. These soil types are easily damaged when wet suffering compaction and/ or capping. A small proportion of higher carbon soils are associated with limited heathland and wetland habitats in the NCA. | Local | These soils are easily damaged when wet by compaction and capping which can occur when using heavy machinery, over-stocking (poaching) and location of feed or watering points. This reduces the soil quality and capacity for rainfall infiltration which results in sediment run-off. This can be addressed by reducing grazing levels, managing the provision of feed, and increasing the organic content of soils. Arable productivity can increase the risk of compaction and capping of soils as organic matter is reduced. However, this can be improved by adoption of good farming practices and take-up of Environmental Stewardship schemes to maintain good soil structure and increase organic matter. | Encourage sustainable land management practices for arable and livestock production and woodland planting as outlined in climate regulation section. Ensure well-timed cultivations (preferably early autumn) and avoid using farm machinery in wet conditions. | Regulating soil quality Regulating soil erosion Food provision Biodiversity Climate regulation Regulating water quality Regulating water flow Regulating soil erosion |

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|--------------------------------|---|---|------------------|--|--|--|
| Regulating soil erosion | <p>Soils</p> <p>Semi-natural habitats</p> <p>Woodland</p> | <p>The main soil types in this NCA are at low risk of soil erosion, but are easily compacted or capped in wet conditions or where livestock levels are high.</p> <p>There are no priority catchments designated under the ECSFDI.</p> <p>Woodland planting on steep-sided valleys can help reduce soil erosion.</p> | Local | <p>Compaction and capping of soils when wet can damage soil structure and increase erosion by surface water run-off.</p> <p>Opportunities for increased woodland planting can provide shelter from the wind and improve soil strength and stability, thereby reducing erosion.</p> | <p>Encourage sustainable land management practices for arable and livestock production and woodland planting as outlined in the climate regulation section.</p> <p>Ensure well-timed cultivations (preferably early autumn) and avoid using farm machinery in wet conditions.</p> <p>Increase woodland cover, particularly on steep valley sides to improve soil stability while increasing, infiltration of water and strengthening biodiversity and landscape character.</p> | <p>Regulating soil erosion</p> <p>Regulating soil quality</p> <p>Food provision</p> <p>Biodiversity</p> <p>Climate regulation</p> <p>Regulating water quality</p> <p>Regulating water flow</p> <p>Timber provision</p> |

| Service | Assets/ attributes: main contributors to service | State | Main beneficiary | Analysis | Opportunities | Principal services offered by opportunities |
|--------------------|---|---|------------------|--|--|---|
| Pollination | <p>Semi-natural vegetation</p> <p>Estates and parklands</p> <p>Country parks</p> <p>Local Nature Reserves</p> <p>Gardens</p> <p>Roadside verges</p> <p>Woodland</p> | <p>Semi-natural vegetation is fragmented as the NCA is largely urban, but there are gardens, parklands and common land.</p> <p>There are few hedgerows and hedgerow trees dividing highly productive arable land.</p> <p>Woodland cover is low except for steep-sided river valleys, country estates and parklands.</p> | Local | <p>Pollinating insects need a range of semi-natural habitats, particularly species-rich grassland which are few in the NCA. However, there are potential nectar sources from the limited woodlands and hedgerows, and on estates and parkland in rural areas. In urban settlements, the many gardens, along with country parks, common land and road verges can provide further pollination opportunities.</p> | <p>Create a network of habitats that provide nectar sources such as hedgerows, species-rich grassland and broadleaved woodland.</p> <p>Create, restore and maintain existing hedgerows and woodlands.</p> <p>Encourage sustainable farming practices such as uncropped field margins and planting of pollen and nectar mixes that will increase habitat connectivity.</p> <p>Carefully time the management of boundary features and roadside verges to extend flowering time.</p> <p>In urban areas, seek opportunities to encourage wildlife gardens by growing plants that provide nectar sources for pollinators. Replace traditionally planted areas in parks, verges and roundabouts with wildflower meadows.</p> | <p>Pollination</p> <p>Food provision</p> <p>Pest regulation</p> <p>Biodiversity</p> <p>Timber provision</p> <p>Food provision</p> <p>Sense of place / inspiration</p> <p>Tranquillity</p> |

| Service | Assets/ attributes: main contributors to service | State | Main beneficiary | Analysis | Opportunities | Principal services offered by opportunities |
|------------------------|---|---|------------------|---|---|--|
| Pest regulation | Woodland Hedgerows Roadside verges Gardens Estates and parkland | A variety of semi-natural habitats support populations of pest-regulating species (invertebrates, birds and mammals). In the NCA these habitats are fragmented due to urbanisation and agriculture. | Local | There is some evidence to suggest that certain habitats such as hedges, flower-rich buffer strips and unimproved grassland can support populations of beneficial predator species of insects providing nectar and shelter. Scope to create and extend them is limited due to fragmented semi-natural habitats and urbanisation of the area. However, gardens and country parks may offer additional opportunities in urban settlements. | Seek opportunities to support pest-regulating species by increasing hedgerows and field margins around farmed land, planting new woodlands in appropriate areas, promoting wildlife gardening schemes in urban settlements and planting flower-rich grassland on roadside verges. | Pest regulation Pollination Biodiversity Food production Recreation |

| Service | Assets/ attributes: main contributors to service | State | Main beneficiary | Analysis | Opportunities | Principal services offered by opportunities |
|--|---|---|------------------|--|---|---|
| Regulating coastal erosion and flooding | <p>Rocky headlands, sea cliffs, foreshore outcrops</p> <p>Marine environment</p> <p>Intertidal mudflats and salt marsh</p> <p>Sandy beaches</p> | <p>Although small, the coastal area varies from the sandy beaches and sea cliffs of Prior's Haven (Tynemouth) to an estuarine environment characterised by quay walls and intertidal flats at the Fish Quay, North Tyneside.</p> <p>Defended sea fronts backed by cliffs or dunes lie between hard rock headlands and foreshore outcrops. A small part of the coastline is designated (Ramsar, SSSI and SPA).</p> <p>The rock features form partial barriers to movement resulting in formation of individual bays which are relatively independent of each other and erosion is low as sediment transportation is limited due to lack of sediment supply.</p> <p>Historic cliff top erosion rates are also relatively low, reaching a maximum of around 0.3 m per year.</p> <p>Tyneside is a major commercial port for fishing and navigation of sea vessels (sea ferry terminal), with some mineral and waste disposal requiring access to water-borne transport.</p> | Regional | <p>Management of the coastline is supported by two SMPs covering north and south of the Tyne estuary¹² respectively. Both generally recommend a coastal defence policy of 'hold the line' with limited scope for 'no active intervention' and 'managed realignment'.</p> <p>Climate change trends suggest sea level rise and more frequent storm events may exacerbate coastal erosion and flooding. This may lead to loss of intertidal salt marsh and mud flats within the mouth of the River Tyne, dune erosion at Tynemouth Longsands, loss of geological features through cliff erosion, and loss of habitats due to coastal squeeze.</p> <p>In the longer term, there is potential risk of tidal flooding in the lower River Tyne affecting settlements in the Newcastle and Gateshead areas.</p> <p>Where feasible, no further construction of defences should occur, allowing cliffs to erode naturally. However, in South Tyneside, the SMP outlines the need to build greater width into existing defences to protect settlements, which may cause steepening of beaches and loss of amenity.</p> <p>While hard sea defences are required to protect commercial and industrial infrastructure and built heritage, they also limit the extent of coastal habitats which can provide natural defences by absorbing the energy of the tides.</p> | <p>Ensure coastal management policy is fully integrated into regeneration plans along with a sustainable approach to land use planning.</p> <p>Where feasible, seek opportunities to allow natural coastal processes to occur and support policies that protect natural, cultural and built heritage of the coastal area.</p> | <p>Regulating coastal erosion and flooding</p> <p>Regulating water flow</p> <p>Sense of place / inspiration</p> <p>Recreation</p> <p>Tranquillity</p> <p>Geodiversity</p> |

¹² *Northumberland and North Tyneside Shoreline Management Plan 2: Scottish Border to River Tyne*, Environment Agency (May 2009); and *River Tyne to Flamborough Head Shoreline Management Plan 2*, Environment Agency (February 2007)

| Service | Assets/ attributes: main contributors to service | State | Main beneficiary | Analysis | Opportunities | Principal services offered by opportunities |
|------------------------------------|---|--|------------------|--|--|---|
| Sense of place/ inspiration | <p>Native, broadleaved, wooded river valleys</p> <p>Estates and Parkland</p> <p>Green spaces (Local Nature Reserves, country parks)</p> <p>Riverside cities with historic buildings</p> <p>Restored/ reclaimed land/ spoil heaps</p> <p>Extensive conurbations of Tyneside and Wearside and mining villages in south</p> <p>Tyneside port and estuary</p> <p>Coastline of rocky cliffs and limited sandy beaches.</p> | <p>This gently undulating landscape is characterised by well-wooded, incised river valleys and mixed land use, resulting from the reclamation of ex-industrial (coalmining) sites. These have often been transformed into recreational or wildlife sites of woodland plantations, paddocks on former spoil heaps and wetlands on open cast extraction sites but some derelict brownfield sites have developed high biodiversity value.</p> <p>The spreading conurbations of Tyneside have dense networks of road and rail links with an urban fringe of small paddocks, pony grazing and sheds, but further south a more rural character prevails with dispersed settlements and towns and wide stretches of large, regular, arable fields, few hedgerows and pastures.</p> <p>Distinctive historical and cultural riverside cities include Durham with its rich ecclesiastical heritage located on high rock bluff within a sharp meander on the river Wear and densely-wooded, river banks and Newcastle upon Tyne and Gateshead heavily influenced by Victorian industrial heritage and distinguished by a series of dramatic 19th- and 20th-century bridges.</p> <p>A small but varied coastline occurs between Whitley Bay and South Shields of mud, sand and rocky foreshore with fragmentary sand dunes and the heavily modified, Tynemouth estuary has a busy commercial fishing quay and terminal for sea ferries to Norway and Denmark, This is also a conservation area for its important built heritage.</p> | National | <p>Heavily influenced by human intervention, particularly the legacy of coal mining, while semi-natural habitats have reduced and ex-industrial land reclaimed to new uses, these are largely of amenity value and of importance for engaging large urban populations with the natural environment, particularly if they contained semi-natural habitats.</p> <p>The urban conurbations of Newcastle upon Tyne and Gateshead are expanding as pressure for development on the greenbelt for housing, and business continue and city centres are regenerated, particularly along the River Tyne.</p> <p>Urban settlements are a key feature of the NCA and the crossing points of the rivers Tyne and Wear were crucial in developing the cities of Durham and Newcastle which expanded during the industrial revolution along with smaller settlements of Spennymore, South Shields, and mining villages around Durham.</p> <p>Inspiration is offered by the industrial heritage of Newcastle, Tynemouth and the historic core of Durham with its towering cathedral and beech/oak-clad banks of the Wear. Artists inspired by the area include J.M.W. Turner and recently, Antony Gormley and his famous sculpture, 'Angel of the North'.</p> <p>The coastline and marine area offers recreation for visitors and local people and the busy Tyneside port with its ferry services and fishing industry is commercially important.</p> | <p>Seek opportunities to improve the urban fringe through careful design and integration of ex- industrial sites as part of the green infrastructure, ensuring links with the wider countryside.</p> <p>Excepting brownfield sites of high biodiversity value, ensure planning policies support the creation of semi-natural habitats on reclaimed land such as native woodland, grassland, reedbeds, wet pastures and areas of open water and improve access for quiet recreational uses such as walking, cycling and horse riding.</p> <p>Ensure developments respect local settlement patterns, using traditional building materials.</p> <p>Adopt a sustainable approach to land use, planning and management of the shoreline, ensuring that areas of regeneration consider minimal impact on coastal and estuarine habitats and allow for access and enjoyment by walkers.</p> | <p>Sense of place / inspiration</p> <p>Sense of history</p> <p>Recreation</p> <p>Tranquillity</p> <p>Biodiversity</p> <p>Geodiversity</p> <p>Regulating coastal erosion and flooding</p> |

| Service | Assets/ attributes: main contributors to service | State | Main beneficiary | Analysis | Opportunities | Principal services offered by opportunities |
|-------------------------|--|---|------------------|---|---|---|
| Sense of history | <p>Permian rocks overlying Coal Measures</p> <p>Rivers Tyne and Wear</p> <p>World Heritage Sites (Hadrian's Wall and buffer zone, Durham Cathedral and Castle)</p> <p>Tyneside bridges</p> <p>Ecclesiastical monuments</p> <p>Estates and Parklands</p> <p>Medieval settlement patterns and 18th / 19th century mining villages</p> <p>18th century sandstone buildings</p> <p>Victorian mining terraces of brick and slate, post-war housing</p> <p>Tyneside Port</p> | <p>There is evidence of Roman occupation in the eastern end of Newcastle upon Tyne (Hadrian's Wall) and historic Durham City has a strong medieval character with its Norman castle and cathedral rising from incised cliffs of the River Wear.</p> <p>Evidence of the recent industrial past is linked to coal mining including locally prominent, coal spoil heaps and artefacts of mining; waggonways, tramways and coke ovens.</p> <p>Further south, beyond the built up areas, there is evidence of deserted medieval villages and associated ridge-and-furrow.</p> <p>The built heritage includes mid 18th century buildings of local sandstone and grey or red brick mining terraced housing with grey slate roofs.</p> <p>Along the coast, Whitley Bay, Cullercoats, Tynemouth, and North Shields Fish Quay are all conservation areas including 19th and 20th century sea defences and Grade II listed buildings mainly; Fish Quay; North Pier and Lighthouse, Prior's Haven, Tynemouth Priory and the Grand Hotel, Tynemouth.</p> | International | <p>The urban settlements have strong heritage due to the long history of settlement from the Bronze age, Roman (including Hadrian's Wall) to the ecclesiastical monuments of Durham Cathedral and Durham Castle – a reminder of the church's power in the Palantine of Durham.</p> <p>The underlying Coal Measures have been a huge economic asset enabling an extensive period of coal mining from Roman/ medieval origins to the 19th century which transformed the settled landscape. New pithead villages emerged and industrial infrastructure developed. Coal mining along with ship building continued to the 20th century when urban centres such as Newcastle, Jarrow and Gateshead expanded.</p> <p>High quality engineering developed during the Industrial Revolution personified in the Tyne bridges, but those in Durham are of Norman or medieval origin.</p> <p>In 1936, the famous protest march against unemployment and poverty in the north-east of England set out from Jarrow and over 200 people walked 300 miles to Westminster to lobby Parliament.</p> <p>Newcastle upon Tyne and Durham City were built at strategic bridging points across the Rivers Tyne and Wear and have World Heritage Sites; Hadrian's Wall, Durham Castle and Cathedral.</p> <p>Industrial prosperity is reflected in the large number of 18th- and 19th-century country houses, set within parkland in the vicinity of major settlements and post-war housing is prominent in the planned new town of Washington.</p> | <p>Protect and maintain buildings of historic importance and encourage use of traditional building materials and styles in repairing and restoring historic buildings. Conserve the character of mining settlements.</p> <p>Raise awareness and increase interpretation facilities relating to the extensive local history of the area and its national importance in relation to our industrial heritage for local populations and visitors.</p> <p>Protect and maintain buildings of historic importance including Newcastle's Roman and Victorian heritage, the medieval character of Durham. World Heritages Sites (Hadrian's Wall, Durham Castle and Durham Cathedral) and Conservation Areas of Tynemouth.</p> <p>Encourage use of traditional building materials for appropriate developments, contributing to the strong heritage in the NCA.</p> | <p>Sense of history</p> <p>Sense of place / inspiration</p> <p>Recreation</p> <p>Geodiversity</p> <p>Regulating coastal erosion and flooding</p> |

| Service | Assets/ attributes: main contributors to service | State | Main beneficiary | Analysis | Opportunities | Principal services offered by opportunities |
|---------------------|---|--|------------------|--|--|---|
| Tranquillity | <p>Steep-sided river valleys</p> <p>Rivers Tyne and Wear</p> <p>Estates and parklands</p> <p>Tyne estuary</p> <p>Coastline</p> <p>Marine environment</p> <p>Local green spaces (including country parks and Local Nature Reserves)</p> <p>Common land</p> | <p>Most of the NCA has a low tranquillity threshold due to widespread urbanisation. Some of the densest coverage in the north of England occurs in this NCA (CPRE Map of Tranquillity 2006).</p> <p>There are a large number of green spaces throughout the NCA offering recreation and areas of tranquillity. This includes several country estates and parklands on the outskirts of settlements and dramatic riverside walks along the incised river valleys of the Tyne and Wear. There are new open spaces and wetlands created from spoil heaps, some now used as country parks and Local Nature Reserves.</p> | Local | <p>High levels of intrusion (mainly visual and auditory) reduce tranquillity in the NCA. Since the 1960s there has been a significant expansion of disturbed areas along the A1 corridor and around the Newcastle upon Tyne conurbation. Local parks and green spaces such as the Moor in Newcastle and the incised wooded valleys such as are found in county Durham, offer relative tranquillity in a largely urbanised area and are highly valued by the local populations.</p> | <p>Seek opportunities to create more parks, pocket parks, Local Nature Reserves and other green spaces within urban areas, to provide places of relative peace and tranquillity.</p> <p>Ensure new developments close to undisturbed areas and green spaces are sensitively designed, minimising light spill and of sympathetic, visual design.</p> <p>Maintain and increase the extent of woodland cover in appropriate areas and support new community forest schemes to increase woodland cover in urban areas.</p> | <p>Tranquillity</p> <p>Recreation</p> <p>Sense of history</p> <p>Sense of place / inspiration</p> <p>Geodiversity</p> <p>Biodiversity</p> |

| Service | Assets/ attributes: main contributors to service | State | Main beneficiary | Analysis | Opportunities | Principal services offered by opportunities |
|-------------------|--|--|------------------|---|---|--|
| Recreation | <p>Network of public footpaths and bridleways including Hadrian's Wall Path National Trail</p> <p>World Heritage Sites (Hadrian's Wall, Durham Cathedral and Durham Castle)</p> <p>Tyneside coastline</p> <p>Post-industrial restoration sites and country parks</p> <p>Estates and parkland</p> <p>Waldridge Fell (common land)</p> <p>Rivers Tyne and Wear</p> <p>Well-wooded, steep sided valleys</p> | <p>Four percent (1,803 ha) of the NCA is publically accessible with 655 km of public rights of way at a density of 1.4 km per km². There is also 24 km of Hadrian's Wall Path National Trail and a 23 km National Cycle Route (Newcastle to Whitley Bay). There are 15 registered parks and gardens.</p> <p>Restoration of post-industrial sites offer access to valuable greenspace in urban areas and can contribute to improved health and wellbeing.</p> <p>Some country estates set in parkland close to urban settlements may offer visitor opportunities.</p> <p>The urban settlements within the NCA have distinctive character and are internationally important tourist attractions including for their World Heritage sites; Hadrian's Wall, Durham Cathedral and Durham Castle.</p> <p>Regeneration of former quaysides of Newcastle and Gateshead provide vibrant cultural and recreational experiences for local people and visitors.</p> <p>The coastal area is popular with local people and visitors for beach use, watersports and walking.</p> | National | <p>The National Trail (Hadrian's Wall) and Cycle Route offers recreation opportunities for urban dwellers from the city out to the countryside and coast. Post-industrial restoration has resulted in the creation of urban green spaces and country parks linking to networks of footpaths and cycle routes which were originally old wagonways and railway lines from the former coal industry. Former deep cast mining sites have been transformed into amenity ponds and lakes and there are dramatic riverside walks along the rivers Tyne and Wear.</p> <p>Local greenspace provides opportunities for recreation and outdoor education close to where people live, allowing local communities to enjoy the natural environment, take action to improve it and to benefit from the health and social rewards it affords them.</p> <p>There are many country estates set in parkland close to urban settlements in the NCA but most are private residences and not publically accessible, but there may be opportunities to develop tourism initiatives.</p> <p>Continued over...</p> | <p>Seek opportunities to create appropriate access for all abilities to brownfield and urban green spaces for their wildlife and recreational value, and improve links to the network of footpaths and old railway/tram lines onto these sites.</p> <p>Promote opportunities in the urban areas to improve health and wellbeing of local populations through the numerous Walking for Health schemes that operate in the NCA, by allowing people access to their local greenspace through connecting routes in towns and cities such as Newcastle, Gateshead, Durham and the Tynemouth coastal area.</p> <p>Explore opportunities to develop tourism initiatives by working with owners of the many country estates in the NCA.</p> <p>Continued over...</p> | <p>Recreation</p> <p>Sense of history</p> <p>Sense of place / inspiration</p> <p>Regulating coastal erosion and flooding</p> <p>Geodiversity</p> <p>Biodiversity</p> |

| Service | Assets/ attributes: main contributors to service | State | Main beneficiary | Analysis | Opportunities | Principal services offered by opportunities |
|----------------------|--|-------|------------------|---|--|---|
| Recreation continued | | | | <p>...continued from previous.</p> <p>There are many tourism and recreation opportunities in the distinctive towns and cities in the NCA due to its varied history and culture, which includes the legacy of the Industrial Revolution (coalmining and shipbuilding) and the ecclesiastical heritage of Durham with its World Heritage Site.</p> <p>Art and culture flourishes in the NCA including regeneration of the quaysides in Newcastle and Gateshead which have transformed former derelict industrial land and buildings into a thriving public space, particularly the BALTIC Centre for Contemporary Art and The Sage Gateshead music centre, a contemporary, iconic building designed by Norman Foster.</p> <p>Along the coast. Caravan sites are scattered along Tynemouth and popular resorts include Whitley Bay and South Shields for beach use, watersports and walking.</p> | <p>...continued from previous.</p> <p>Improve interpretation along key locations along the rivers Tyne and Wear and along the coast including the potential for a coastal heritage trail in North Tyneside.</p> <p>Protect the NCA's key assets that make it an important visitor destination by supporting good development and design that is sympathetic to the built and natural heritage of the area.</p> | |

| Service | Assets/ attributes: main contributors to service | State | Main beneficiary | Analysis | Opportunities | Principal services offered by opportunities |
|---------------------|---|--|------------------|---|---|--|
| Biodiversity | <p>Northumbria Coast Ramsar and SPA</p> <p>Northumbria Heritage Coast</p> <p>Waldridge Fell and Tynemouth to Seaton Sluice SSSI</p> <p>River valleys of semi-natural oak or oak-birch woodlands</p> <p>Wooded parklands and estates</p> <p>Lowland heathlands</p> <p>Lowland meadows</p> <p>Reedbeds, mudflats and salt marsh</p> <p>Rocky headlands, sea cliffs and foreshore outcrops</p> <p>Continued over...</p> | <p>Parts of the coastal area are internationally designated because of important numbers of wintering shore birds including North Tyneside's intertidal habitats which provide winter feeding and roosting habitats for wading birds.</p> <p>The coastal area contains Northumberland Shore SSSI and Tynemouth to Seaton Sluice SSSI and supports important numbers of breeding little tern, while along the rocky and shore and man-made structure of South Shields pier large numbers of turnstone and purple sandpiper and local numbers of knot, ringed plover and golden plover can be found.</p> <p>Waldridge Fell SSSI is an important relic of lowland heath</p> <p>Fragmented priority habitats occur in isolated areas of wet woodland, lowland heath, lowland mixed deciduous woodland, fens and small areas of intertidal habitats, all of which cover less than 1 per cent of the NCA.</p> <p>Although, the largest semi natural habitat is broadleaved, mixed woodland.</p> <p>The limited extent of species-rich neutral grasslands is predominantly managed as pasture for cattle or horses with minimal inputs of fertiliser.</p> <p>An important relic of lowland heath survives at Waldridge Fell, containing Wanister Bog, a valley mire supporting bog mosses, cotton grass, rushes and sedges.</p> <p>Continued over...</p> | International | <p>Within rural areas, several well-wooded parklands and estates contain broad-leaved, mixed plantations and mature specimen trees and rivers valleys contain semi-natural oak or oak-birch woodlands. Such woodlands should be maintained ensuring that young trees replace over mature stock.</p> <p>Species-rich grassland could be restored and maintained by engaging farmers and landowners.</p> <p>Some river flood plains hold pockets of fen, reedbed and species-rich grasslands and Waldridge Fell SSSI has one of the largest and most diverse lowland heathland in the north-east of England which could be buffered by a network of habitats to improve its condition.</p> <p>Although priority habitats are limited, due to industrial/ urban development, there is always further potential for restoration, linking green spaces through linear routes such as old wagonways and railway lines.</p> <p>Subsidence ponds tend to be of average nutrient status and generally support aquatic and marginal vegetation and provide roosting or feeding sites for waterbirds.</p> <p>The rivers Tyne and Wear and their tributaries provide important wildlife links through the NCA including marginal vegetation and extensively wooded banksides.</p> <p>Continued over...</p> | <p>Plant new native woodlands to help reverse woodland losses, in particular looking for opportunities to link existing fragmented sites and expand and buffer small isolated woodlands.</p> <p>Through agri-environment schemes, where appropriate protect woodlands from browsing by livestock or wild animals in order to ensure growth of young trees.</p> <p>Encouraging farmers and landowners to establish permanent grassland strips alongside water courses and field margins and on highly cultivated land, to adopt practices that reduce reliance on high levels of fertiliser application.</p> <p>Maintain areas of lowland heath by scrub clearance or low intensity grazing, controlled burning or mechanical management to avoid grassland encroachment and provide buffers to the SSSI by creating other semi-natural habitats around it.</p> <p>Incorporate more greenspace in urban areas, making links with the countryside by creating habitats in corridors such as roadside verges, old wagonways, railway lines and rivers and extend species rich grasslands and native woodlands on existing and new reclamation sites.</p> <p>Continued over...</p> | <p>Biodiversity</p> <p>Climate regulation</p> <p>Regulating soil erosion</p> <p>Regulating soil quality</p> <p>Regulating water quality</p> <p>Recreation</p> <p>Sense of place / inspiration</p> |

| Service | Assets/ attributes: main contributors to service | State | Main beneficiary | Analysis | Opportunities | Principal services offered by opportunities |
|-------------------------------|--|---|------------------|---|--|---|
| Biodiversity continued | <p>...continued from previous</p> <p>Rivers (Tyne, Wear, Derwent, Browney)</p> <p>Brownfield sites of high biodiversity value</p> | <p>...continued from previous</p> <p>While there are few natural water bodies, subsidence ponds have formed in the hollows created by the collapse of underground mine workings.</p> <p>The Tyne estuary falls largely within a well developed, urban environment but still supports important riverside habitats. The River Tyne is an important wildlife corridor providing habitat for wading birds, otters and a key migration route for salmon.</p> <p>Dune grasses found at Tynemouth, Longsands are fragmented.</p> <p>Urban structures have provided roosting or nesting sites for seabirds and derelict industrial sites have developed rare habitats and have benefited species such as the dingy skipper butterfly.</p> <p>Local urban green spaces such as country parks and Local Nature Reserves provide communities with access to biodiversity and some derelict, industrial sites have developed unique biodiversity interest meeting priority habitat criteria for open mosaic habitats.</p> | | <p>...continued from previous</p> <p>Intertidal salt marsh and mud flats provide roosting habitats but these are vulnerable due to coastal squeeze and erosion including the dunes at Tynemouth Longsands.</p> <p>Engineering structures have become important features for bird life. Kittiwakes nest under the Tyne Bridge and breed on other quayside buildings, including the BALTIC Centre for Contemporary Art, and on Gateshead's purpose built Kittiwake Tower. The South pier is used by a range of sea birds and is a notification feature of the SPA.</p> <p>Throughout the NCA, sites containing open mosaic habitat on previously developed land are found. These are important biodiversity resources recreating fragmented habitats and supporting rare and scarce invertebrates. Development and inappropriate restoration will lead to losses.</p> <p>Local green spaces in urban areas have potential to offer local communities involvement in biodiversity and the monitoring, planning and management of sites close to where they live and work.</p> <p>Some derelict industrial sites have naturally colonised and developed mosaic habitat often supporting pollinators. Butterflies (dingy skipper) and birds, including nesting and roosting by sea birds and priority species such as house sparrow and starling.</p> | <p>...continued from previous</p> <p>Maximise opportunities to engage urban populations, with biodiversity, for example by enhancing the biodiversity value of urban green spaces and actively engaging the local community.</p> <p>Resist the loss of valuable brownfield sites, provide public access onto them and undertake site management to maintain their open character.</p> <p>Minimise disturbance to breeding seabirds and wintering waders along the coast and estuary by encouraging the zoning of activities/sensitive usage of the area.</p> <p>Seek opportunities to enable local communities to participate in conservation activities through events and volunteering in local green spaces such as country parks and Local Nature Reserves.</p> <p>Seek opportunities on brownfield sites of high biodiversity value to become Local Wildlife Sites for the benefit of local communities and wildlife conservation.</p> | |

| Service | Assets/ attributes: main contributors to service | State | Main beneficiary | Analysis | Opportunities | Principal services offered by opportunities |
|---------------------|--|---|------------------|---|--|--|
| Geodiversity | <p>Upper Carboniferous, Coal Measures overlain by glacial deposits</p> <p>Rocky headlands, sea cliffs, foreshore outcrops</p> <p>Tynemouth to Seaton Sluice SSSI</p> <p>Marine environment</p> | <p>The underlying geology on the coast is relatively soft Middle, Upper Carboniferous, Coal Measures overlain by glacial deposits which have been reworked by sea level rise following the last ice age.</p> <p>Permian rocks overlie Coal Measures cropping out in small areas where they form sea cliffs and individual bays.</p> <p>In the later glacial period, temporary lakes formed with local deposits of fine silt and clay accumulation. These laminated clays have been extensively worked for brick making in the Birtley area. Post-glacial windblown sands occur on the low-lying coast at South Shields.</p> <p>From Tynemouth to Seaton Sluice, the area is designated a geological SSSI and is one of the best exposures of Coal Measures strata in Great Britain.</p> <p>Two Local Nature Reserves provide additional interest mainly; Clara Vale and Marsden Quarry.</p> <p>Glaciation altered drainage patterns by blocking the original northward route of the river Wear diverting it eastwards. In the county of Durham it cut down into the valley floor, creating narrow steep-sided gorges and denes.</p> | National | <p>Tynemouth to Seaton Sluice SSSI is of considerable importance for interpreting the palaeogeographical structure of Britain during the Middle Carboniferous period.</p> <p>Climate change predictions of sea level rise may result in loss of geological features through cliff erosion, drainage issues and wave action. Hard sea defences can also interfere with natural coastal processes which would otherwise reduce the impact of wave action and erosion.</p> <p>Increased flow of streams during peri- and post-glaciation caused severe down-cutting of existing river courses which is illustrated by the incised meander gorge of the River Wear at Durham providing educational opportunities about this geological feature to visitors, schools and colleges.</p> <p>The underlying Coal Measures have brought prosperity to the NCA through the coal mining industry and have shaped the landscape as part of the area's industrial heritage as well as contributing to the expansion of Newcastle and Gateshead.</p> <p>Clara Vale Local Nature Reserve provides evidence of the coal mining heritage while Marsden Quarry reveals Magnesian Limestone cliffs, the result of past quarrying activities.</p> | <p>Explore opportunities to for interpretation, education and research into the geodiversity and key glacial features of the NCA, which will contribute to the sense of place as well as to understanding and enjoyment of the history and geodiversity of the area.</p> <p>Provide interpretation about the history and culture associated with ex-mining sites for local communities and visitors linked to the geology of the area.</p> <p>Seek opportunities for research, education and interpretation including establishing geological links to the history and culture associated with industrial heritage such as the Tynemouth to Seaton Sluice, geological SSSI, and inland, exposed geology of disused quarries and shaping of the landscape associated with the last ice age through visible glacial tills along the coast, incised meander and gorges of the Wear and the Denes.</p> | <p>Geodiversity</p> <p>Recreation</p> <p>Sense of history</p> <p>Sense of place / inspiration</p> <p>Tranquillity</p> |

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